

## NATIONAL CLASSIFICATION OF OCCUPATIONS

## DIVISION-2

## PROFESSIONALS

Professionals increase the existing stock of knowledge, apply scientific or artistic concepts and theories, teach about the foregoing in a systematic manner, or engage in any combination of these three activities. Most occupations in this division require skill at the fourth skill level.

**21 PHYSICAL, MATHEMATICAL AND ENGINEERING SCIENCE PROFESSIONALS**

Physical, mathematical and engineering science professionals conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to fields such as physics, astronomy, meteorology, chemistry, geophysics, geology, mathematics, statistics, computing, architecture, engineering and technology.

**211 PHYSICISTS, CHEMISTS AND RELATED PROFESSIONALS**

Physicists, Chemists and related professionals conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to physics, astronomy, meteorology, chemistry, geophysics, and geology.

**2111 PHYSICISTS AND ASTRONOMERS**

Physicists and astronomers conduct research improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to physics and astronomy, in industry, medical or other fields.

**2111.10 Physicist, General** conducts theoretical and experimental studies and research in different branches of physics such as gravitation, structure and properties of matter, heat, light, sound, electricity, magnetism, electronics, atomic and nuclear physics, biophysics, astrophysics, and geophysics to formulate theories of physical phenomena and to solve industrial and technical problems. Studies theory and experiments with physical properties of solids, liquids and gases. Performs experiments on laws of motion, electricity, centre of gravity, liquid pressure etc., to identify and measure elements of matter and energy and their interaction. Applies results to formulate theories of physical phenomena, solve industrial and technical problems and for making delicate instruments and testing equipment. Undertakes study of applied physics for understanding analysis data,

Solar stellen and astrophysics, biological and geophysical phenomena, etc. May specialize in one or more branches of physics such as mechanics, heat, light, sound, electronics, aero and hydrodynamics, or use of X-Rays in testing of materials.

**2111.15 Physicist, Mechanics** conducts theoretical and experimental studies and research in fields of mechanics such and aero dynamics, hydrodynamics, elasticity, hydrostatics, ballistics, etc., to formulate theory of physical phenomena and solve industrial and technical problems. Performs basic tasks similar to those of **Physicist General** and conducts theoretical and experimental studies and research in different fields of mechanics using appropriate instruments, apparatus and equipment. Analyses data and formulates theories of physical phenomena and solves industrial and technical problems relating to hydrostatic, gravitation aerodynamics, hydrodynamics, ballistics, elasticity, use of high pressure or high-vacuum, control and efficiency of mechanical instruments and measuring devices, etc. May specialize in one or more branches of mechanics.

**2111.20 Physicist, Heat** conducts theoretical and experimental research and studies in

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branch of physics concerning heat to formulate theories on its physical phenomena, and to solve connected industrial and technical problems. Performs basic tasks similar to **Physicist General**, conducts theoretical and experimental studies and research in generation, application or withdrawal of heat such as those connected with calorimetry, thermodynamics, high and low temperature effects, temperature measurements, and radiation. Analyses data and effects on physical state and evolves theories and formulae for designing heat engines, temperature recording instruments, application of heat, maintenance of temperature, cooling devices and other industrial and technical problems. May specialize in any particular branch of research on problems relating to heat.

**2111.25 Physicist, Light** conducts theoretical and experimental studies and research on transmission and projection of light and other optical problems for formulation of theories on light and to apply them to industrial and technical uses. Performs basic tasks similar to **Physicist General**, conducts studies and experiments on transmission and projection of light and optical problems using lenses, mirrors, prisms, projectors and other appropriate apparatus, instruments and equipments. Analyses data, formulates theories and evolves formulae for designing optical instruments, solving optical problems and application to industrial and technical uses. May specialize in any particular branch of light such as illumination, spectroscopy, collometry, optics, photography, polarized light, photometry, and infra and ultra rays.

**2111.30 Physicist, Sound** conducts theoretical and experimental studies and research in field of acoustics to formulate theories and solve various industrial and technical problems connected with generation, propagation, dispersion and reception of sound waves. Performs basic tasks similar to **Physicist General**, conducts studies and experiments for recording frequency, amplitude and compression of sound waves, using amplitude detector, frequency modulation detector, amplifiers, automatic recorders. Analyses data and evolves scientific theories for designing

delicate sound recording and propagating instruments, vibration recorders, musical instruments etc. May specialize in any particular branch of sound such as broadcasting, transmitting, reception, musical instruments, etc.

**2111.35 Physicist, Electricity and Magnetism** conducts theoretical and experimental studies and research in fields of electricity and magnetism to formulate theories, evolve formulae and solve related industrial and technical problems. Performs basic tasks similar to **Physicist General**, conducts studies and research in various fields of electricity and magnetism such as direct and alternate electrostatics, electromagnetism, electric currents, magnetic and electric fields, electrical generators and motors, electrical measuring instruments, radiation from high frequency circuits, electromagnetic induction, flow of electricity conductors, and insulators, using appropriate apparatus and equipment such as ammeters, voltaic cells, voltmeters, galvanometers, magnetic compass, variable resistances, magnets, potentiometer and arc lamps. Analyses observations and readings, formulates theories, evolves formulae and applies them to design magnetic and electrical equipment, to solve industrial and technical problems, and in fields of electro-chemistry, X-Ray, heat and electronics. May specialize in particular field of electricity and magnetism.

**2111.40 Physicist, Electronics** conducts theoretical and experimental studies and research on electronics to formulate theories and evolve electronic laws and formulae for designing electronic equipments and solve industrial and technical problems. Performs basic tasks similar to **Physicist General**, conducts theoretical and experimental studies and research in fields of electronics such as reception and transmission of electro magnetic waves, cathode rays, radiology, physiotherapy, and electronic signals for designing wireless receiving and transmission equipment, X-Ray electron microscopes, television, radio navigational aids, radar, electronic calculating machines electronic tubes, electronic equipment for civil, medical and defence purposes and to solve industrial and technical problems. May specialize in any particular field of

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electronics such as electron optics, electron emission, fluorescent materials, photo-electric cells, radio, circuits, microwaves, and electronic brain computers.

**2111.50 Physicist, Nuclear; Physicist, Atomic** conducts theoretical and experimental studies and research in fields of nuclear physics to formulate and apply theories in atomic fields for peaceful purposes. Performs basic tasks similar to **Physicist General**, conducts research and studies in atomic fields such as nuclear structure and disintegration, measurements and separation of isotopes (elements having very similar chemical and physical properties but slightly different in atomic weights), generation of high velocity particles and X-Ray crystallography. Analyses observations and data and evolves theories and designs for nuclear generation of power, fission and fusion of atoms, medical use and other purposes. May specialise in any particular field of nuclear physics.

**2111.60 Astronomer:** Astrophysicist studies, sizes, shapes, position, masses, movement and other characteristics of heavenly bodies such as moon, planets and stars, and interprets solar and stellar prominences and other celestial phenomena. Observes celestial bodies with telescopes fitted with complex devices such as spectrosopes, photometers, bolometers and other photography and radiation-recording instruments and records observations. Computes position and orbits of stars, planets, comets and asteroids. Takes photographs of sun in calcium and hydrogen lights to locate sun spots and eruption. Interprets data regarding size, composition, position, temperature etc. of planet and other heavenly bodies at given times for use by air and sea navigators. Publishes results of observations and solar prominences, dark marking and other phenomena. Sends periodical messages to research centers regarding solar and geomagnetic observations, behavior and other phenomena of sun and moon during particular periods (International geophysical year). May undertake research in special fields. May specialise in particular fields and activities such as cosmic rays, ozone, radio astronomy etc.

**2111.90 Physicists and Astronomers, Other** include all other physicists and astronomers working in other fields of physics and astronomy such as those engaged in controlling, testing and analyzing physical and astronomical properties or in developing experimental, testing and recording equipment, not elsewhere classified.

**2112 METEOROLOGISTS**

Meteorologists conduct research, improve or develop concepts, theories and operational methods related to the composition, structure and dynamics of the atmosphere, and prepare detailed or long term weather forecasts used in aviation, shipping, agriculture and other areas and for the information of the general public.

**2112.10 Meteorologist** studies, compiles and interprets weather data, forecast changes in weather over short and long periods and supplies metrological information for various interests such as agriculture, aviation, etc. Sets up metrological post equipped with special devices and equipment such as barometer, thermometer, anemometer, hygrometer, humidity recorders, balloons, and radio-theodolite. Observes and records readings from equipment and analyses them to determine barometric pressure, temperature and moisture content of air, fog and snow, direction and speed of wind, rainfall and atmospheric ozone. Interprets data and forecasts changes in weather conditions for agricultural, navigation, scientific, aviation and other purpose. Informs aerodrome authorities about weather conditions for safety of planes in flight. Prepares weather charts and maps indicating climatic and weather conditions. Checks recording instruments, hydrogen balloons, equipment and accessories periodically and ensures their accuracy and correct performance. May undertake research in specific fields and specialise in any particular branch of metrology such as solar and stellar observation or radio astronomy. Is designated as **Climatologist**, if engaged in compiling and interpreting data on temperature, sunlight, rainfall, humidity and wind for forecasting weather conditions. Is designated as **Aeronautical Meteorologist**, if engaged in forecasting weather changes

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for aircraft flights stressing atmospheric conditions such as winds, aloft, ceiling, visibility, cloud formation etc. Is designated as **Hydro-meteorologist**, if engaged in analyzing problems of formation and movement of water particularly relating to flood control, hydroelectric power, irrigation and similar field of engineering and water resources. Is designated as **radio-meteorologist**, if engaged in propagation of radio engineering through atmosphere by use of radio and radar equipment in metrology and as **Aerologist**, if engaged in studying phenomena of upper air for use of Pilots proposing high altitude flights.

**2112.90 Meteorologists, Other** include meteorologists who conduct research, improve or develop concepts, theories and operational methods related to the composition, structure and dynamics of the atmosphere, and prepare detailed or long term weather forecasts used in aviation, shipping, agriculture and other areas and for the information of the general public not else where classified.

**2113 CHEMISTS**

Chemists conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to chemistry mainly to test, develop and improve materials, and industrial products and processes.

**2113.10 Chemist, General** conducts chemical analysis, synthesis, research and sampling of solids, liquids or gases to determine their composition, properties, physical and chemical changes as means of developing new products effecting improved production process and advancing scientific knowledge. Tests samples of materials or substances by various chemical means such as dissolving them in solvents observing changes from application of heat, pressure or vacuum from reaction to acids, standard reagents (gases and chemicals), and from precipitation, filtration, dehydration and cooling to determine their properties. Conducts quantitative, qualitative, ion exchange, and micro-chemical analysis, microscopic analysis, electronic hydrogen ion measurement, component separation by electrolysis, etc. to find physical and

chemical composition, crystalline structure, pH values, optical activity, behavior of ions and other characteristics of samples. Assesses results of experiments and conducts any additional research needed to devise or improve methods of production, perfect formulae, develop new products or for further knowledge in field. May control chemical processes and production methods and supervises performance of **Laboratory Assistants, Chemical**. May guard against explosions and accidents. May interpret findings statistically. May specialise in particular field of work.

**2113.20 Chemist, Organic** conducts analysis tests, and experiments on organic carbon compounds such as petroleum, dyes, and rubber to determine their properties, structure and other characteristics for improving production processes or for advancing technical knowledge. Performs basic tasks similar to **Chemist General** utilizing appropriate chemical processes depending on nature of test or experiment. Assesses results obtained to find new compounds, perfect formula, effect improvement in production processes or to further develop research purposes. May specialise in particular branch of organic chemistry such as petroleum, dyes, rubber, alcohol, oils, natural fats, organic acids, pesticides, organic compounds and their polymerization and precipitate products, plastics and soaps.

**2113.30 Chemist, Inorganic** conducts analysis tests and experiments on inorganic substances such as metals, acids, salts and gases to determine their properties reactions, and other characteristics. Performs basic tasks like **Chemist General** utilizing chemical processes according to nature of test or experiment such as distillation, evaporation, filtration, detection of cations and anions (positive and negative ions), and salt analysis. Assesses results to find different constituents of compounds and solutions, their strength, optical activity etc., for sampling, in order to develop new compounds, improve production procedures or increase technical knowledge in research field. May specialise in particular field of work such as production acids, salts, minerals and metals or in laboratory research and analysis work.

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**2113.40 Chemist, Physical** conducts tests and experiments with metal ores, gases and different chemical elements and compounds to ascertain their physical and chemical properties, radio activity, structures, atomic and molecular weight etc., by application of electro-chemistry thermodynamics and various physico-chemical processes. Performs basic tasks similar to **Chemist General** using instruments and apparatus such as sensitive balances, spectroscope, microscope, X-Ray, pressure and temperature measuring devices, depending upon type of test or experiment. Analyses readings and assesses results by applying principles of electro-chemistry, thermodynamics periodic classification of elements, atomic theory, chromatography (Qualitative and quantitative measurements of ions) to determine physical and chemical properties, atomic weight, atomic structure, pH value, radio activity, relationship in periodic classification table, characteristics, reaction at different temperature and pressures fission and fusion of atoms, change of state of solid, liquid and gases etc., for advancement of research knowledge and for improvement of production processes. May specialise in particular branch of physical chemistry.

**2113.50 Chemist, Analytical** conducts chemical analysis of inorganic and organic samples to ascertain their composition, reaction and properties. Performs basic tasks like **Chemist General** using instruments apparatus and standard reagents in laboratory such as spectroscope, pressure and temperature recording devices, desiccators, balances, acids, alkalizes, and standard solution indicators to determine composition, strength or conformity with prescribed standards to ascertain presence or absence of particular element. Analyses findings and submits report to medical or other authorities. May do statistical interpretation of observations.

**2113.60 Chemist, Industrial** analyses at different stages of production samples of heavy chemicals, hydrogenation of oils, fertilizers, cosmetics etc., to ensure stipulated correct chemical composition of end product. Studies chemical properties of raw ingredients, chemical reactions being effected, and composition of final product to

determine most economic qualitative and quantitative production processes. Applies findings in collaboration with production manager and **Chemical Engineer**. Prescribes rate of feeding of raw materials tests samples at different stages of production, regulates chemical reactions by various processes such as application or pressure or vacuum, introduction of catalyst (substance which causes chemicals to react but which itself is not involved), evaporation, and filtration to ensure stipulated qualitative and quantitative control. Tests samples of final product and makes any needed adjustments in manufacture process to maintain prescribed standards. May suggest alterations or modifications in plant and lay out designs to improve production process. May specialise in any particular branch of work.

**2113.70 Chemist, Pharmaceutical;** directs and supervises manufacture of drugs and other pharmaceutical products such as tablets, syrups, ointments etc. according to prescribed formulae. Assembles various chemical ingredients in required quantities to prepare medical compounds according to prescription of **Physicians, Dentists and Veterinarians**, and analyses them if necessary, to ascertain their conformity to prescribed standards. Mixes ingredients according to standard formulae either manually or by mechanical devices. Conducts analysis at different stages of production and of final products to ensure that they conform to specifications. Performs experiment to formulate new pharmaceutical combinations, develops new products and studies their stability. Supervises production and carries out investigation to improve manufacturing process for syrups, drugs, antibiotics, vitamins, vaccines etc. Procures pharmaceutical products and ensures their proper storing in specified conditions. May work as **Medical Representative** by explaining composition and uses of drugs to customers in order to increase sales.

**2113.80 Chemist, Forensic Science** applies scientific principles to analysis, identification, and classification of mechanical devices, chemical and physical substances, materials, liquids, or other physical evidence related to criminology, law enforcement, or investigative work:

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Searches for, collects, photographs, and preserves evidence. Performs variety of analytical examinations, utilising chemistry, physics, mechanics, and other sciences. Analyses items, such as paint, glass, printed matter, paper, ink, fabric, dust, dirt, gases, or other substances, using spectroscope, microscope, infrared and ultraviolet light, microphotography, gas chromatograph, or other recording, measuring, or testing instruments. Identifies hair, skin, tissue, blood, bones, or human organs. Examines and classifies explosives, firearms, bullets, shells, and other weapons. Interprets laboratory findings relative to drugs, poisons, narcotics, alcohol, or other compounds ingested or injected into body. Reconstructs crime scene, preserving marks or impressions made by shoes, tires, or other objects by plaster or moulage casts. Prepares reports or presentations of findings, methods, and techniques used to support conclusions, and prepares results for court or other formal hearings. May testify as expert witness on evidence or crime laboratory techniques. Confers with experts in such specialties as ballistics, fingerprinting, handwriting, documents, electronics, metallurgy, biochemistry, medicine, or others.

**2113.90 Chemists, Other** include all other chemists performing laboratory tests, analysis and experiments such as those engaged in agricultural chemistry, geochemistry, etc., not elsewhere classified.

## **2114 GEOLOGISTS AND GEOPHYSICISTS**

Geologists and geophysicists conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to geology and geophysics in such fields as oil, gas and mineral exploitation, water conservation, civil engineering, telecommunications and navigation.

**2114.10 Geologist** studies physical structure of earth's crust, its rock formations and fossils to determine earth's history, gradual changes and development or to locate minerals and fuels. Conducts exploratory geological survey using special instruments and techniques such as air survey and air-photo mapping and geo-chemical and

geophysical prospecting methods to locate deposits of mineral, oil and gas. Supervises drilling operations in areas of economic mineral deposits. Collects samples of minerals or rocks at various depths for detailed study to determine their formulation and quality and quantity of deposits. Evaluates extent of deposit for commercial exploitation and under-takes and coordinates various activities relating to drilling, testing, development and production. Prepares reports, maps and diagrams showing out crops of rocks and ore bodies and their various geological structures. Advises on suitability of soils and rocks for construction of dams, tunnels, roads, buildings, etc., and on strength of foundation necessary. Renders advice on problems of underground water reservoirs. Studies natural phenomena such as earthquakes, volcanoes, glaciers and mountain building for advancement of knowledge and research on gradual changes and development of earth's crust. May combine teaching with research and administrative work when employed by college or university. May be designated according to field of duties such as **Exploration Geologist, Test Geologist, Development Geologist and Resident Geologist.**

**2114.15 Geologist, Petroleum** Explores and charts stratigraphic arrangement and structure of earth to locate gas and oil deposits: Studies well logs, analyzes cores and cuttings from well drillings, and interprets data obtained by electrical or radioactive well logging and other subsurface surveys to identify earth strata. Examines aerial photographs, evaluates results of geophysical prospecting, and prepares surface and subsurface maps and diagrams depicting stratigraphic arrangement and composition of earth and probable deposits of gas and oil. Recommends acquisition, retention, or release of property leases or contracts. Estimates oil reserves in proven or prospective fields, and consults with PETROLEUM ENGINEERS (petrol. & gas) concerning drilling and production methods. May direct drilling of shallow exploratory wells.

**2114.20 Petrologist** studies composition, structure and genesis of rocks and minerals forming earth's crust. Studies thin section of

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rocks and minerals using microscopes. Traces causes of rock and mineral formation on basis of microscopic studies, pattern of sedimentation etc. Makes genetic classification of rocks and reconstructs geological history of sedimentation and igneous activities. May advise on economic exploitation and composition of rocks and indicate likely pattern of ore and mineral concentration.

**2114.30 Paleontologist** studies fossilized remains of plants and animals founding geological formations in order to trace historical sequence of evolution and development of past life and to identify geological formations according to their nature and chronology. Visits different areas and studies earth and rock formations, nature of soil, etc. Collects fossilized specimens from geological formations using special tools such as hammer, sickle, etc. and classifies them according to botanical and zoological families and probable age. Prepares treatises on findings giving evaluation of life, formation of earth and sea and other geological data to aid location of natural resources such as petroleum bearing formations or coal. May maintain fossil specimens as museum exhibits. May also study plants fossils.

**2114.40 Geophysicist** studies seismic, gravitational, electrical, thermal and magnetic phenomena to determine structure and composition of earth and its environment in space. Investigates origin, location and activities of glaciers and volcanoes and characteristics of earthquakes. Prepares charts of oceans, takes related measurements concerning shape and movement of earth and acoustic, optical and electrical phenomena in atmosphere using precision instruments such as seismograph, magnetometer, gravimeter etc. to measure transmission of vibrations through earth's interior, magnetization of different kinds of rocks and pull of gravity. Applies electromagnetic, magnetic, gravity and seismic tests and other research data to locate petroleum, mineral deposits and other structural features. Selects fixed points on surface of earth for use in making navigational charts and maps. Predicts radio-communication and atmospheric conditions. Develops water supply and flood-control programmes. May

specialise in particular branch of geophysics and be designated according to field of work such as **Exploration Geophysicist or Development Geophysicist.**

**2114.50 Hydrologist** Studies distribution, disposition, and development of waters of land areas, including form and intensity of precipitation, and modes of return to ocean and atmosphere: Maps and charts water flow and disposition of sediment. Measures changes in water volume due to evaporation and melting of snow. Studies storm occurrences and nature and movement of glaciers, and determines rate of ground absorption and ultimate disposition of water. Evaluates data obtained in reference to such problems as flood and drought forecasting, soil and water conservation programmes, and planning water supply, water power, flood control, drainage, irrigation, crop production, and inland navigation projects.

**2114.55 Hydrographer, Waterworks** Analyses hydrographic data to determine trends in movement and utilization of water: Reads meters and gauges to measure waterflow and pressure in streams, conduits, and pipelines, and records data. Measures water level in lakes, reservoirs, and tanks. Calculates seepage and evaporation rates for dams and reservoirs. Measures depth of water in wells and test holes to determine ground water level. Measures snow characteristics to evaluate water yield from snow runoff. Prepares graphs and charts to illustrate water patterns. Positions sluice gates to direct water onto spreading grounds. Installs, calibrates, and maintains metering instruments. Recommends locations for metering stations and instrument placement.

**2114.60 Mineralogist** examines, analyses and classifies minerals to determine their composition and internal structure. Conducts microscopic, X-Ray, Spectroscopic and other examinations of mineral to determine their composition. Does chemical analysis of minerals and renders advice on economic exploitation of mineral deposits.

**2114.70 Seismologist** investigates phenomena relating to earth, cause and effects of earthquakes and other seismic activities using seismographs and other instruments for registering earthquakes.

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Designs, develops and calibrates seismographic instruments according to degree of sensibility and type of data required. Supervises selecting of sites and setting of seismoscopes. Collects and analyses data recorded by seismographs to locate epicenter of earthquake, depth of focus, intensity and frequency of impulses, etc. Processes data and disseminates conclusion by issuing bulletins and reports. Conducts studies at important earthquake sites to determine intensity of earthquake and other seismic phenomena. Locates faults in earth crust structure and prepares detailed seismic zonal maps. Conducts field studies by evaluating nature of damage through explosive seismology to evolve suitable seismic design co-efficient for structures like dams and buildings to counter-balance destructive effects of seismic phenomena to locate important faults in earth crust structure and geology, and to advance explanation of seismic phenomena. May conduct seismological investigation in exploration of ores and oil deposits.

**2114.80 Oceanographer** studies characteristics of oceans for use in navigation, geography, meteorology and other sciences. Makes oceanic explorations to gather data on configuration and nature of ocean bed and such phenomena as tides, currents and icebergs. Makes chemical analyses of bottom mud and seawater at various depths. Maps deposition of sand on beaches. Studies and summaries exploration data to develop a comprehensive and unified picture of oceanic behaviour.

**2114.90 Geologists and Geophysicists, Other** include all other Geologists and Geophysicists, performing research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to geology and geophysics in such fields as oil, gas and mineral exploitation, water conservation, civil engineering, telecommunications and navigation not else where classified.

### 2119 PHYSICAL SCIENTISTS, n.e.c

Workers in this Family perform various activities in the field of physical science, and are not elsewhere classified. Their functions include: studying constitution,

structure and history of earth's crust; seismic, gravitational, electrical, thermal and magnetic phenomena to determine structure and composition of earth, and forces causing movement and wrapping of its crust; size, masses, shapes, positions, distances, motions, orbits, characteristics, composition and structure of heavenly bodies; weather conditions, and forecasting changes in weather.

**2119.10 Metrologist** Develops and evaluates calibration systems that measure characteristics of objects, substances, or phenomena, such as length, mass, time, temperature, electric current, luminous intensity, and derived units of physical or chemical measure: Identifies magnitude of error sources contributing to uncertainty of results to determine reliability of measurement process in quantitative terms. Redesigns or adjusts measurement capability to minimize errors. Develops calibration methods and techniques based on principles of measurement science, technical analysis of measurement problems, and accuracy and precision requirements. Directs engineering, quality, and laboratory personnel in design, manufacture, evaluation, and calibration of measurement standards, instruments, and test systems to ensure selection of approved instrumentation. Advises others on methods of resolving measurement problems and exchanges information with other metrology personnel through participation in government and industrial standardization committees and professional societies.

**2119.20 Material Scientist** Conducts scientific studies for understanding, characterizing and developing materials leading to potential uses for the benefit of science and emerging technologies: Conducts programmes for studying structures and properties of various materials, such as metals, alloys, ceramics, semiconductors and polymers to obtain research data. Plans experimental laboratory production of materials having special characteristics to confirm feasibility of processes and techniques for potential users. Prepares reports of materials studies for information of other scientists and requestors. May guide technical staff engaged in developing materials for specific use in projected product or device.



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**2119.90 Physical Scientists, Other** conduct studies in other fields of physical sciences and apply their principles to practical problems and research work and include all other physical scientists not else where classified.

**212 MATHEMATICIANS, STATISTICIANS AND RELATED PROFESSIONALS**

Mathematicians, Statisticians and related professionals conduct research, improve or develop mathematical, actuarial or statistical concepts, theories and operational methods and techniques, and apply this knowledge to a wide range of tasks in such fields as engineering, business or medicine as well as in other areas of natural, social or life sciences.

**2121 MATHEMATICIANS AND RELATED PROFESSIONALS**

Mathematicians and related professionals conduct research and improve or develop mathematical and actuarial concepts, theories and operational methods and techniques and advise on or engage in their practical application in such fields as engineering, business or medicine as well as other areas of natural, social or life sciences.

**2121.10 Mathematician** solves mathematical problems by using known principles or by evolving new principles and techniques and applies mathematical principles and methods of analysis for solution of various economic and other scientific problems. Determines and applies mathematical principles involved for solution of problems. Carries out research to discover new principles or to develop and improve known principles. Formulates his own mathematical tools and ways of application to abstract theoretical problems. May work problems of mathematical nature in other branches of science such as mechanics, hydrodynamics, communication, power transmission thermodynamics etc.

**2121.20 Actuary** calculates and fixes premium rates for insurance against different types of risks on the basis of statistical, mathematical and financial calculations involving probability of future payment or

contingencies. Collects and analyses data from different sources concerning losses to person from death, disability, sickness, injury etc. and losses to property from fire, burglary, explosion, hazards etc. Considers probable frequency of such risks, calculates their costs, and fixes premiums rates for different types of risks taking in to account money market and economic conditions and probable future trends thereon. Studies continually new developments, business trends, legislative, social and other factors affecting insurance business. Prepares contract provisions of insurance and pension plans. Determines proper basis and method of evaluating liability of insurance and pension organisations. Recommends to managements suitable measures regarding future policy and course of action for raising earnings. Advises management about extent of bonus out of profits if valuation discloses strong financial position. May prepare records on mortality (death), morbidity (sickness) and compute tables of premium rates and policy values. May prepare articles, press releases and speeches dealing with insurance business.

**2121.90 Mathematicians and Related Professionals, Other** perform research and improve or develop mathematical and actuarial concepts, theories and operational methods and techniques and advise on or engage in their practical application in such fields as engineering, business or medicine as well as other areas of natural, social or life sciences and include all other professionals not else where classified.

**2122 STATISTICIANS**

Statisticians conduct research, improve or develop mathematical and other aspects of statistical concepts, theories and operational methods and techniques, and advise on or engage in their practical application, in such fields as business or medicine as well as in other areas of natural, social or life sciences.

**2122.10 Statistician** develops and applies most effective methods for collecting, tabulating and interpreting quantitative data in any one of wide variety of fields. Determines character and volume of information necessary for solution of any statistical problem and obtains or devises

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methods for collecting necessary information. Reduces or determines most effective techniques for reduction of data according to nature of available information and type of problem under study. Interprets and presents data in form of charts, graphs, diagrams and written summaries. May write reports analyzing and evaluating conclusions on the basis of variable conditions affecting interpretation or validity. May specialise in any particular branch of statistics such as financial or industrial statistics, or in statistical analysis in specific scientific field such as physics, chemistry or biology.

**2122.20 Statistician, Applied** plans data collection, and analyzes and interprets numerical data from experiments, studies, surveys, and other sources and applies statistical methodology to provide information for scientific research and statistical analysis: Plans methods to collect information and develops questionnaire techniques according to survey design. Conducts surveys utilizing sampling techniques or complete enumeration bases. Evaluates reliability of source information, adjusts and weighs raw data, and organizes results into form compatible with analysis by computers or other methods. Presents numerical information by computer readouts, graphs, charts, tables, written reports or other methods. Describes sources of information, and limitations on reliability and usability. May analyse and interpret statistics to point out significant differences in relationships among sources of information, and prepare conclusions and forecasts based on data summaries. May specialize in specific aspect of statistics or industrial activity reporting.

**2122.30 Operation Research Analyst** Formulate and apply mathematical modeling and other optimizing methods using a computer to develop and interpret information that assists management with decision making, policy formulation, or other managerial functions. May develop related software, service, or products. Frequently concentrates on collecting and analyzing data and developing decision support software. May develop and supply optimal time, cost, or logistics networks for programme evaluation, review, or implementation. Analyzes problem in terms

of management information and conceptualizes and defines problem. Prepares model of problem in form of one or several equations that relates constants and variables, restrictions, alternatives, conflicting objectives and their numerical parameters. Specifies manipulative or computational methods to be applied to model. Evaluates implementation and effectiveness of research. Develops and applies time and cost networks to plan and control large projects. Prepares for management reports defining problem, evaluation, and possible solution. Studies information and selects plan from competitive proposals that afford maximum probability of profit or effectiveness relating to cost or risk. Defines data requirements and gathers and validates information, applying judgment and statistical tests. Designs, conducts, and evaluates experimental operational models where insufficient data exists to formulate model. Performs validation and testing of model to ensure adequacy, or determines need for reformulation.

**2122.90 Statisticians, Other** include all other statisticians not else where classified.

### **2129 MATHEMATICIANS, STATISTICIANS AND RELATED PROFESSIONALS, n.e.c**

Workers in this Family conduct research, develop mathematical techniques and include those not else where classified.

**2129.90 Mathematicians, Statisticians and Related Professionals, Other** include those mathematicians, statisticians and related workers not elsewhere classified.

### **213 COMPUTING PROFESSIONALS**

Computing professionals conduct research, plan, develop and improve computer based information systems, software and related concepts, develop principles and operational methods as well as main data dictionary and management systems of databases to ensure integrity and security of data.

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**2131 COMPUTER SYSTEMS DESIGNERS AND ANALYSTS**

Computer systems designers and analysts conducts research, improve or develop computing concepts and advise on or engage in their practical application.

**2131.10 System Analyst** analyses user requirements, procedures, and problems to automate processing or to improve existing computer system: Confers with personnel of organizational units involved to analyse current operational procedures, identify problems, and learn specific input and output requirements, such as forms of data input, how data is to be summarised, and formats for reports. Writes detailed description of user needs, programme functions, and steps required to develop or modify computer programme. Reviews computer system capabilities, workflow, and scheduling limitations to determine if requested programme or programme change is possible within existing system. Studies existing information processing systems to evaluate effectiveness and develops new systems to improve production or workflow as required. Prepares workflow charts and diagrams to specify in detail operations to be performed by equipment and computer programmes and operations to be performed by personnel in system. Conducts studies pertaining to development of new information systems to meet current and projected needs. Plans and prepares technical reports, memoranda, and instructional manuals as documentation of programme development. Upgrades system and corrects errors to maintain system after implementation. May assist COMPUTER PROGRAMMER in resolution of work problems related to flow charts, project specifications or programming. May prepare time and cost estimates for completing projects. May direct and coordinate work of others to develop, test, install, and modify programmes.

**2131.20 Data Communication Analyst** researches, tests, evaluates, and recommends data communications hardware and software: Identifies areas of operation which need upgraded equipment, such as modems, fiber optic cables and telephone wires. Conducts survey to determine user needs. Reads technical manuals and brochures to

determine equipment which meets establishment requirements. Visits vendors to learn about available products or services. Tests and evaluates hardware and software to determine efficiency, reliability, and compatibility with existing system, using equipment such as computer terminal and modem. Analyses test data and recommends hardware or software for purchase. Develops and writes procedures for installation, use, and solving problems of communications hardware and software. Monitors system performance. Trains users in use of equipment. Assists users to identify and solve data communication problems. May write technical specifications to send to vendors for bid. May oversee or assist in installation of communications hardware. May perform minor equipment repairs.

**2131.90 Computer Systems Designers and Analysts, Other** Computer systems designers and analysts conducts research, improve or develop computing concepts and advise on or engage in their practical application and all other computer systems designers and analysts not elsewhere classified.

**2132 COMPUTER PROGRAMMERS**

Computer programmers write, test and maintain computer programmes to meet the needs of users of computer systems.

**2132.10 Computer Programmer** converts data from project specifications and statements of problems and procedures to create or modify computer programmes: Prepares or receives from **SYSTEMS ANALYST**, detailed workflow chart and diagram to illustrate sequence of steps that programme must follow and to describe input, output, and logical operations involved. Analyses workflow chart and diagram, applying knowledge of computer capabilities, subject matter, and symbolic logic. Confers with supervisor and representatives of departments concerned with programme to resolve questions of programme intent, data input, output requirements, and inclusion of internal checks and controls. Converts detailed logical flow chart to language processable by computer. Enters programme codes into computer system. Inputs test data into

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computer. Observes computer monitor screen to interpret programme-operating codes. Corrects programme errors, using methods such as modifying programme or altering sequence of programme steps. Writes instructions to guide operating personnel during production runs. Analyses, reviews, and rewrites programmes to increase operating efficiency or to adapt programme to new requirements. Compiles and writes documentation of programme development and subsequent revisions. May train workers to use programme. May assist **COMPUTER OPERATOR** to resolve problems in running computer programme. May work with **SYSTEMS ANALYST** to obtain and analyse project specifications and flow charts. May direct and coordinate work of others to write, test, and modify computer programmes.

**2132.20 Software Engineer** researches, designs, and develops computer software systems, in conjunction with hardware product development, for medical, industrial, communications, aerospace, and scientific applications, applying principles and techniques of computer science, engineering, and mathematical analysis: Analyzes software requirements to determine feasibility of design within time and cost constraints. Consults with hardware engineers and other engineering staff to evaluate interface between hardware and software, and operational and performance requirements of overall system. Formulates and designs software system, using scientific analysis and mathematical models to predict and measure outcome and consequences of design. Develops and directs software system testing procedures, programming and documentation. Consults with customer concerning maintenance of software system. May coordinate installation of software system.

**2132.30 Programmer Analyst** plans, develops, tests, and documents computer programmes, applying knowledge of programming techniques and computer systems: Evaluates user request for new or modified programme, such as for financial or human resource management system, clinical research trial results, statistical study of traffic patterns, or analysing and developing specifications for bridge design,

to determine feasibility, cost and time required, compatibility with current system, and computer capabilities. Consults with user to identify current operating procedures and clarify programme objectives. Reads manuals, periodicals, and technical reports to learn ways to develop programmes that meet user requirements. Formulates plan-outlining steps required to develop programme, using structured analysis and design. Submits plans to user for approval. Prepares flowcharts and diagrams to illustrate sequence of steps programme must follow and to describe logical operations involved. Designs computer terminal screen displays to accomplish goals of user request. Converts project specifications, using flowcharts and diagrams, into sequence of detailed instructions and logical steps for coding into language processable by computer, applying knowledge of computer programming techniques and computer languages. Enters programme codes into computer system. Enters commands into computer to run and test programme. Reads computer printouts or observes display screen to detect syntax or logic errors during program test, or uses diagnostic software to detect errors. Replaces, deletes, or modifies codes to correct errors. Analyzes, reviews, and alters programme to increase operating efficiency or adapt to new requirements. Writes documentation to describe programme development, logic, coding, and corrections. Writes manual for users to describe installation and operating procedures. Assists users to solve operating problems. Recreates steps taken by user to locate source of problem and rewrites programme to correct errors. May use computer-aided software tools, such as flowchart design and code generation, in each stage of system development. May train users to use programme. May oversee installation of hardware and software. May provide technical assistance to programme users. May install and test programme at user site. May monitor performance of programme after implementation. May specialize in developing programmes for business or technical applications.

**2132.40 Programmer, Engineering and Scientific** converts scientific, engineering, and other technical problem formulations to format processable by computer: Resolves

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symbolic formulations, prepares flow charts and block diagrams, and encodes resultant equations for processing by applying extensive knowledge of branch of science, engineering, or advanced mathematics, such as differential equations or numerical analysis, and understanding of capabilities and limitations of computer. Confers with other engineering and technical personnel to resolve problems of intent, inaccuracy, or feasibility of computer processing. Enters programme into computer system. Reviews results of computer runs with interested personnel to determine necessity for modifications or reruns. Develops new subroutines or expands programme to simplify statement, programming, or coding of future problems. May direct and coordinate activities of **COMPUTER PROGRAMMERS** working as part of project team.

**2132.50 System Programmer** coordinates installation of computer operating system software and tests, maintains, and modifies software, using computer terminal: Reads loading and running instructions for system software, such as task scheduling, memory management, computer file system, or controlling computer input and output, and loads tape into tape drive or transfers software to magnetic disk. Initiates test of system programme and observes readout on monitor of computer system to detect errors or work stoppage. Enters code changes into computer system to correct errors. Analyzes performance indicators, such as system's response time, number of transactions per second and number of programmes being processed at once, to ensure that system is operating efficiently. Changes system software so that system performance will meet objectives. Reviews computer system capabilities, workflow, and scheduling limitations to determine if requested changes to operating system are possible. Writes description of steps taken to modify system and procedures required to implement new software. Assists users having problems with use of system software. May train users, to use system software. May prepare workflow charts and diagrams to modify system software. May visit vendors to observe demonstration of systems software. May administer and monitor computer programme that controls user access to

system. May review productivity reports and problem records to evaluate performance of computer system.

**2132.90 Computer Programmers, Other** computer programmers who write, test and maintain computer programmes to meet the needs of users of computer systems and all other computer programmers not elsewhere classified.

**2139 COMPUTER PROFESSIONALS, n.e.c**

This family covers computing professionals not classified elsewhere in Group 213, Computing Professionals. For instance, occupations classified in this family are those who have a general knowledge of both computer hardware and software.

**2139.10 Quality Assurance Analyst (Computers)** evaluates and tests new or modified software programmes and software development procedures used to verify that programmes function according to user requirements and conform to establishment guidelines: Writes, revises, and verifies quality standards and test procedures for programme design and product evaluation to attain quality of software economically and efficiently. Reviews new or modified programme, including documentation, diagram, and flow chart, to determine if program will perform according to user request and conform to guidelines. Recommends programme improvements or corrections to programmers. Reviews computer-operating log to identify programme-processing errors. Enters instructions into computer to test programme for validity of results, accuracy, reliability, and conformance to establishment standards. Observes computer monitor screen during programme test to detect error codes or interruption of programme and corrects errors. Identifies differences between establishment standards and user applications and suggests modifications to conform to standards. Sets up tests at request of user to locate and correct programme operating error following installation of programme. Conducts compatibility tests with vendor-provided programmes. Monitors programme performance after implementation to prevent reoccurrence of

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programme operating problems and ensure efficiency of operation. Writes documentation to describe programme evaluation, testing, and correction. May evaluate proposed software or software enhancement for feasibility. May develop utility programme to test, track, and verify defects in software programme. May write programmes to create new procedures or modify existing procedures. May train software programme users.

**2139.20 Data Base Design Analyst**

Designs logical and physical data bases and coordinates data base development as part of project team, applying knowledge of data base design standards and data base management system: Reviews project request describing data base user needs. Estimates time and cost required to accomplish project. Determines if project requires creating series of new programmes or modifying existing programmes that access data stored in data bases. Attends specification meeting with project team workers to determine scope and limitations of project. Reviews workflow chart developed by PROGRAMMER-ANALYST to understand tasks computer will perform, such as updating records. Reviews procedures in data base management system manuals for making changes to data base, such as defining, creating, revising, and controlling data base. Revises company definition of data as defined in data dictionary (information about data, including name, description, source of data item, and key words for categorising and searching for data item descriptions). Determines and enters changes to data dictionary descriptions, including type, structure, and intended use of data within system, using computer or assigns data entry work to programmer. Develops data model describing data elements and how they are used, following procedures and using pen and template or computer software. Creates description to enable PROGRAMMER-ANALYST to understand how programmes should access data. Writes description of how user accesses data, referred to as logical data base. Writes physical data base description, such as location, space requirements, and access method, to protect company data resources against unauthorized access and accidental destruction, according

to computer industry standards and knowledge of data base management system. May specialize in adding, deleting, and modifying data items in data dictionary. Workers typically specialize in one or more types of data base management systems.

**2139.30 Data Base Administrator**

coordinates physical changes to computer data bases; and codes, tests, and implements physical data base, applying knowledge of data base management system: Designs logical and physical data bases or reviews description of changes to data base design to understand how changes to be made affect physical data base (how data is stored in terms of physical characteristics, such as location, amount of space, and access method). Establishes physical data base parameters. Codes data base descriptions and specifies identifiers of data base to data base management system or directs others in coding data base descriptions. Calculates optimum values for data base parameters, such as amount of computer memory to be used by data base, following manuals and using calculator. Specifies user access level for each segment of one or more data items, such as insert, replace, retrieve, or delete data. Specifies which users can access data bases and what data can be accessed by user. Tests and corrects errors, and refines changes to data base. Enters codes to create production data base. Selects and enters codes of utility programme to monitor data base performance, such as distribution of records and amount of available memory. Directs programmers and analysts to make changes to data base management system. Reviews and corrects programmes. Answers user questions. Confers with coworkers to determine impact of data base changes on other systems and staff cost for making changes to data base. Modifies data base programmes to increase processing performance, referred to as performance tuning. Workers typically specialise in one or more types of data base management systems. May train users.

**2139.40 Computer System Hardware Analyst**

analyses data processing requirements to plan data processing system that will provide system capabilities required for projected work loads and plans layout and installation of new system or

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modification of existing system: Confers with data processing and project managers to obtain information on limitations and capabilities of existing system and capabilities required for data processing projects and projected work load. Evaluates factors such as number of departments serviced by data processing equipment, reporting formats required, volume of transactions, time requirements and cost constraints, and need for security and access restrictions to determine hardware configurations. Analyses information to determine, recommend, and plan layout for type of computers and peripheral equipment, or modifications to existing equipment and system, that will provide capability for proposed project or work load, efficient operation, and effective use of allotted space. May enter data into computer terminal to store, retrieve, and manipulate data for analysis of system capabilities and requirements. May specify power supply requirements and configuration. May recommend purchase of equipment to control dust, temperature, and humidity in area of system installation. May specialise in one area of system application or in one type or make of equipment. May train users to use new or modified equipment. May monitor functioning of equipment to ensure system operates in conformance with specifications.

**2139.90 Computer Professionals, Other**

Covers computing professionals not classified elsewhere in Group 213, Computing Professionals.

**214 ARCHITECTS, ENGINEERS AND RELATED PROFESSIONALS**

Architects, engineers and related professionals conduct research and improve or develop concepts, theories and operational methods, or apply existing knowledge in such fields as architecture and engineering, as well as in the field of technological and economic efficiency of production process.

**2141 ARCHITECTS, TOWN AND TRAFFIC PLANNERS**

Architects, town and traffic planners conduct research and advise on and design residential, commercial and industrial buildings, layout of towns, landscapes and

traffic systems, and plan and monitor their construction, maintenance and rehabilitation. **2141.10 Architect** prepares designs for construction of buildings, monuments, etc., estimates cost and co-ordinates functional and organizational details for execution. Collects information from party concerned about requirements and type(s) of buildings to be constructed, available funds, special features desired, if any, etc., and records points for consideration. Prepares designs, estimates cost and submits them to party for approval. Prepares detailed drawing either himself or gets them prepared by **Draughtsman, Architectural** to specified scale showing location of building (s) on site plan and submits them to competent authorities. Draws up specifications regarding flooring, finish, architectural features etc., estimates quantities of materials required and other details and indicates them in drawing for correct execution of plan. May guide, supervise and inspect construction work from time to time to ensure execution according to plan. May consult engineer and specialist and get light and power fittings, sanitary fittings, etc. done by them. May specialise in landscape architecture. May approve payment on correct execution of work.

**2141.20 Town Planner** designs layout and coordinates development of towns, cities and colonies, taking into consideration various aspects such as financial resources, location of residential areas, industries, schools, parks etc. Conducts town planning survey of specified area for designing layout. Collects data from State Governments, Municipal Corporation and other sources, regarding climate, soil condition, contours, rivers, transport and public health facilities, public utility services, age and condition of buildings if any, density of population, traffic, wind direction etc. Analyses this data and consults specialists as necessary such as **Engineer, Industrialist, Geologist, Sociologist, Geographer, Statistician**, etc. for expert opinion. Prepares road pattern accordingly and fills in details indicating locations of open spaces, parks, school, hospital and other buildings, etc. Prepares detailed drawings of area and obtains approval of sponsoring authority. Submits copies of plan to Corporation or State authorities for their concurrence; passes on

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approved plan to **Architect** for designing and preparing estimates. May design and prepare estimates etc. himself, if qualified as **Architect**.

**2141.30 Traffic Planner** studies Vehicular-traffic conditions on urban or national highways and develops plan for altering conditions to promote safety and reduce congestion. Studies traffic condition from fixed position to detect unsafe or congested conditions and observes location of alternative routes. Evaluates statistical and physical data regarding such considerations as vehicle count per mile, load-capacity of pavement, and feasibility of widening pavement and projected traffic loads in future. Conducts experiments with alternative traffic plans on nearby routes and on same route with modification in signals, traffic directions or other controlled devices and techniques. Evaluates results of experiments and directs or recommends permanent changes to improve conditions. Confers with citizens and government officials to resolve complaints concerning traffic problems requiring cooperation of public or other jurisdiction.. May prepare public information materials to enlist cooperation of public in reducing congestion and accidents. May integrate results of traffic studies with work of other agencies to develop transportation plans.

**2141.90 Architects, Town and Traffic Planners, Other** conduct research and advise on and design residential, commercial and industrial buildings, layout of towns, landscapes and traffic systems, and plan and monitor their construction, maintenance and covers all other architects, town and traffic planners not elsewhere classified.

**2142 CIVIL ENGINEERS**

Civil Engineers conduct research and advise on, design, and direct construction, and manage the operation and maintenance of civil engineering structures, or study and advise on technological aspects of particular materials.

**2142.10 Civil Engineer, General** plans, organizes and supervises construction and repair of buildings, highways, dams, bridges, tunnels, canals, aerodromes, towers, laying

of pipe lines, railway tracks etc. with or without assistance of **Architect** or other specialised civil engineers. Prepares or gets sketches, plans etc. of project prepared by **Architect** according to the requirements of authority concerned. Visits area(s) for preliminary survey, selection of size, and collection of necessary data such as measurements, soil condition, availability of materials, labour etc. with or without assistance of specialised **Civil Engineers, Overseer** and **Estimator**. Prepares designs, detailed drawings and estimates of cost with assistance of **Draftsmen, Civil** or himself and gets them approved by his client or authority concerned. Arranges for required materials, machinery, labour and commencement of work at site. Ensures correct execution of work according to specifications at every stage of progress. Checks at site, measurements taken by overseer for preparation and payments of bill. Inspects and examines structure, completion of work to ensure its conformity with prescribed specification. May draw sketches and plans himself. May call for tenders and award work to one or more contractors. May undertake maintenance, development or remodelling work.

**2142.20 Civil Engineer, Building** plans, organizes and supervises construction and repair of buildings etc. for office or residential purposes with or without assistance of **Architect**. Visits site to ascertain soil condition, availability of labour, materials, etc. and decides type of structure to be built, and materials to be used. Prepares detailed drawings and estimates according to requirements of authority concerned with assistance of **Draftsmen, Civil** and **Estimators**; lays specifications of various components finishing, flooring and architectural features or gets them done by **Architects**. Arranges materials, labour, machinery etc. Gets concrete cured (sprayed with water) and gets cubes tested in laboratory as work progresses to ensure designed strength. Gets roofing, flooring, terracing and distempering or white-colour washing done according to specification. Checks measurements carried out by **Overseer** from time to time for payment of bills. May call for tenders and award work to one or more contractors.



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**2142.30 Civil Engineer, Structural** plans, organizes and supervises construction and repairs of bridges, factories, towers and other structures to meet specific requirements with assistance of **Civil Engineer, Building; Mechanical Engineer, Structural; Draftsmen, Civil; Estimator**, etc. as necessary. Receives instructions and available sketches and data from authority concerned. Undertakes preliminary survey to collect necessary information about soil condition, area available etc. Collects further information on drainage, maximum water level, flow of water, neighbouring habitation, permanent course of water, pressure of communication etc. for bridge construction. Calculates and prepares himself or gets prepared by **Architect or Draftsman** design, estimated cost and detailed drawings with complete specifications of trusses, foundation, height, movement space, light and ventilation etc. and gets them approved by client. Supervises drilling operations and gets samples of underground geological strata tested to divide suitable type of foundation and length of spans for bridge construction. Arranges for men, material, machinery and appliances. Gets work commenced on scheduled plan under his direct or authorised supervision. Gets coffer dam, dewatering, dredging, well foundation and concreting done and tiers and abatement constructed over foundation. Gets sub and superstructure of bridge, factory building, or other structure constructed by stages according to design in consultation with **Mechanical Engineer, Structural; Civil Engineer, Building**; etc., as necessary. Ensures execution according to specifications and directs preparation and payment of bills. May invite tenders and get part or parts of work done by contractors or other specialised persons. May undertake construction of staff quarters, approach roads, etc., if required.

**2142.40 Civil Engineer, Irrigation** plans, organizes and supervises construction and maintenance of dams, barrages, canals, tunnels etc. with assistance of geologist and other engineers where necessary. Visits site to collect necessary data such as course of water, topography, near by villages, agricultural lands, availability of labourers, materials etc. Selects suitable site in

consultation with **Geologist**. Draws out preliminary sketches and detailed drawings and general financial implications, estimate of materials, required machinery etc. with assistance of **Draftsman, Civil and Estimator**. Arranges for material, labour and machinery. Gets cofferdams or other devices for diverting water constructed and gets dewatering and excavation work commenced. Supervises laying of concrete in foundation, construction of other concrete or masonry work and digging of canals. Controls quality of concrete by getting cubes tested at every stage of construction. Gets sluice gates erected, in case of barrage, with assistance of **Mechanical and Civil Engineer, Structural**. Gets pipe line of power house laid and machinery installed with assistance of **Mechanical and Electrical Engineer**. Checks work to ensure conformity with specifications. May call tenders and award work to **Contractors**. May also undertake construction of staff quarters, office buildings, approach roads etc.

**2142.45 Hydraulic Engineer** designs and directs construction of power and other hydraulic engineering projects for control and use of water: Computes and estimates rates of waterflow. Specifies type and size of equipment, such as conduits, pumps, turbines, pressure valves, and surge tanks, used in transporting water and converting waterpower into electricity. Directs, through subordinate supervisors, activities of workers engaged in dredging, digging cutoffs, placing jetties, and constructing levees to stabilise streams or open water ways. Designs and coordinates construction of artificial canals, conduits, and mains to transport and distribute water; and plans reservoirs, pressure valves, and booster stations to obtain proper water pressure at all levels. Frequently builds laboratory models to study construction and flow problems.

**2142.50 Civil Engineer, Highways and Roads** plans, organizes and supervises construction and repair of roads, as well as culverts and bridges to connect cities, towns and important places within town. Undertakes reconnaissance and topographical surveys to gather information regarding villages, towns and cities to be connected, river, nullah and railway

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crossings inroute, soil data etc. to decide suitable route for road construction. Prepares himself or gets prepared by **Draftsman Civil** detailed drawing with complete specifications such as width of road, foundation, drainage system, bridges culverts etc. Arranges for labour, machinery and materials and commences work under his direct or authorised supervision. Constructs culverts and bridges inroute or entrusts them to **Civil Engineer, Structural**. Checks work from time to time to ensure proper consolidation of earth work and prevention of sinking of roads. Checks measurements taken by **Overseer (Civil)** for payment of bill. Inspects completed work and hands over completed project to client. May invite tenders and assign road construction to approved **Contractors**. May maintain road making machinery like road rollers, concrete miers, etc. in working order. May arrange road side plantation and their maintenance.

**2142.60 Civil Engineer, Railways** plans, organises and supervises maintenance and laying of railway tracks, and construction of bridges, roads, buildings, sheds etc. for railways according to prescribed specifications. Surveys area(s) with assistance of **Surveyors** to collect necessary details such as soil condition, rivers, drains, course of water, localities and villages inroute, etc. Designs work on basis of collected data, estimates cost and submits them to authority concerned for approval. Prepares or gets detailed drawings prepared by **Architect** and plans execution of work. Arranges for labour, material, machinery, appliances etc. and commences work under his personal or authorised supervision. Gets embankment consolidated, levelled and ballasted. Gets sleepers and rails laid in position and fish plates screwed to join rails. Inspects track during and after construction to ensure conformity of gradients, inclinations etc. with prescribed standards. Supervises construction, repair and maintenance of building, railway stations, bridges, platforms and other railway structures by performing similar functions as those of **Civil Engineer, Building, Civil Engineer, Structural**, etc. Takes special safety measures to protect track and bridges during floods and land slides, etc. may construct tunnels and lay track through them.

May invite tenders and allot work to approved **Contractors**.

**2142.65 Airport Engineer** plans and lays out airports and landing fields and directs construction work involved in levelling fields, laying out and surfacing runways, and providing drainage: Designs runways based on weight and size of aircraft and prepares material and construction specifications. Directs or participates in surveying to lay out installations and establish reference points, grades, and elevations to guide construction. Estimates costs to provide basis for payments to contractor. Observes progress of construction to ensure work is in conformity with specifications and advises **SUPERINTENDENT, CONSTRUCTION** regarding necessary corrections. May serve as employee of contractor and study plans and specifications to recommend special equipment or procedures to reduce time and cost of construction. May schedule delivery of materials, analyse costs, and provide technical advice in solution of construction problems.

**2142.70 Civil Engineer, Public Health** plans, organizes and supervises installing of water supply, pipelines and accessories and construction of drains, sewers and other sanitary workers in Municipal Corporation, township or specified area(s). Visits site to conduct topographical survey with assistance of **Surveyor** to collect necessary information such as source of water, drains, localities, and villages etc. inroute. Designs and prepares drawings and estimates of project ensuring scope for future development. Arranges for labour, machinery and materials. Starts digging of respective areas for drainage or embedment of pipes under his personal or authorised supervision. Gets culverts, sewers, sewage plants, pump houses, cannels, and reservoirs etc. constructed. Ensures correct execution of work according to specifications at every stage of progress. Checks at site, measurements taken by **Overseer** for preparation and payment of bills. May undertake removal of silt, construction of approach road etc., if required. May invite tenders and award work to **Contractors**.

**2142.72 Engineer, Waterworks** plans and directs activities concerned with water utility

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systems installation, operation, maintenance, and service: Directs activities of engineers engaged in preparing designs and plans to construct, enlarge, and modify such facilities as water treatment plants, watersheds, and dams, hydroelectric stations, pumping stations, and to install water mains, and other appurtenances. Provides engineering and technical direction for planning and design of water utility projects. Reviews plans and specifications prior to instituting project to determine whether they meet organizational requirements. Analyzes and compiles data received from engineers to prepare budget estimates. Directs and coordinates engineers in conducting studies, such as economics of systems operation, water distribution, and water treatment plants or relative equipment performance to determine most feasible approach to meeting organizational and technical problems. Confers with municipal authorities concerning budget requirements, changes in organizational policy, regulation of water rates and plumbing requirements, or other problems affecting community.

**2142.90 Civil Engineers, Other** specialise in designing, constructing and maintaining other civil engineering works such as those engaged in designing and constructing docks, harbors, light houses, aerodromes, runways, etc. and include those specialists not elsewhere classified.

**2143 ELECTRICAL ENGINEERS**

Electrical Engineers conduct research and advise on, design and direct construction of electrical systems, motors and equipments, and advise on and direct their functioning, maintenance and repairs, or study and advise on technological aspects of particular materials, products and processes.

**2143.10 Electrical Engineer, General** plans, designs and supervises manufacture, installation, testing, operation and maintenances of various types of electrical wiring, machinery and equipment. Plans layout of work and equipment and prepares himself or directs preparation of sketches, detailed drawings and writing diagrams. Specifies method of construction materials to be used and standard of work ship required. Prepares or checks estimates of cost of materials, construction, installation and

labour charges. Supervises construction and installation or erection work and gives necessary technical advice at every stage of progress. Inspects completed work to ensure efficient operation according to prescribed specifications and safety standards. Directs repairs and maintenance of electrical apparatus and equipment. May specialise in designing and manufacturing of any particular item e.g., transformers, switchgears, simple electronic equipment, etc., other applications of electrical energy or in generation and transmission of electricity. May examine economical aspects of schemes to be undertaken. May be designated as **Project Engineer, Electrical** if engaged in electrical construction or installation project work.

**2143.20 Designer, Electrical Engineering; Electrical Engineer, (Design)** plans and designs various types of electrical plants and equipment using available research data. Prepares plans, diagrams and sketches of electrical plants and equipments for manufacture, indicating construction details, material specifications and production methods. Supervises production, tests and observes performance and designs additional or alterations to effect improvements or to suit particular requirements. Studies consumer's needs and develops design for manufacture of new devices and products. Prepares detailed plant instructions and maintains manuals and diagrams illustrating operation details, circuits, connections, etc. Conducts research and experiments on efficiency, performance etc. of existing machines and equipment to effect improvement. May inspect assembly and installation of electrical equipment and machinery. May prepare designs and estimate cost of production for submitting tenders.

**2143.30 Electrical Engineer, Generation and Supply; Power House Superintendent, Mains Engineer; Maintenance Superintendent** installs, operates and maintains power generating stations and power transmission and distribution system. Calculates details and prepares sketches and drawings with necessary instructions for erection of power generating station, sub-station, transmission lines, etc., or gets them prepared under his

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guidance. Supervises assembly and erection of generation and transformer equipment. Surveys area to determine installation of power lines and directs erection of distribution lines to carry power to consumers. Attends to breakdowns and restores power supply within least possible time. Tests meters, transformers, relays and other sensitive instruments for calibration, accuracy and stipulated performance. Estimates unit cost of power production and calculates suitable tariff rates for supply of power to consumers and other supply authorities. Inspects premises having electrical equipments and ensures compliance with statutory requirements. May invite tenders, compare them and suggest purchases to be made. May supervise construction of powerhouses and sub-stations. May be designated as **Generation Engineer, Distribution Engineer, Operation Engineer**, etc. according to nature of work performed.

**2143.40 Illumination Engineer** designs and directs installation of illuminating equipment and systems for buildings, plants, streets, stadia, tunnels, and outdoor displays: Studies lighting requirements of client to determine lighting equipment and arrangement of lamps that will provide optimum illumination with economy of installation and operation. Designs lamps of required light intensity and output, light control reflectors and lenses and lamp arrangement required to meet illuminating standards. Plans and prepares drawings for installation of lighting system in accordance with client's specifications and municipal codes. Directs installation of system to ensure conformance with engineering specifications and compliance with electrical codes.

**2143.90 Electrical Engineers, Other** include all other Electrical Engineers such as those specialised in inspecting or testing systems of electrical equipment, carry out research work, give technical advice in electrical engineering problems, etc., not classified elsewhere.

#### **2144 ELECTRONICS AND TELECOMMUNICATION ENGINEERS**

Electronics and telecommunication engineers conduct research and advise on,

design, and direct construction of electronic systems and equipment, and advise on and direct their functioning, maintenance and repairs, or study and advise on technological aspects of particular materials, products or processes.

**2144.10 Telecommunication Engineer, General;** designs, manufactures, installs, operates and maintains telegraph and telephone telex systems, radio, radar, special microwave and other telecommunication instruments. Surveys areas for installation of telegraph and telephone equipment. Prepares plans and gets drawing made with necessary details. Installs suitable telecommunication equipment like teleprinters, signaling equipment, transmitters, radio receivers etc. Supervises laying of overhead and underground cables. Conducts periodical checks of stations and units and attends to breakdowns to remove faults in telephone and telegraph systems. Maintains telecommunication equipment in working order. May specialise in designing and maintaining special equipments for telegraphs, telephone, teleprinting or radio broadcasting systems including sero-mechanism and tele-system controls and is designated accordingly.

**2144.20 Radio Engineer, Telecommunication** plans, designs, installs and maintains equipment utilized in radio broadcasting, transmission reception and television programmes. Plans lay-out of transmission and receiving system equipment. Prepares sketches, drawings or wiring diagrams and specifies method of construction, materials to be used and other details. Estimates labour, material and other construction and installation costs. Supervises construction and installation of plant and equipment. Inspects completed work to ensure efficient operation and compliance with specification and safety standards. Tests electronic equipment, generators, alternators, motors and other components of broadcasting system periodically to maintain performance according to prescribed specifications. Supervises necessary repairs and replacements. Maintains frequency of transmission wave length within prescribed limits. Operates critical frequency measuring equipment, decides choice of

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correct frequency for efficient transmission and supervises changes in system for transferring broadcast to different frequency in accordance with international agreements on frequency schedules. Maintains communication with ships at sea or aircraft in flight and land. Deciphers code messages received through wireless or other means. May specialise in designing equipment and studios or in installation and maintenance of tele-communication equipment including transmission lines, aerials and propagation of radio waves.

**2144.30 Microwave Engineer, Telecommunication** designs, installs, maintains and operates special tele-communication equipment working on microwaves such as radar, navigational aids etc., to maintain communication between specified points. Prepares layout and supervises installation of microwave project taking into account site, accessibility, availability of power, etc. Checks functional operations of equipment and puts it into action to establish communication between specified points (between stations in service area, between ground and air etc.). Keeps regular watch and records all readings registered by instruments. Detects any faults, ascertains reasons of break downs, and sets them right either by adjusting or by getting defective components replaced. Supervises regular maintenance of equipment according to schedule, including maintenance of wave guides, distribution lines, aerials etc., keeps units in working order, and ensures proper reception and transmission of messages. May undertake research in problems connected with tele-communication engineering and carry out administrative duties.

**2144.40 Line Communication Engineer, Tele-communication; Telephone Engineer; Telegraph Engineer** plans, designs, installs and maintains telegraph, telephone and other tele-communication equipment. Instals telephone and telegraph communication equipment and supplies necessary power to them. Instructs subordinates in correct methods of laying underground cables, submarine cables, overhead lines, etc. Instals telephone equipment and gives service connections to subscribers. Plans and develops new

telephone or telegraph equipment or improves existing ones to give better service facilities to customers. Maintains equipment in perfect working condition and ensures that communication circuits in telephone exchanges, telegraph offices, long distance communication lines, carrier systems for trunk services, teleprinters etc., are maintained at optimum level of efficiency. Attends to breakdowns of communication and traffic lines and restores service quickly by rectifying defects or research and develops new equipment or components to improve methods of communication. May calculate distance between nearest telephone line and subscriber's location, cost of materials required, labour charges etc., and prepare estimates for installation of telephone connections to new subscribers. May specialise installing manual, automatic or trunk telecom exchanges, teleprinters (voice frequency telegraph type), carrier system or wireless transmitting and receiving stations. May specialise in manufacturing of telephone and telegraph equipments and their spare parts.

**2144.50 Sound Engineer** designs acoustic construction and installs, operates and maintains audio systems for transmission of voice in studio broadcasting, public address systems and for recording sound for motion pictures. Sets microphone and sound recording equipment close to artist or speaker in suitable manner to effect best results. Records sound impulses (dialogues, speeches, songs, etc.) on special media like discs, film, magnetic wire or tape (film) using sound recording equipment. Examines developed sound for clarity. Records songs, dialogues, etc., in studio from old or unsatisfactory films or new magnetic tape or wire. Plays sound recorded on magnetic tape for broadcasting or for procuring positive, films (tapes) by using special electronic equipment. Checks whether sound recorded on film meets acoustic standards and synchronizes correctly with actions. Instructs **Recordist (Sound)** for correct recording and specifies, developing requirements to **Developer** on processing of sound films. May specialise in studio design, broadcasting, recording, etc. May repair and overhaul sound recording equipment. May dub films with different sound recordings.

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**2144.60 Electronics Engineer** researches, develops, designs, and tests electronic components, products, and systems for commercial, industrial, medical, and scientific applications, applying principles and techniques of electronic engineering: Designs electronic circuits, components and integrated systems, utilising ferroelectric, nonlinear, dielectric, phosphorescent, photoconductive, and thermoelectric properties of materials. Designs test control apparatus and equipment, determines procedures for testing products, and directs engineering personnel in fabrication of test control apparatus and equipment. Develops new applications of conductive properties of metallic and nonmetallic materials used in components, and in application of components to products or systems. May direct field operations and maintenance of electronic installations. May evaluate operational systems and recommend design modifications to eliminate causes of malfunctions or changes in system requirements. May specialise in development of electronic principles and technology in fields, such as telecommunications, telemetry, aerospace guidance, missile propulsion control, counter-measures, acoustics, nucleonic instrumentation, industrial controls and measurements, high-frequency heating, computers, radiation detection, encephalography, electron optics, and biomedical research. May use computer-assisted engineering and design software and equipment to perform engineering tasks.

**2144.65 Stress Analyst** conducts stress analyses on engineering designs for electronic components, systems, and products, using mathematical formulas and computer-aided engineering (CAE) systems: Analyses engineering designs, schematics, and customer specifications to determine stress requirements on product. Formulates mathematical model or three-dimensional computer graphic model of product, using calculator or CAE system. Analyses ability of product to withstand stress imposed by conditions such as temperature, loads, motion, and vibration, using mathematical formulas and computer simulation. Builds product model of wood or other material, performs physical stress tests on model, and evaluates test results. Consults with ELECTRONICS-DESIGN ENGINEER to recommend design modifications of product

based on results of stress analysis. Prepares stress analysis reports.

**2144.70 Electro-Optical Engineer** conducts research and plans development and design of gas and solid state lasers, masers, infrared, and other light emitting and light sensitive devices: Designs electronic circuitry and optical components with specific characteristics to fit within specified mechanical limits and to perform according to specifications. Designs suitable mounts for optics and power supply systems. Incorporates methods for maintenance and repair of components and designs, and develops test instrumentation and test procedures. Confers with engineering and technical personnel regarding fabrication and testing of prototype systems, and modifies design as required. May conduct application analysis to determine commercial, industrial, scientific, medical, or other use for electro-optical devices. May assist with development of manufacturing, assembly, and fabrication processes.

**2144.90 Electronics and Telecommunication Engineers, Other** include all other Electronic Engineers such as those specialised in inspecting or testing systems of electronic equipment, carry out research work, give technical advice in electronic engineering problems, etc., not classified elsewhere.

**2145 MECHANICAL ENGINEERS**

Mechanical Engineers conduct research and advise on, design, and direct production of machinery and industrial plant, equipment and systems, and advise on and direct their functioning, maintenance and repairs, or study and advise on technological aspects of particular materials, products or processes.

**2145.10 Mechanical Engineer, General** plans, designs and supervises installation, operation, production and maintenance of machines and equipment. Prepares drawings with specifications showing details of construction and directs installation of machinery and equipment. Studies performance of existing machinery and suggests improvements to obtain optimum efficiency. Supervises technical side of production. Inspects work in workshop at

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different stages of production to ensure correct standards. Conducts methods studies and time and motion studies and determines efficient and economic way of production. Directs repairs and maintenance of workshop tools, equipment and accessories to ensure efficient operation. Ensures safety measures and observance of factory laws and statutory provisions. Examines indents and directs checking of out going and incoming stores according to specifications. May specialise in manufacture and erection of oil engines, turbines, machines, tools, earth moving equipment, concrete mixers, etc. May teach in engineering institution.

**2145.15 Designer, Machine; Mechanical Engineer, Designs; Machine Designer** plans and designs various types of machines, tools and equipment for manufacture or experiment. Studies details and performance of existing machinery. Examines manufacturing process, production cost, wastage, etc. for preparing improved designs. Calculates data and develops new designs of machines, tools and equipment involving manufacture, repairs, replacement or modification to effect improvement. Prepares sketches, drawings etc. showing new features, dimensions, specifications, working details, limits (accuracy) and all other necessary information for accurate, easy and economical production. Advises party and management on various technical (Mechanical) problems with regard to construction, erection and installation of machinery, production methods, alteration and modification of machines, tools and equipment purchase of plants and materials, machine and building lay out, etc. May prepare designs for submitting tenders for machines and equipment. May specialise in preparing design of particular type of machinery in any specific industry.

**2145.20 Tool Engineer; Tool Designer; Mechanical Engineer, Tools** designs and supervises manufacture of tools, jigs, fixtures, gauges, cutters and other mechanical equipment and get those already used & reconditioned, if possible, for further use. Studies production methods, feed and speed of tools and machines used, required hardness and finish of products prescribed and standard of accuracy desired. Calculates sizes of tools from drawings or samples.

Determines materials, tools and machines to be used, hardness and tempering temperatures etc. Prepares sketches or drawings with complete specifications, accuracy required and relevant instructions for manufacture. Observes work and checks it at different stages of production such as machining, feeling, hardening, tempering, grinding, lapping etc. with precision instruments such as micrometers, vernier, slip gauges, sine-bar shadow-graph, hardness testing machine etc. to ensure that work is being made to required accuracy. Inspects finished product, observes performance to ensure required accuracy and certifies conformity to precision standards. Examines used tools, gauges, fixers, cutters etc., determines if they can be further used with prescribed accuracy by minor repairs, such as regarding replacement of component, hardening, tipping (brazing or welding required type of steel cutting edge on tool) etc. and gets them reconditioned if possible. May check tools and cutters periodically and ensures their proper maintenance. May specialise in designing particular type of tools such as press-tools, form cutters, hammer dies etc.

**2145.25 Mechanical Engineer, Production; Production Engineer, Mechanical** plans processes and directs manufacture of products by efficient methods at economical cost and according to time schedule. Studies drawings or blue-prints to ascertain various specifications of products to be manufactured. Plans manufacture, sequence of operations and machines to be used according to work load. Maintains loading (work load) figures of all machines and ensures that loads are balanced and within prescribed capacity of plant and equipment. Considers estimated cost, devises time saving and economical method of production. Checks work by sight and with measuring instruments at different stages of production, or supervises Viewers in this activity to ensure conformity with prescribed standards and tolerances (limits). Arranges collection and storing of manufactured articles, rejected components and cut pieces for reuse or sale as appropriate. Issues work orders to different shops (sections) and follows progress and production control system to time schedule. Devises alternative method of production in

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case of breakdown or other delay. Advises **Maintenance Engineer** regarding repairs and overhauling of machines when required or according to schedule. May specialise in production of particular type of product. May advise **Tool Engineer** to change design of tool to suit production requirements. May specialise in process planning and be designated as **Process Engineer**.

**2145.30 Mechanical Engineer, Structural; Structural Engineer** plans, designs and supervises construction and erection of steel structures. Prepares tentative plans, sketches and diagrams of structures to be erected giving details of steel or metal parts to be used, elevation to be given etc. Visits site of construction to familiarizes himself with conditions and problems involved. Decides type of materials to be used, size of structures required, load requirements, etc. Designs structure and prepares final drawings indicating size, shape, strength and type of materials required. Supervises construction of structures and renders spot advice while foundations are dug or during construction. Conducts tests on strength of materials, physical and chemical properties of metals used, etc. Inspects existing structures and devises suitable measures for repairs and replacements of worn out or defective parts. May specialise in designing and erection of ship structure, steel bridges, multistoried buildings, trusses, water tanks, etc.

**2145.35 Mechanical Engineer, Maintenance** plans repairs, undertakes overhauling of machines and equipment and maintains them in proper working order. Observes working of machines and equipment to determine their capacity and maximum efficiency. Plans and draws up programme of running repairs and periodic overhauling of machines, plants and equipment avoiding disruption to work schedule as far as possible. Prepares maintenance instruction charts indicating special care and precautions to be taken during servicing and overhauling work, particularly of machines meant for precision work. Ensures that all moving parts of machinery are properly oiled and greased. Undertakes periodical inspection of plants, machinery, equipment, belting, etc, recommends repairs or replacements as

necessary and condemns unserviceable once. Supervises maintenance gang and **Mill Wright Fitters** and enforces placing of covers, guards, fencing, etc. for safety as prescribed factory laws. Checks repaired under overhauled plants and machinery to ensure correct performance, efficiency and accuracy and certifies them as fit for operation. Attends to breakdowns, undertakes immediate repairs or makes alternative arrangements, as appropriate, to avoid hindrance to production as far as possible. May install and erect new machines.

**2145.40 Mechanical Engineer, Automobile; Automobile Engineer** designs new models and plans manufacture and repairs of cars, trucks and other motor vehicles. Studies performance of different type and models of automobiles and designs new models or types of vehicles by application of engineering data, formulae and principles of heat engines and thermodynamics to give better performance, appearance and durability according to current demand in market or customers needs. Plans manufacture or repairs, prepares estimates and makes arrangement of supply of necessary spares. Supervises assembly or repair work, effects necessary modifications and replacements of parts, gets tuning and adjustments done and checks completed vehicle for efficiency and roadworthiness. May specialise in designing or repairs of particular types of petrol or diesel vehicle. May undertake motorcycle and scooter repairs. May be designated as **Service Engineer, Service Manager** or **Works Manager** if placed as incharge of motor transport workshop.

**2145.42 Automobile Designer** designs and drafts working layouts and master drawings of automobile components, assemblies, and systems from specifications, sketches, models, prototype or verbal instructions, applying knowledge of automotive vehicle design, engineering principles, manufacturing processes and limitations, and conventional and computer drafting techniques and procedures, using drafting instruments and computerised work aids: Analyses specifications, sketches, engineering drawings, ideas and related design data to determine critical factors



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affecting design of components based on knowledge of previous designs and manufacturing processes and limitations. Draws rough sketches and performs mathematical computations to develop design and work out detailed specifications of components. Applies knowledge of mathematical formulas and physical laws and uses conventional and computerized work aids to make calculations. Performs preliminary and advanced work in development of working layouts and final master drawings adequate for detailing parts and units of design. Makes revisions to size, shape and arrangement of parts to create practical design. Confers with AUTOMOBILE ENGINEER and others on staff to resolve design problems. Specialises in design of specific type of body or chassis components, assemblies or systems, such as door panels, chassis frame and supports, or braking system.

**2145.45 Mechanical Engineer, Aeronautical; Aircraft Maintenance Engineer**

develops and modifies designs of aircraft structural and missile systems and maintains their air-worthiness. Analyses comprehensive or incomplete engineering sketches, drawings and notes to evaluate manufacturing and functional practicability of proposed design. Draws preliminary sketches and applies mathematical formulae, physical laws and fundamental aerodynamics theory to develop detailed drawings and specifications of structures or systems such as rib assemblies, struts, landing gear, weight, strength etc. Designs components to be cast or machined from metal stock. Selects standard components such as gears, motors, relays etc. for incorporation in drawing and drafts complete layout drawings. Compiles stress analysis data resulting from testing of experimental component and prepares reports, charts and graphs for use by engineering personnel in making design decisions. Inspects various units and components of aircraft such as engine, airframe, landing gear, electrical system, various instruments, generator, starters, auto-pilot mechanism etc. before and after flight according to chart and gets necessary repairs, replacement and adjustments done by respective aircraft mechanics. Issues daily certificate of safety for flight after checking and ensuring

airworthiness and signals **Pilot** for taking off. May specialise in aero-engine or airframe and conduct their overhaul. May conduct air crash enquiries to find out cause of crash and suggest remedial measures.

**2145.50 Mechanical Engineer, Marine;**

**Marine Engineer** plans, designs and supervises construction and erection of all mechanical equipments of ships, boats, tugs, dredgers etc., installs and maintains motors, engines, boilers and auxiliaries and carries out their periodic overhaul. Inspects ships and other marine vessels to assess type and nature of repairs required, prepares estimate of costs and seeks approval of owner. Examines and approves parts, equipment and materials to be used for additional work or replacement of worn parts and draws programme of work to be done. Supervises and controls subordinates attending to repairs on erection work. Watches performance and ensures efficiency of mechanical equipment fitted to ships. May devise new or effect improvement in existing equipment. May specialise in erection and installation of electric motors or special heating and ventilating system of ships.

**2145.55 Architect Naval**

designs and oversees construction and repair of marine craft and floating structures. Studies design proposals and specifications to establish basic characteristics of craft such as of size, weight, speed, propulsion, armament, cargo, displacement, draft, crew and passenger compliments, and fresh or salt water service. Supervises construction and testing of prototype in model basin and develops sectional and water line curves of hull to establish center of gravity, ideal hull form and buoyancy and stability data. Designs complete hull and superstructure according to specifications and tests data, in conformity with standards of safety, efficiency and economy. Designs layout of craft interior including cargo space, passenger compartments, ladder wells and elevators. Confers with **Marine Engineer** to establish arrangements of boiler room equipment and propulsion machinery, heating and ventilating systems, refrigeration equipments, piping, and other functional equipment. May be known as **Architect Marine; Naval Designer**.

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**2145.60 Mechanical Engineer, Air Conditioning; Mechanical Engineer, Refrigeration; Refrigeration Engineer**

designs, assembles, installs and maintains air conditioning, refrigerating or ventilating plants and accessories in buildings, mills, storage rooms, mines, etc., for obtaining and maintaining required degree of temperature, relative humidity and air motion, or for exhaust and supply of fresh air. Surveys premises or rooms for installation of equipment. Works out technical details of erection of machinery, alteration of existing structures etc., prepares estimate of costs and get it approved. Installs unit or machinery by assembling various parts like refrigerant pressure pipe, refrigerant condensers, compressors, etc. by welding chilled water piping, setting thermal insulation, connecting pipe for supply of water, etc. Ensures that premise or room is airtight so that cooled air does not escape and that meters indicating pressure, temperature, etc. record correct readings. Ensures that various electric motors, pumps, steam boilers and ammonia and freon compressor units work satisfactorily. Tests temperature and humidity controls (electric and pneumatic type). Records temperatures produced by machines and makes necessary settings and adjustments to produce desired temperature. Supervises work of mechanics engaged in repairing and overhauling of refrigeration machines and other accessories. May specialise in particular branch of refrigeration or air conditioning.

**2145.90 Mechanical Engineers, Other** include all other mechanical engineers such as those engaged in research, testing of equipment, rendering technical advice or mechanical engineering problems such as installing machine foundations, erecting structural steel, transportation facilities etc. not elsewhere classified.

**2146 CHEMICAL ENGINEERS**

Chemical Engineers conduct research and develop, advise on and direct commercial-scale chemical processes and production of various substances and items such as crude oil, petroleum derivatives, food and drink products, medicaments, or synthetic materials, and direct maintenance and repair of industrial plant, or study and advise on

technological aspects of particular materials, products or processes.

**2146.10 Chemical Engineer, General; Process Engineer, Chemical Engineering** directs and supervises operations of chemical plants and equipment for dissolving filtration, evaporation, dehydration, reduction, concentration, combination, crystallisation, and all other unit operations for manufacture of heavy chemicals, fine chemicals, etc., according to specifications. Studies existing processes or equipment used, their efficiency and production level. Conducts research into principles of chemistry, physics, thermodynamics etc., to develop new process and to improve design of equipments for increasing efficiency of production. Directs and supervises operations, dehydration, reduction, concentration, combination, crystallization, etc. for manufacture of heavy chemicals, fine chemicals according to specifications. Supervises installation of equipment for production on commercial scale. Studies chemical characteristics of chemical or chemical products such as acids, rayon, dyes developed in laboratory and devises processes and equipment for their manufacture. Designs, constructs and studies operation of pilot plants to test efficiency of process before construction of full-size equipment. Plans layout of plant to obtain maximum operating efficiency and supervises installation of equipment. Supervises and coordinates activities of works operating grinders, mixers, vats, stills reactors and other equipment to ensure efficient treatment of raw materials by chemical, mechanical and other means. May specialise in particular phase of chemical engineering such as supervision of construction or operation of plant and works and be designated accordingly.

**2146.20 Designer, Chemical Engineering** designs and plans lay-out and supervises installation of chemical plants and equipment for manufacture of heavy and fine chemicals, paper pulps, cements rayon, oils, soaps, coke, coke oven by-products etc. Prepares plans, diagrams and sketches for new chemical plants to be erected. Prepares project reports, selects processes based on techno economic study; studies working of existing plants, production processes,

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economics of costs etc. Undertakes basic costing in relation to cost of products manufactured. Conducts research to develop new and improved chemical manufacturing processes or to obtain additional information in commercial production possibilities. Designs full size plant after determining kind of equipment required and ascertaining optimum conditions and other essential factors. Estimates capital cost for installation of plant and cost of plant operation and coordinates activities of workers operating grinders, mixers, vats, stills, reactors, evaporators and other equipment to ensure efficient treatment of raw materials by chemicals, mechanical and others means. Establishes and enforces standards for testing and inspecting machinery and equipment. Tenders technical service to maintain out-put or performance and equipment at most favourable economic point. May draw out specifications for procuring equipments and machinery for specific duties. May inspect and supervise erection of plants. May specialise in any engineering field such as consulting, technical sales and service, testing, purchasing and teaching at University level.

**2146.30 Chemical Engineer, Paints and Varnish** develops new or improved techniques for manufacturing paint and varnish by various chemical processes. Selects raw materials for manufacture of paint or varnish and determines proportion of ingredient such as zinc oxide, barytes, colour pigments, natural resins, synthetic resins and solvents, linseed oil, etc., according to quality and type of paint such as stiff paints, industrial paints, etc., to be manufactured. Tests viscosity, film, drying time, covering capacity, durability of paint under manufacture by applying it on surface of wall or metal sheet. Develops technique for improved and economical productions. May advise and look after packing of paints and varnish. May intent and stock sufficient raw materials to meet daily requirements. May work out cost of manufacture for new products. May be designated as **Chemical Engineer, Dyes** if engaged in manufacturing dyes.

**2146.35 Chemical Engineer, Drugs and Acids** develops new or improved techniques

for manufacturing drugs and acids according to prescribed formulae. Studies details of products producing methods employed in existing processes or in laboratory. Undertakes process research to check details and to obtain additional information on possible improvements in process. Supervises installation of new equipment or alterations to existing equipment. Supervises and coordinates activities of workers operating grinders, mixers vats, stills, heaters, condensers and other equipment to ensure efficient treatment of raw materials by chemical, mechanical and other means. Checks and controls temperature, water feed, cooling limits etc., to plant. Sends samples of products to laboratory to ensure required standard of product. Directs adjustments to plant according to results of laboratory tests or quality requirements. Develops new and improved processes at economic cost. Maintains equipment and machinery in perfect working condition and at optimum level of efficiency. May specialise in specific fields of manufacture of particular drugs and undertake research in such subjects. May teach students in chemical engineering.

**2146.40 Chemical Engineer, Petroleum; Petroleum Refining Engineer** develops new or improved techniques for treatment and refining of petroleum, extracts by-products, designs and supervises construction, installation and operation of equipment, plant, and works for such refining. Conducts test runs and surveys refining equipment and plant operations. Works out material and energy balances as well as economic evaluation of balances. Prepares process designs, cost estimates, technical reports and records on operating and technical data. Observes and records day to day refining operating data for analysing plant performance and recommends measures to improve operating efficiency, reduce cost and increase production capacity. Checks product quality, deviation and follows up difficulties in blending, viscosity, vapour pressure and other specifications. Analyses all losses such as oil, fuel, gas, chemical, utilities and catalyst, deduction of flare gas etc., calculates material and energy balance for given refinery unit and decides or

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recommends product pattern after studying market requirements. Prepares drawings of process designs and other engineering drawings as required. May prepare process designs and assist in preparation of complete designs.

**2146.45 Chemical Engineer, Fertilizers** plans, designs and installs various types of chemical plants, equipment and machinery for manufacture of fertilizers. Prepares plans showing layout of plant equipment for manufacture of fertilizers. Supervises erection of plant and various ancillary machinery and equipment. Test-runs and surveys on equipment and plant operations and works out material and energy balance as well as economic evaluation of balances. Instructs subordinates in charging plant with prescribed quantity of raw materials like phosphates, bonemeal, acids, etc. Controls pressure, temperature, acid feed, cooling limits etc. of plant and sends samples of finished or semi-finished product to chemist for analysis. Checks that bones are properly cooked, dried and ground to prescribed fineness. Develops new and improved processes at economic cost. Maintains plant and equipment at optimum level of efficiency. May prepare process designs and assist in preparation of complete designs. May design new equipment. May specialise in particular branch of manufacture of fertilizers. May undertake research and teach students in universities.

**2146.50 Chemical Engineer, Food** develops new or improved methods and techniques of food processing in manufacture of vanaspati, dairy and other food products. Studies and checks details of products producing methods employed in existing process or in laboratory to obtain additional information on possible improvements in process or in commercial production possibilities. Directs and supervises various processes to get maximum efficiency, consistent with quality and statutory obligations. Supervises installations of new equipment or alterations to existing equipments and coordinates activities of workers engaged in preparation of food material such as dairy products, baby-foods, dehydration of vegetables, canning of food, etc. May undertake process research or report to research division for

proper investigation any inexplicable and exceptional phenomenon.

**2146.55 Technologist, Food** devises new or improved technique for processing, conservation, preservation, utilisation and evaluation of contents of new food stuffs generated from plant and animal life and suitable for human consumption and animal breed. Conducts research processes to create new foods, improves existing techniques to economise processing and also to impart better values and tastes to food, such as cold storage of perishable, meat, fish, etc., canning, pickling, dehydration of fruits and vegetable etc. evolves measures such as infestation control, fungicidal treatment and insecticidal storage to protect foods from spoilage and damage. Examines food stuff contamination, adulteration, food value, etc. by biochemical and nutrition tests and quality control measures. Develops through research, new methods and processes for recovering useful and utilisable by-products from industrial and domestic wastes of food stuffs. May control and guide transformation process such as blending, antioxidisation and microbiological and sanitary measuring.

**2146.60 Technologist, Fuel** analyses physical and chemical properties of fuels (solid, liquid and gaseous) in laboratories and plants, and develops improved processes and techniques for optimum utilisation of their heating capacity. Undertakes coal surveys in field stations for quantitative and qualitative assessment of fuel resources. Determines wash ability characteristics, nature and utilisation potentialities of different kinds of fuel. Investigates properties of low-grade coals by experiments to determine their suitability for producing domestic and metallurgical coke required for recovery of by-products, like tar, gas etc. and extraction of chemicals from them by low-temperature carbonisation (heating in absence of air). Organises and conducts experimental studies on high-temperature carbonisation in relation to optimum utilisation of superior coking coal, upgrading inferior coal, blending sub-standard coking coal with prime coking coal, adoption of improved iron and steel melting techniques, etc. for purposes of production of metallurgical coke and conservation of

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coking coal reserves. Determines briquetting potentialities of fine coal, coke dust and lignites and develops improved methods of briquetting, by experimental studies, for their efficient utilisation as domestic fuel. Studies coal gasification by conducting tests on by-product fuels and inferior coal for evolving improved and purified process of manufacturing domestic and industrial gas and of utilising gas for synthesis of chemicals and oils, undertakes combustion studies in respect of by-products fuels, middlings and rejects for their utilisation in power generation for developing suitable small boiler pulverised coal burners and for developing economical combustion techniques. Determines nature of crude petroleum and related correlation indices for developing processes of upgrading Kerosene fractions of crude, producing diesel oil from coal tar fractions and utilising surplus motor spirit production etc. Conducts investigations on recovery and utilisation of by-products like gas, tar, bezol and liquor for extraction of industrially useful chemicals and acids, and on conversion coal, coal dust and slacks and other colliery and washery rejects into soil conditioners and organic nitrogenous fertilizers. Undertakes studies on evolving methods of briquetting lignites, their carbonisation and preparation of coke from them, on development of coal products from coal and other raw indigenous materials, on improving developing and standardizing methods of sampling, on analysis and testing of coal, coke and other fuels, on synthesis of liquid fuels like petroleum diesel, kerosene, etc. from coal by direct and indirect methods of hydrogenation and on statistical analysis, and on programming and survey of scientific and industrial data. Undertakes fundamental studies in different fields; designs high and low-pressure gas storage and distribution system, and appliances for utilizing fuel gas, of varying characteristics. May render technical assistance to industries and other agencies on problems of fuel, and specialise in particular kind of solid, liquid and gaseous fuel.

**2146.62 Oil Technologist** conducts research to develop new or improves processes for manufacture of oil, soap, vanaspati, paints, varnish, perfumes, essential oil and allied products etc. Studies physical and chemical properties of raw materials of oils, fats, oil

products, e.g., oil seeds. Observes extraction of oil by machine under different conditions and devises methods, techniques and process for analysis and better results. Designs and fabricates chemical plants, tests refined oil and other by-product by chemical examination. Ensures that finished products like vanaspati and other edibles conform to prescribed standards. Advices utilisation of by-products and waste products in manufacturing other commercial products like soap, scents, cylindering of oxygen, etc. and guides and supervises operation of plants and processes to improve rates of output, product quality etc.

**2146.68 Technologist, Paper** evolves and supervises chemical and technological processes for production of quality paper. Conducts research in laboratories for maximum utilisation of indigenous raw materials and reduction of industrial wastage; evolves new production techniques and improves old ones for production of various varieties of quality paper at economical and competitive cost. May supervise installation, operation and maintenance of machinery and equipment for production of paper.

**2146.70 Technologist, Alcohol** conducts research for manufacturing industrial and beverage alcohols, rectified spirits and by-products. Receives cultures of different varieties of yeast from distilleries, documents them into different varieties, tests them in laboratory, formulates results and sanctions its use by public. Conducts technical instruction of distilleries to maintain efficiency at high level. Keeps technical control on fermentation, grinding and distillation and advises distilleries and pharmacies in day to day technical problems. Advises excise department and Government on technical matters connected with fermentation industries. Inspects petrol mixing depots to examine their procedure for preparation of petrol mixture. Initiates research problems connected with fermentation industries and with properties of liquid fuels. Analyses products (intermediate and final) drawn by various excise inspectors and examines technical efficiency data furnished by various distilleries. Examines tools and equipments and premises periodically and considers

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cases for extension. Builds up researches for development purpose, recommends new application of alcohol and suitable denaturants and preserves samples.

**2146.80 Technologist, Rubber** develops production processes for manufacture of rubber products such as tyres, tubes, sports goods, rubber gloves and hot bags. Analyses physical and chemical properties of raw materials such as crude rubber, zinc oxide, acids, anti oxidants, oils softeners, colour pigments, etc. and evolves formulae for mixing raw materials in different proportions for manufacturing different types of rubber products like tyres, tubes, industrial and domestic rubber goods etc. Conducts various tests in laboratory by mixing various chemicals with rubber compounds and studying their properties to determine new formulae of production processes. Tests rubber product at each process of production to ensure conformity to prescribed standards and improvement in quality. Develops new rubber compounds and processes. Examines finished products for quality, tensile strength, and hardness etc. using different machines. May design new machinery or equipment or make improvement in existing ones. May specialise in particular fields of rubber manufacturing.

**2146.85 Technologist, Plastics** evolves, adopts and supervises various processes for manufacture of synthetic material, called plastics. Carries out research in laboratories to determine chemical composition and physical qualities of various raw materials and substances, such as coal, petroleum, wood, cotton, and evolves and adopts various processes, viz. comparison, heat moulding, lamination, calendaring, vacuum forming, fabrication, and spreading for production of synthetic materials called plastics. Tests finished products. May supervise and guide production processes in factories.

**2146.90 Chemical Engineers and Technologists, Other** include all other chemical engineers who specialise in designing and installing chemical plants, developing techniques of production processes, sales of plants and equipments and manufacture of bricks, pottery, glassware, plastics, paper, oil, fat, soaps,

cosmetics, coal tar products, dye stuffs, etc. not elsewhere classified.

### **2147 MINING ENGINEERS, METALLURGISTS AND RELATED PROFESSIONALS**

Mining Engineers, metallurgists and related professionals conduct research, design and develop and maintain commercial-scale methods of extracting metals from their ores, or minerals, water, oil or gas from the earth and of developing new alloys, ceramic and other materials, or study and advise on technological aspects of particular materials, products or processes.

**2147.10 Mining Engineer, General;** plans, organizes and supervises work of extracting metallic and non metallic minerals from earth and their treatment prior to direct use or further processing. Studies geological and topographical surveys to determine location, size, inclination, etc. of mineral deposits. Decides upon most effective and economic techniques to be used. Prepares working and development plans for mining operation including plans for roadways, railways and power supply. Supervises and co-ordinates various mining surveying and related operations such as preparation for entrance into mine by driving of shaft or otherwise, transport, ventilation, roofing by providing supports etc. and arranges storage of explosives, blasting, haulage, sampling of mined materials, sand stowing, valuing and related operations. Ensures safe extraction and efficient working. Supervises operations in treatment of minerals at mine or quarry such as washing, crushing and re-dressing. Enforces safety measures and checks unauthorised exploitation of minerals. Supervises rescue operations when required. Maintains records and statistical data and prepares reports for Government and other authorities. May advise Government regarding leasing of mineral properties and may collect rent and royalty from lessees. May undertake research in mining engineering. May be known as **Inspector of Mines; Mining Officer; Conservator, Mines;** depending on specialisation.

**2147.20 Mining Engineer, Non-Metals** plans, organises and supervises extracting of stratified deposits of solid non-metal

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minerals like coal, fire clay, gypsum, mica, precious stones etc. from earth by various mining processes. Performs basic tasks similar to those of **Mining Engineer, General** but specialises in extraction of coal, stone clay, diamond and other solid non-metallic minerals by underground or surface operations and in their preliminary treatment such as washing, ore dressing, etc.

**2147.25 Mining Engineer, Metals** plans, organises and supervises extraction of metallic ores like gold, silver, copper, iron, manganese, etc. and their preliminary treatment for further processing; performs basic tasks similar to those of Mining Engineer, General but specialises in extraction of gold, silver, copper and other metallic minerals by underground or surface operations and in their preliminary treatment by crushing and other means.

**2147.30 Mining Engineer, Petroleum and Gas** plans, organises and supervises work of extracting, storing and transporting petroleum and natural gas. Supervises geographical and geophysical surveys and studies earth samples and other data. Recommends appropriate techniques for drilling oil and gas wells, and for testing flow, pressure etc. of petroleum or gas. Advises on spacing and locating of wells, position and size of casing, location of cementing points, etc. Devises well completion methods on basis of test results and sub-surface engineering features. Calculates reserves of petroleum and gas by studying core and fluid samples. Recommends optimum production methods consistent with conservation practices and later exploitation of field. Utilises suitable surface and subsurface equipment and maintains it in working order. Treats well by various physical and chemical means to maintain production. Dehydrates oil by various physical and chemical processes. Formulates and controls compositions of drilling fluids and guards against contamination or lost circulation of oil or gas. Obtains core and subsurface sampling of reservoir fluids. Injects gas or fluids to maintain production pressure. Initiates and supervises regulations regarding safety and fire protection. Maintains accurate records of oil, gas and water production for engineering, royalty, tax and other purposes.

May be known as **Production Superintendent or Production Engineer, Petroleum; Reservoir Engineer, Crude Oil; Mud Engineer, Petroleum** according to attainments and experience gained.

**2147.40 Metallurgist, Extractive; Production Metallurgist; Process Metallurgist** plans, organises and controls extraction of metals from ores, their conversion into industrially useful products and production of alloys. Analyses ore and determines methods of extraction of metals to be employed such as pyrometallurgy (dry method, carried on at elevated temperature in furnace), hydrometallurgy (wet method, dissolving ore in suitable solvent and then precipitating or depositing metal by suitable substance or electrolysis) or electrometallurgy (carried out at high temperature and tapping metal in fused condition) depending on type, quality and quantity of ore. Ensures maximum economic extraction of metal or alloy of best possible prescribed grade. Prescribes temperatures, proportions of ingredients and chemicals to be added, solvents to be used, voltage required and controls them at all stages of production. Supervises production, and controls all operations such as smelting, calcining, roasting, oxidising, flux, charging fusibility of compounds, distillation, precipitation, current, voltage, and deposition of metal. Analyses samples at regular intervals, records observations and makes needed adjustments according to furnace and bath (large lined metal trays) condition to ensure that metal or alloy produced conforms to prescribed quality and quantity. May design and supervise construction or repairs of furnace, bath, etc. May test physical properties of metal or alloy produced for quality control and to effect improvement.

**2147.50 Metallurgist Adaptive; Metallurgist, Physical; Metallurgist, Mechanical** investigates properties and treatment of metals and supervises production of basic metals and alloys. Conducts microscopic (both low and high magnification) spectroscopic, X-Ray, and other studies of metals and alloys to determine their physical characteristic such as crystalline structure, dispersion of alloy particles through basic metal and presence of

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impurities, fractures and other defects in metal samples. Develops techniques for rolling, alloying, casting, forging, drawing (metal drawing), spinning, diecasting, welding, heat-treating and like operations obtain desired characteristics such as ductility, malleability, elasticity, plasticity, toughness, hardness, strength, etc. Tests samples at different stages of production, adopting pressure and other suitable devices and apparatus to determine their compliance with prescribed standards. Undertakes designing of mills and assists **Electrical and Mechanical Engineers** in repairs and maintenance.

**2147.90 Mining Engineers, Metallurgists and Related Professionals, Other** include all other mining engineers and metallurgists such as those engaged in developing new types of alloys, supervising construction and repair of metallurgical furnaces, testing physical properties of metals and alloys etc. and consultation for planning and extraction of mineral product, conducting research in sampling of precious metals, fumes and ores etc. not elsewhere classified.

#### **2148 CARTOGRAPHERS AND SURVEYORS**

Cartographers and Surveyors apply surveying methods and techniques to determine the exact position of natural and constructed features and boundaries of land, seas, underground areas and celestial bodies, and prepare or revise digital, graphic and pictorial representations.

**2148.10 Cartographer** prepares maps from aerial photographs, technical drawings, data etc. Checks workability and combination of air photographs to bring them to proposed scale of map. Marks streams, railways, sites, contours, vegetation and other items of aerial photographs with ink for details. Draws maps to prescribed scale ensuring correct geographical position with regard to boundary lines, latitudes and longitudes. Indicates physical, political, industrial and other details on maps using respective conventional signs. Traces ink-marked items on tracing film for use in administration, research, survey, excavation, construction, mining, exploration of minerals etc.

**2148.20 Surveyor, Topographical** surveys land to determine out line, contours and relative position of control points (land marks) on tract of land, coast, harbour, etc. for preparing topographical and other maps and records. Establishes control points and pillars to do instrumentation work on ground to prepare maps. Provides identification marks on ground for photographs taken in aerial survey. Fixes position of control points on ground in relation to some permanent position and with reference to celestial bodies using astrolabes (for lat. and long), transit telescopes (for time and longitudes), field magnet instruments (for magnetic forces and elements), theodolites and precise levels, tellurometers (electronic distance measuring instruments) barometers for atmospheric pressure, etc. Adjusts and sets theodolites, compasses, plane tables, levelling and other instruments for surveyor, observes and records measurements and angles from three determined points (triangulation), locations to scale on proper sketch. Corrects margin of error due to worn-out tapes which become incorrect, and readings on instruments which are affected by light, sound, heat, tension, environments and gravitational changes due to varying reserves underneath ground. May be known as **Superintendent Surveyor Officer Surveyor** or **Surveyor** according to degree of authority.

**2148.25 Aerial-Photograph Interpreter** analyses aerial photographs to detect significant industrial, resource, or topographical data: Studies photographs to locate roads, industrial centers, rivers, forest areas, and to determine nature of terrain. Interprets photographs to evaluate the potentiality of resources. May draw maps for use of field officers in planning and exploitation of resources. May interpret photographs for timber evaluation, water shed management, construction, or mining. May request enlargement of photograph for more detailed analysis. May use computers and data banks to store, retrieve, and compare information.

**2148.30 Surveyor, Photogrammetric; Surveyor, Reproduction** prepares topographical and project maps from air photographs of area by determining longitude and latitude of number of points on



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ground by triangulation or traverse method. Connect photographs together in proper sequences aligning, features, pointing out details and information such as names of places, rivers, tracks administrative and forest boundaries and other verification data to have continuous picture of area photographed. Identifies control points using stereoscopes and verifies points on ground if they are not clear on photographs due to different scales of photograph from point to point, distortions or otherwise. Brings photograph on same scale applying graphical methods or using Photogrammetric machine.

**2148.40 Surveyor, Mine** surveys mines and prepares maps indicating location, topographical and underground features describing outline, results of deposits, natural or other barriers, linking space for passages and seams, crevices for driving shafts for mechanical quarrying, etc. for open pit and underground mines. Performs function of **Surveyor, Topographical** and directs **Topo-Auxiliaries** or helpers in location of points and in placing of instruments, theodolites, compasses, etc. Works as **Topo-Traverser** for connecting points by metered chains and takes measurements. Records size, location, elevation, angles, and plots data on drawing-paper marking boundaries, showing exact location of roads structures, natural or artificial barriers, surface and underground mineral, bringing out topographical features. May specialise in survey of coalmines, metal mines or quarries.

**2148.50 Surveyor, Hydrographic; Surveyor, Marine** surveys and maps areas bounded, banked or inundated by waters of rivers, lakes, sea, water-sheds, etc. indicating shore lines and including other information in chart for use of navigators and for constructing piers and light houses. Determines underwater features of sea, nature of river beds and depth of waters from several points (control points) by sounding echoes and or depth charges from survey ships for determining navigability and constructing piers and light houses. Collects details regarding behaviour of ocean currents and prepares charts. Register surfacing of rocks in chart for warning to boats chartering those waters. Incorporates tidal behaviour during different times of year in maps to add

navigation. Produces charts and other ancillary publications such as "Notices to Mariners" to inform them of changes in waters, light houses, etc. May be known as **Civil Hydrographic Assistant, Civil Hydrographic Officer; Principal Civil Hydrographic Officer; Assistant Chief Hydrographic; Chief, Civil Hydrographic** according to degree of responsibility.

**2148.90 Cartographers and Surveyors, Other** Cartographers and Surveyors apply surveying methods and techniques to determine the exact position of natural and constructed features and boundaries of land, seas, underground areas and celestial bodies, and prepare or revise digital, graphic and pictorial representations and all other Cartographers and Surveyors not classified elsewhere.

#### **2149 ARCHITECTS, ENGINEERS AND RELATED PROFESSIONALS n.e.c.**

This 'Family' covers architects, engineers and related professionals not classified elsewhere in 'Group' 214, Architects, Engineers and related Professionals.

**2149.05 Solar-Energy-Systems Designer** designs solar domestic hot water and space heating systems for new and existing structures, applying knowledge of energy requirements of structure, local climatological conditions, solar technology, and thermodynamics: Estimates energy requirements of new or existing structures, based on analysis of utility bills of structure, calculations of thermal efficiency of structure, and prevailing climatological conditions. Determines type of solar system, such as water, glycol, or silicone, which functions most efficiently under prevailing climatological conditions. Calculates on-site heat generating capacity of different solar panels to determine optimum size and type of panels which meet structure's energy requirements. Arranges location of solar system components, such as panel, pumps, and storage tanks, to minimize length and number of direction changes in pipes and reconstruction of existing structures. Studies engineering tables to determine size of pipes and pumps required to maintain specified flow rate through solar panels. Specifies types of electrical controls, such as

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differential thermostat, temperature sensors, and solenoid valves, compatible with other system components, using knowledge of control systems. Completes parts list, specifying components of system. Draws wiring, piping, and other diagrams, using drafting tools. May inspect structures to compile data used in solar system design, such as structure's angle of alignment with sun and temperature of incoming cold water. May inspect construction of system to ensure adherence to design specifications.

**2149.10 Works Inspector, Engineering;** inspects and tests raw materials and finished products in factory or institution, using various testing and measuring equipment and ensures that raw materials and finished goods conform to specified standards. Conducts physical tests of raw materials and gets it chemically tested by **Chemists** to see that it conforms to prescribed standards of quality and quantity; rejects materials not conforming to required specification. Carries out stage inspection of finished and semi-finished goods. Enforces quality control methods in load test, durability, flexibility, hardness and other tests depending upon value of components or goods and importance of products, supervises and controls production work to keep percentage of rejection at minimum. Stops operations when percentage of rejection is high and informs superiors for rectification of machines or tools. Maintains record of work indicating type of product checked, percentage of rejections, reasons for rejection etc. Certifies passed articles or goods conforming to prescribed standards. Is designated as **Boiler Inspector** if engaged in inspecting boilers or ensuring production of boilers to required specifications. May specialise in particular types of components or products.

**2149.15 Instrument Engineer,** designs and supervises operation and maintenance of electrical, mechanical and thermal instruments and control equipment necessary for safe and efficient operation of industrial plant. Studies plant layout and process requirements to determine type and number of items needed; writes specifications for selection of stock or special instruments from supplies. Directs installation, calibration, and testing of equipment.

Supervises application, inspection, and maintenance of instruments in operation.

**2149.17 Biomedical Engineer** conducts research into biological aspects of humans or other animals to develop new theories and facts, or test, prove, or modify known theories of life systems, and to design life-support apparatus, utilising principles of engineering and bio-behavioral sciences: Plans and conducts research concerning behavioural, biological, psychological, or other life systems. Studies engineering aspects of bio-behavioural systems of humans, utilising knowledge of electrical, mechanical, chemical, or other engineering principles and knowledge of human anatomy and physiology. Develops mathematical models to simulate human bio-behavioural systems in order to obtain data for measuring or controlling life processes, utilising knowledge of computer, graphics, and other related technologies. Designs and develops instruments and devices, such as artificial organs, cardiac pacemakers, or ultrasonic imaging devices, capable of assisting medical or other health-care personnel in observing, repairing, or treating physical ailments or deformities, using knowledge of materials compatible with body tissues, energy exchanges within the body, and instrumentation capable of measuring and controlling body functions. May specialise in design and development of biomedical equipment used by medical faculties and be known as Clinical Engineer.

**2149.18 Agricultural Engineer,** applied engineering principles to solve related agricultural problems. Designs, develops and supervises manufacturing of agricultural machinery, such as pumps and irrigation equipment, tractors, cultivators, sprayers, dusters and harvesters. Lays out and supervises construction of farm buildings and utilities, crop processing plants and rural electric power distribution systems. Conserves soil and water by installation of irrigation, drainage, and flood and soil erosion control systems. May specialise in such field as farm management, pest control, rural roads and farm fire protection.

**2149.20 Textile Technologist** conducts research in chemistry of textiles and institutes methods to control processes for

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scouring, bleaching, mercidising,; sizing, and dyeing textiles. Prepares formulae for various phases of processing. Controls variables, such as temperatures, sequence of operation, and concentration of chemicals, for treatment of silk, cotton, wool, rayon, and other fabrics during processing. Experiments with synthetic and re-generated fibers, animal hair, feathers, cellulose products, and other materials to develop new textiles. Investigates problems relating to textile chemistry, such as treatment of fabrics to impart water, fire, mildew, or insect resistant qualities, to reduce fabric shrinkage, or to develop qualities of shape retention and abrasion resistance in textile. May analyse dyes, alkalies, acids, bleaches, and finishes for conformance to specifications. May design, erect and patent new textile machinery.

**2149.22 Radiation-Protection Engineer**

supervises and coordinates activities of workers engaged in monitoring radiation levels and condition of equipment used to generate nuclear energy to ensure safe operation of plant facilities: Evaluates water chemical analysis data in primary and supportive plant systems to determine compliance with radiation content and corrosion control regulations. Investigates problems, such as radioactive leaks in reactors and auxiliary systems, or excessive radiation or corrosion of equipment, applying knowledge of radiation protection techniques and principles of chemistry and engineering to correct conditions. Confers with departmental supervisors, manufacturing representatives, and regulatory agency staff to discuss problems, to develop tests to detect radioactive leaks, and to design plans to monitor equipment and safety programmes. Directs workers in testing and analysing water samples and monitoring processing system. Prepares reports, such as environmental monitoring operation report, radioactive waste releases, and shipping reports, for review by administrative personnel and submission to regulatory agency. May prepare employee performance reviews and related reports.

**2149.23 Nuclear Engineer** conducts research into problems of nuclear energy systems; designs and develops nuclear equipment; and monitors testing, operation,

and maintenance of nuclear reactors: Plans and conducts nuclear research to discover facts or to test, prove, or modify known nuclear theories concerning release, control, and utilisation of nuclear energy. Evaluates findings to develop new concepts of thermonuclear analysis and new uses of radioactive processes. Plans, designs, and develops nuclear equipment such as reactor cores, radiation shielding, and associated instrumentation and control mechanisms. Studies nuclear fuel cycle to define most economical uses of nuclear material and safest means of waste products disposal. Monitors nuclear tests and examines operations of facilities which process or utilize radioactive or fissionable material to ensure efficient functioning and conformance with safety specifications, regulations, and laws. Prepares technical reports, utilising knowledge obtained during research and development activities and inspectional functions. May direct operating and maintenance activities of operational nuclear facility.

**2149.25 Jute Technologist**

conducts research and improves standards and quality of jute fiber and jute products. Carries out research in physical, chemical and testing laboratories and suggests measures for increasing agricultural yield of jute by scientific sowing, rearing and harvesting. Devises better facilities for separating fiber from plant stem and protecting jute crops from pests and diseases. Identifies various chemical components and compositions of fiber structure; checks chemical reaction on fiber to modify or change its original chemical properties and characteristics; improves and produces fiber of better quality with increased stiffness, toughness, rigidity and resilience. Evolves tests and develops new processing techniques and equipment, and supervises their proper installation and maintenance.

**2149.30 Fiber Technologist**

conducts research in extraction and utilisation of vegetable (animal or synthetic) fibers such as jute, moonj, ganja, etc., and develops techniques for spinning and weaving of fibers, and for pulping fiber for making utility goods, like paper, card-board and allied materials. Sets raw material for decomposition by bacterial action to identify

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fiber. Conducts physical and chemical tests for identification of fiber and fiber damage and also to assess presence of non-fibrous impurities and contents of hygroscopic nature, tensile strength, elasticity, elongation, staple length, frictional characteristics, fineness, diameter etc. of fiber. Supervises workers engaged in extraction and processing and guides and trains them on proper lines. May find substitute for rare fibers and direct adulteration. May mix together various fibers to form ultimate product by chemical and microscopic examination.

**2149.35 Spinning Master** organises, controls and supervises various processes in spinning yarn from various fibers such as wool, jute, cotton etc. Directs mixing and blending of different grades of fiber to produce yarn of required quality. Supervises cleaning, carding and combing of fiber and drawing spinning of yarn. Ensures that required degree of temperature and humidity in various spinning sections is maintained. Visits spinning sections constantly to check continuity of operations. Gets machines repaired or replaced for restoration of work. Controls staff and ensures that quantity and quality of production are maintained. Keeps machinery and equipment in good working order for optimum efficiency. May advice management to introduce new methods or devices to improve quality and quantity of yarn production. May conduct research to evolve better methods of production.

**2149.40 Weaving Master** organises, controls and supervises weaving of clothes, calendaring and process preparatory to weaving such as winding, warping, sizing, etc. Instructs Jobbers for proper winding, warping and sizing of yarn. Ensures that required degree of temperature and humidity in various weaving sections is maintained. Visits sections periodically and supervises work of men under charge. Ensures that quality of cloth produced conforms to prescribed standard and suggests alterations and improvements wherever necessary. Gets machines repaired or replaced as necessary for restoration of work. Maintains quality and quantity of production and keeps machines, looms and equipment in good working order. Controls staff and maintains discipline. May introduce new methods and

devices to improve quality of cloth. May conduct research for better methods of production.

**2149.45 Dyeing and Bleaching Master; (Textile)** organises, controls and supervises dyeing and bleaching of yarn and cloth. Controls costing of all incidental processing of dyeing, bleaching etc. and determines dyes and their proportions for dyeing yarn and cloth to required colour and shade. Supervises mixing of dyes according to predetermined formula, and its heating to required temperature. Tests sample of dye solution on textiles to get desired colour and shade visits sections periodically and supervises various operations such as bleaching of yarn or cloth in kier, washing and dyeing them in special dyeing machines and ensures quality of production. Tests sample of dyed cloth in laboratory to check fastness of colour, etc. Maintains machines and equipment in perfect working condition. Keeps record of batches of colours mixed, quantity of yarn and cloth bleached and dyed etc. May specialise in processes of dyeing or in bleaching of yarn and cloth and be designated as **Dyeing Master** or **Bleaching Master** according to nature of work performed. May conduct research for evolving better methods of production and different colour combinations. May train new workers in department.

**2149.50 Printing Master; (Textiles)** organises, directs and supervises printing of cloth in various designs ensuring quality, output and smooth running of printing department. Arranges for supply of necessary chemicals and dyes. Checks mixing of colours in required proportions for printing purpose. Examines printed sample to check its quality and carries out chemical tests to ensure its fastness. Ensures regular supply or required quantity of cloth for printing in his department. Gets printing rollers with required engraving of pattern fitted in printing machine. Supervises work of **Printers Textile** to ensure quality and output. Maintains record of job orders completed, and batches of colours used. May check operations of printing machines to ensure optimum output and may make arrangements for repair of defects in machines or replacements of parts.

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**2149.55 Sugar Technologist** conducts research and devises improved methods and processes for manufacture of high quality sugar and other by-products such as molasses, power alcohol etc. Studies physical and chemical properties of raw cane-juice, conducts alkaline and acidity test of juice, and determines type of equipment needed for boiling juice, and quantity of lime or sulphur to be added in chemical process. Sets up pilot plant and studies its working under given conditions. Designs or manufactures latest machinery and equipment or suggests changes or alterations to existing machinery or equipment. Studies corrosive action on metals, formation of scales on pans, loss of heat to pans etc. and suggests use of proper metal to eliminate corrosion on metal for increased production. Tests and examines various by-products and advises on their maximum utilisation or conversion into commercial products such as making alcohol from molasses, commercial, cylindering of gases like **Oxygen, Carbon dioxide**, etc. Supervises erection of plant and renders guidance in set up.

**2149.57 Dairy Technologist** applies principles of bacteriology, chemistry, physics, engineering and economics to develop new and improved methods in production, preservation, and utilisation of milk, cheese, ice cream, and other dairy products: Conducts experiments in such problems as preventing bacterial increase in milk during handling and processing, improving pasteurisation methods, and designing better packaging materials, dairy equipment, or supplies. May specialise according to product, as ice cream or cheese, or according to functional activity, as sanitation research or storage problems.

**2149.60 Wood Technologist** conducts experiments and investigates problems connected with seasoning, preservation and utilisation of timber and its by-products and evolves methods for curing timber, testing it for strength, converting it into charcoal, plywood, etc. Studies physical properties of wood such as hardness, pliability, moisture, shrinkage, stresses during drying, etc. Devises scientific and economical methods of improving properties of ready use, maintains ledger files, containing collection of tropical and other forestry literature and

gives technical advice to interested parties on matters connected with subject. May coordinate procurement and supply of seeds of various species between agencies concerned. May coordinate activities of different state units, for promoting mensurational research all over country. May study different types of soil erosion, its causes and determine suitable preventive remedial measures. May impart advance training on subject to State Forest Officers and students of Forest College and maintain silviculture museum.

**2149.65 Leather Technologist** conducts research for developing tanning processes for manufacture of leather, conforming to prescribed standards. Examines hides and skins for structural defects. Studies preservative methods practiced by **Tanners** and suggests improvement in existing methods of preservation and drying for making better leather. Evolves new method of vegetable and chrome tanning of skins, hides, sole leathers, etc. to reduce cost of tanning. Analyses various chemicals such as salts, dyes, oils and other chrome compounds used in leather industry to determine properties. Tests tanned and finished leather at every stage for conformity to prescribed standards of quality. Conducts research on utilisation of by-products, treatment of abnoxious odours and tannery effluents, use of waste products for manufacture of leather boards, gut and surgical sutures, gelatin etc. Plans, designs and installs new equipment and machines. Demonstrates correct and economical methods of vegetable or chrome tanning of leather and skins, use of machine and manufacture of industrial and fancy leather to guide **Tanners**. May specialise in particular branches of study like vegetable or chrome tanning, utilisation of by-products, manufacture of industrial or fancy leathers, sports goods leather, garment leather, dying and finishing of leather etc.

**2149.70 Glass Technologist** conducts experiments in chemistry of glass and develops and controls processes involved in manufacture of glass products. Devises and installs laboratory and batch-control systems. Selects formulae to be used in compounding standard type of glass and develops new formulae to produce special purpose glass

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such as optical glass, glass oven-wear, or coloured glass products. Directs activities of operating crew engaged in compounding ingredients and charging melting furnaces. Ascertains furnace temperature periodically and makes necessary temperature adjustments. Determines characteristics of glass samples by subjecting them to chemical and physical test.

**2149.72 Ceramic Technologist** conducts research, develops processing techniques and supervises technical work concerned with manufacture of ceramics products. Supervises testing of physical, chemical and heat-resisting properties of materials such as clays and silicas. Analyses result of test to determine combinations of materials which will include quality of products. Conducts research into methods of processing, forming and firing of clays to develop new ceramic products, such as refractories for air craft, and for using glass and steel furnaces. Designs equipment and apparatus for forming, firing and handling products. Coordinates testing activities of finished products for characteristics, such as texture, colour, durability, blazing and refactoring properties. May specialise in any branch of ceramic production, such as brick, glass, crockery, tile, pipe or refractories. May specialise in developing heat-resistant and corrosion-resistant material for use in nuclear energy field.

**2149.74 Printing Technologist** conducts research and develops better and economical printing processes for use in printing industry. Evolves processes of letterpress printing, off-set printing (lithography), gravure printing (reserve of letter printing), and screen printing. Conducts research for utilizing electronic and magnetic devices in printing processes e.g. composing, electro typing, stereo typing, photo composition, photo engraving, oil-type composition. Develops rapid and accurate methods of composing matter; evolves better and economical processes of printing to serve different printing purposes or specific processes. Experiments with different links, papers and machines to improve ultimate printed matter. May supervise printing processes in printing press.

**2149.76 Industrial Engineer** performs variety of engineering work in planning and overseeing utilisation of production facilities and personnel in development or other subdivision of industrial establishment. Studies and plans equipment layout, work flow, and accident prevention measures to maintain efficient and safe utilisation of plant facilities. Plans and supervises work study and training programmes to promote efficient manpower utilisation. Develops and ensures quality control, cost control, inventory control, and production record systems. May study manner in which particular tasks are performed and suggest improved methods. May work independently as consultant to any Organisation needing advice and assistance.

**2149.77 Packaging Engineer** plans and directs activities concerned with design and development of protective packaging containers: Analyses engineering drawings and specifications of product to determine physical characteristics of item, special-handling and safety requirements, and type of materials required for container. Consults with establishment's purchasing and production departments to determine costs and feasibility of producing proposed packaging. Develops or directs development of sketches, specifications, samples, and written analyses of proposed packaging in order to present design for approval. May confer with customers or sales representatives to draw up contracts. May advise employer or customers on efficient packing procedures, innovations in packaging materials, and utilization of sealing and fastening devices.

**2149.78 Planning Engineer, Development Engineer** plans and directs activities for increasing operational efficiency in production of articles using appropriate machine at less cost. Studies work orders, availability raw materials, production methods and production capacity of machines. Examines plans, sketches, diagrams etc. of articles to be produced and decides on type of machine to be used and sequence of production operations. Assesses and arranges quantum of raw materials required for production of articles. Arranges for layout of plants. Decides use of special tools or equipments to ensure quick and

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continuity of work operations. Prepares work schedules and instructs section heads to complete work orders. Coordinates work of different sections and eliminates delays or removes difficulties. Supervises work of subordinates and ensures that finished products conform to prescribed standard and specifications, and are turned out within time targets. Adjusts work load of men and machines to achieve optimum results. May supervise construction and erection of machine and equipment.

**2149.80 Methods Engineer** plans sequences of operations to be followed for manufacture of articles. Examines blueprints, sketches, and specifications of product to be made. Lays out steps to be followed in process, using knowledge of materials, machine operations, plant layout and mathematics to select least expensive and most efficient production methods. Specifies machines and kinds of cutting tools and set ups to be used. Writes technical reports. May coordinate activities with design, production and other departmental personnel.

**2149.82 Time and Motion Study Engineer** develops work measurement procedures and directs time-and-motion studies to promote efficient and economical utilization of personnel and facilities. Directs or conducts observation and analysis of personnel and work procedures to determine time and motion requirements of job duties. Analyses work study data and equipment specifications to establish time and production standards. Applies mathematical analysis to determine validity and reliability of sampling and work study statistics. Applies principles of industrial engineering and applied psychology to evaluate work methods proposals and to develop recommendations to management affecting work methods, wage rates, and budget decisions. Trains Industrial-Engineering Technicians in time-and-motion study principles and techniques.

**2149.84 Engineering Estimator** prepares cost and work completion estimates for engineering works. Compiles itemized materials and price lists from blueprints and specializations and itemizes equipment readily available or to be purchased from outside sources. Computes cost and

estimates of raw material, purchased equipment and labour required for work and decides delivery dates. Keeps in touch with market conditions regarding prices of commodities, raw materials, fluctuations in prices, labour hiring charges etc. May compute percentage profits and add to cost estimates. May consult with engineering departments concerning cost problems.

**2149.85 Safety Engineer** inspects industrial plants for hazards, suggests measures preventing or reducing industrial accidents for diseases, or for correcting other injurious environmental conditions which creates hazards to life and property or reduce workers morale and efficiency. Examines plans and specifications of new premises, plant or equipment and ensures that adequate precautions have been taken to avoid hazards. Inspects buildings, equipment and processes to locate hazardous work places, determines amount of weights that can be placed on plant floor with safety and advises on selection and use of goggles, safety belts, protective clothing, extractor fans, ventilators and similar safety equipments. Inspects fire fighting equipment and advises on preparations to be taken against risk of fire. Designs and supervises manufacture and installation of machine guards and other devices to prevent accidents. Investigates causes of accidents and introduces measures to prevent their recurrence. Plans, organises and carries out educational programmes on accident prevention, using lectures, products, films and other means.

**2149.86 Occupational Health and Safety Specialist** reviews, evaluates, and analyses work environments and design programmes and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals. May be employed in the public or private sector. Investigates adequacy of ventilation, exhaust equipment, lighting, and other conditions which may affect employee health, comfort or efficiency. Conducts evaluations of exposure to ionizing and nonionising radiation and to noise. Collects samples of dust, gases,

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vapours, and other potentially toxic materials for analysis. Recommends measures to ensure maximum employee protection. Collaborates with engineers and physicians to institute control and remedial measures for hazardous and potentially hazardous conditions of equipment. Participates in educational meetings to instruct employees in matters pertaining to occupational health and prevention of accidents. Prepares reports including observations, analysis of contaminants, and recommendation for control and correction of hazards. Reviews physicians' reports and conducts worker studies to determine if diseases or illnesses are job related. Prepares and calibrates equipment used to collect and analyze samples. Prepares documents to be used in legal proceedings and gives testimony in court proceedings.

**2149.87 Waste-Management Engineer, Radioactive Materials** designs, implements, and tests systems and procedures to reduce volume and dispose of nuclear waste materials and contaminated objects: Identifies objects contaminated by exposure to radiation, such as trash, workers' clothing, and discarded tools and equipment. Analyses samples of sludge and liquid effluents resulting from operation of nuclear reactors to determine level of radioactivity in substances and potential for retention of radioactivity, using radioactivity counters and chemical and electronic analysers. Refers to state and federal regulations and technical manuals to determine disposal method recommended for prevention of leakage or absorption of radioactive waste. Compares costs of transporting waste to designated nuclear waste disposal sites and reducing volume of waste and storing waste on plant site. Confers with equipment manufacturers' representatives and plant technical and management personnel to discuss alternatives and to choose most suitable plan on basis of safety, efficiency, and cost-effectiveness. Designs and draws plans for systems to reduce volume of waste by solidification, compaction, or incineration. Oversees construction, testing, and implementation of waste disposal systems, and resolves operational problems. Develops plans for modification of operating procedures to reduce volume and radioactive level of effluents, and writes manuals to

instruct workers in changes in work procedures. Advises management on selection of lands suitable for use as nuclear waste disposal sites and on establishment of effective safety, operating, and closure procedures.

**2149.88 Pollution-Control Engineer** plans and conducts engineering studies to analyze and evaluate pollution problems, methods of pollution control and methods of testing pollution sources to determine physiochemical nature and concentration of contaminants: Reviews data collected from pollution emission sources. Performs engineering calculations to determine pollution emissions from various industrial sources and to evaluate effectiveness of pollution control equipment. Reviews compliance schedules and inspection reports to ensure compliance with pollution control regulations. Recommends issuance or denial of permits for industries to construct or operate facilities. Advises enforcement personnel of noncompliance or unsatisfactory compliance with regulations. Develops or modifies techniques for monitoring pollution. Calibrates and adjusts pollution control monitors to ensure accurate functioning of instruments.

**2149.90 Architects, Engineers and Related Technologists, Other** include all other engineers and technologists such as those engaged in proper utilization of machine and manpower, safety devices and other industrial problems, research work in laboratories and application of results thereof to manufacture and practical problems, not elsewhere classified.

## 22 LIFE SCIENCE AND HEALTH PROFESSIONALS

Life Science and Health Professionals conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to fields such as biology, zoology, botany, ecology, physiology, biochemistry, microbiology, pharmacology, agronomy, and medicine.

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Life science professionals conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to biology, microbiology, botany, zoology, ecology, anatomy, bacteriology, biochemistry, physiology, cytology, genetics, agronomy, pathology, or pharmacology.

**2211 BIOLOGISTS, BOTANISTS, ZOOLOGISTS AND RELATED PROFESSIONALS**

Biologists, botanists, zoologists and related professionals conduct research, improve or develop concepts, theories and operational methods and apply scientific knowledge relating to biology, microbiology, bacteriology, cytology, genetics, zoology, botany and ecology, specially in the fields of medicine and agriculture.

**2211.10 Biologist, General** studies and conducts research on various aspects of plant and animal life such as their origin, development, physiology, heredity, environments, reproduction, adaptability, inter-relationship and classification in field or laboratory. Undertakes field study of plants or animals in their natural habitat or collects specimens for study in laboratory. Dissects and studies specimens using microscope, chemicals, photographic methods and other scientific aids. Identifies, classifies and preserves specimens for research and study purposes. Makes statistical analyses of experimental data and prepares reports on findings. May raise experimental plants or animals. May apply results of studies to evolution aspects of human life. May teach students in colleges and schools. May specialise in particular research aspect of evolution and animal or plant life.

**2211.15 Marine Biologist** studies plant and animal life in sea, shore, shallow and off-shore waters and their environmental conditions and that affect their relative abundance and distribution. Makes periodical trips to sea or spot of study to investigate water temperature, light acidity, amount of oxygen, and other physical conditions at various depths to determine their relation to abundance of different forms of marine at various levels and in different

areas. Collects samples of water and specimens of various types of marine life including worms, snails, small plank tonic organisms upon which fish etc. feed. Conducts research in laboratory and investigates evolution of life in sea. Relates findings of research to economic exploitation of sea life, marine products, etc. may specialise in fresh water fish and be designated as **LIMNOLOGIST**.

**2211.20 Cytologist** studies and conducts research in plant and animal cells in relation to their functions, formation, growth behaviour, physical and chemical reactions, disease, etc. selects and cuts sections of minute parts of animal or plant tissues for microscopic study and employs stain techniques to make self structures visible or to differentiate parts for study. Studies component parts and details of division of cell. Relates findings to breeding and reproduction of plants and animals carrying particular characteristics or hereditary characters. Determines physical and chemical factors for growth of cells. Raises different plants in experimental farm for breeding and hybridization. Observes behaviour of hybrids with reference to chromosome pairing, cause of sterility etc, and effect of physical and chemical agents like X-rays, gamma rays, chemical solutions etc. introduces desirable characters from wild relatives of crop plant into cultivated plant. May be designated as **CYTOGENETICIST** if specializing in transfer of genetic characters and as **PLANT CYTOLOGIST OR ANIMAL CYTOLOGIST** according to field of specialization. May teach students.

**2211.25 Ecologist** studies effects of environmental influence of growth, development, distribution etc. of plant or animal life. Undertakes field trips to study plants or animals in their natural habitat. Observes environmental influence such as temperature, rainfall, altitude, kind and quantity of food etc. and their effect on plant or animal growth and development. Classifies or catalogues drought resistant areas and type of fodder and pastures suitable for those areas. Propagates or introduces special varieties of plant, grass, weed etc. to suit local climatic conditions. Runs experimental farms or laboratories

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under natural and artificial condition to watch effect of climatic condition on crops, plants or animals. Studies geographical distribution of different species and genera of Indian flora and role of plants as indication of special types of soil and chemicals. Conducts research on suitable plants from different parts of India or from similar climates outside India for regeneration of swamps and deserts. Is designated as **PLANT ECOLOGIST** or **ANIMAL ECOLOGIST** according to field of specialization.

**2211.27 Environment Scientist (Including Health)** conducts research or performs investigation for the purpose of identifying, abating, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population. Utilising knowledge of various scientific disciplines may collect, synthesize, study, report, and take action based on data derived from measurements or observations of air, food, soil, water, and other sources. Analyses data to determine validity, quality, and scientific significance, and to interpret correlations between human activities and environmental effects. Collects, synthesises, and analyses data derived from pollution emission measurements, atmospheric monitoring, meteorological and mineralogical information, and soil or water samples. Conducts environmental audits and inspections, and investigations of violations. Designs and directs studies to obtain technical environmental information about planned projects. Determines data collection methods to be employed in research projects and surveys. Develops methods to minimize the impact of production processes on the environment, based on the study and assessment of industrial production, environmental legislation, and physical, biological, and social environments. Evaluates violations or problems discovered during inspections in order to determine appropriate regulatory actions or to provide advice on the development and prosecution of regulatory cases. Investigates and reports on accidents affecting the environment. Monitors effects of pollution and land degradation, and recommends means of prevention or control. Monitors environmental impacts of development activities.

**2211.30 Taxonomist**, studies, identifies and classifies plants and animals under standard nomenclatures. Undertakes excursions and field trips to collect various kinds of animals or plants with roots, flowers, fruits etc. as necessary. Studies, dissects and mounts slides for examination. Examines slides and minute parts under microscope and relates findings for correct identification of parts and classifies them giving standard nomenclature indicating genus and species they belong to. Preserves specimens in special preservatives or in herbarium sheets as appropriate. May specialise in particular field and be designated as **TAXONOMIST, ANIMAL** or **TAXONOMIST, PLANT** according to field of study.

**2211.35 Botanist, General** studies origin, development, structure, physiology, reproduction, economic value, etc., of plants for use in such fields as agriculture, forestry horticulture. Undertakes field trips for study of basic aspects of plant life in natural environments. Collects specimens of plants and of rare species or phenomena for study in laboratory. Cuts sections and studies formation of cell and tissues in plants using microscope, special staining techniques and scientific equipment. Identifies and classifies plants. Studies effect on plant growth of environment factors such as rain fall, temperature, climate, soil etc. Devises new methods and measures for growing of plants and other crops useful to human and animal life. Reports on medicinal value of plants and evolves measures for its economic exploitation. Preserves plants and other plant parts in special preservatives or in herbarium sheets. Maintains experimental botanical garden for study and research purposes. May teach students. May conduct research in special fields of study such as ecology, mycology, algology, embryology, etc. May specialise on experiment and research on particular crops like rice, sugarcane, cotton etc. and be designated as **RICE SPECIALIST, SUGARCANE SPECIALIST, COTTON SPECIALIST** etc.

**2211.37 Economic Botanist** specialises in study of plants yielding food, fibre, medicines, essential oil, resin, gum, dyes etc., for economic and industrial purposes and determines conditions necessary for their

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growth, development and utilization. Collects various types of plants of economic value and grows them under control conditions to determine best climatic soil and other essentials. Selects, tests and cross fertilizes (breeds) plants to obtain optimum qualities and quantities of plants for use as food, drugs, fibre, and other economic purposes. May specialise in such fields as oil bearing trees, resins, foods, condiment, forage crops etc.

**2211.40 Plant Breeder** conducts experiments in fields and under controlled conditions to breed improved varieties of plants in relation to size, quality, yield, resistance to frost and diseases etc. Studies different characteristics of plants, such as their growth, yield etc. of both imported and indigenous varieties. Grows plants in selected areas under controlled climatic conditions. Compares characteristics of indigenous varieties with foreign or imported varieties to select best breed for local propagation. Breeds or cross-breeds plants of one variety with another to evolve strain of improved yield, height, size, resistance to diseases etc. Grows in experimental farms nucleus seed to multiply them under controlled conditions of soil, fertility, climate, irrigation etc. Breeds new varieties by inducing artificial mutation by use of light rays, chemicals and radio-active isotopes. Conducts sample check of yield, quality, quantity etc. handles plant after variety is released. May specialise in breeding particular crop plants, such as cotton, millets, pulses, oil seeds, paddy, sugarcane, etc. May teach students.

**2211.45 Paleobotanist**, studies fossilized remains of plants found in geological formations to trace evolution and development of past life and identify geological formations according to nature and chronology. Undertakes field trips and recovers fossilised specimens from dug out layer of earth or rock and notes their positions. Assembles and studies specimens using microscope, chemicals, photographic methods and other scientific aids. Identifies and classifies specimens according to botanical family, probable age, etc. Makes statistical analysis and constructs experimental data to trace history of modern vegetation or to locate natural resources such

as petroleum bearing formations and prepares reports on findings. May organise scientific expeditions and supervise removal of fossils from fossil deposits and material rock formations. May specialise in Geochronology (General history of earth), coal paleobotany, oil paleobotany etc.

**2211.50 Mycologist** conducts research on identification, structure, growth, dissemination and classification of fungi and evolves methods to apply findings in fields of agriculture medicine and industry. Obtains specimen of fungi and prepares cultures in selected media. Conducts microscopic observations of specimens under laboratory conditions to study their structure, growth and multiplication and identifies and classifies chosen specimen. Studies relationship between fungi and other plants and animals. Evolves techniques of control of fungi by chemical and other methods. Extracts, analyses and tests use of by-products of fungus activity and evolves new strains of fungi for similar studies. Conducts experiments for medical and industrial application of such by-products. May specialise and conduct research and development in fields of antibiotics, preservation of stores and improved methods of propagating and growing edible fungi.

**2211.55 Algologist** studies, identifies and classifies algae plants for use as edibles and soil manure. Visits areas such as sea-sides, river-sides, swamps for study or algae on natural surroundings. Collects specimens of different varieties of algae for study in laboratory. Studies nitrogen content, food value, etc. of algae for economic exploitation. Propagates methods for rowing particular type of algae to enrich nitrogen content of soil for paddy cultivation. May specialise in study of fresh water algae or marine algae and control; and growth of algae in water circulation system.

**2211.60 Zoologist General** studies animal life in relation to origin, evolution, classification, structure, behaviour, life processes, disease, environment, growth, development, genetics, mutations, etc. and relates findings to problems affecting human, animal and plant life. Undertakes field trips to collect data and observe animal life in natural habitat on land and in water and

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collects specimens for study in laboratory. Dissects specimens and studies structure and functioning of various systems such as nervous reproduction and circulatory systems, anatomy of body cells etc. under microscope and other scientific equipment regarding formation and functioning of organs, diseases of organs, cells, etc. prepares microscopic slides of special features for future study and research. Preserves rare species of animals, in special preservatives and gets large animals mounted by Taxidermist. Studies characteristics of living organism. Analyses findings and interprets data giving possible or probable causes that affect human life. Collects, rears and breeds various kinds of animals and birds such as mice, monkeys, fowls, pigeons, etc. in artificial condition in captivity for experimental purpose and knowledge of wild life management. May specialise in particular branches of Zoology such as study of embryos, birds, mammals, etc. and be designated as **EMBRYOLOGIST, ORNITHOLOGIST, HISTOLOGIST, VIROLOGIST, BIOLOGIST, CYTOLOGIST, MAMMALOGIST**, etc. May teach students in institutions.

**2211.65 Entomologist** conducts research on different species of insects, non-insects and pests and experiments with different insecticides to devise economic and practical methods to eliminate or control harmful pests which cause damage to trees, crops, fruits etc. and to develop growth of beneficial insects. Makes field visits to collect, identify and classify; different types of insects and pests. Maintains museum of insects and pest collections in special mounts. Studies nature and extent of damage caused to crops by insects, pests, rats etc. Conducts research in laboratory on insects, their life history and other features. Aids in control and elimination of harmful pests by developing new and improved insecticides and biological methods including use of birds, insects and other enemies which prey upon destructive pests. Propagates methods of lac culture, storage of grains, eradication of crop pests, etc. among farmers and others. May specialise in bee or silk worm rearing and be designated as **APICULTURIST** and **SERICULTURIST** respectively. May specialise in plant

protection, storing of grains etc. May teach students.

**2211.70 Parasitologist**, conducts research on animal or human parasites such as protozoans, liver flukes, round-worms, tape-worms etc. and evolves measures for control and treatment of parasitic infection. Collects parasites from different areas and beings such as vertebrates and invertebrates, external parts, arterial cavities, alimentary, canal, blood and from other tissue and conducts research in laboratory to study characteristics, habits, life cycles etc. to determine their manner of attack human beings and animals and effects produced. Investigates modes of transmission from host to host. Develops methods and agents with which to combat parasites or treat infections. May specialise in particular variety of parasites or in development of drug and chemical agents for parasite control. May be designated as **PROTOZOOLOGIST**, if specialises in study and control of unicellular microscopic parasites causing diseases in men and animals; **NEMATOLOGIST**, if engaged in study and control of nematodes (round-worms) that are plant parasitic.

**2211.80 Pisciculturist, Fish Culturist; Fishery Expert** specialises in fish culture and directs measures connected with development of fisheries and breeding and rearing of fish by artificial methods. Conducts experiments on fish culture to obtain data concerning their habits migration, growth, food, enemies, places of breeding and spawning so that conditions of artificial hatching may be made to closely resemble those of natural hatching. Devises methods and directs work of collecting, fertilizing and incubating fish eggs. Supervises care of spawn and fry and directs rearing of fish. Supervises sorting, transferring, distribution and release of seed, fingerlings etc. in streams, ponds and wells for restocking them. Directs constructions of reservoirs, ponds, dams etc. and supervises general maintenance of hatchery. May specialise in fresh water or salt-water fish culture. May supervise catching of fish preservation or marketing. May cultivate oysters in specially prepared oyster see-beds, observe growth of pearl oyster and chanks and introduce artificial media for pearl formation. May supervise works of Divers.

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**2211.85 Bacteriologist; Micro-biologist** conducts research and laboratory experiments on occurrence, growth, development, control and utilisation of bacteria and other microorganisms (including viruses) affecting plant, animal and human life, and industrial processes. Prepares cultures of bacteria by placing samples in suitable nutritive media. Examines under microscopes samples of isolated bacteria for identification. Observes reactions of bacteria to contact with various kinds of chemical substances and effects of changes in physical environment. Studies action of microorganisms on living tissues of higher animals and dead organic matter; analyses organic substances produced by bacteria while acting on organic matter to determine nature of by-product. Evolves and prepares weakened strains of harmful bacteria for utilization in vaccination, immunization and serological application. Studies methods of stimulating and retarding activity of micro-organisms and their utilization in industry. Records and reports findings. May specialise in any particular branch of bacteriology such as dairy, food, soil or public health bacteriology, mycology, etc. and may be known as **DAIRY BACTERIOLOGIST, FOOD BACTERIOLOGIST, INDUSTRIAL BACTERIOLOGIST, VETERINARY BACTERIOLOGIST**, etc.

**2211.90 Biologists, Botanists, Zoologists and Related Professionals, Other** include all other biologists and related scientists engaged in research and special fields not elsewhere classified.

**2212 PHARMACOLOGISTS, PATHOLOGISTS AND RELATED PROFESSIONALS**

Pharmacologists, pathologists and related professionals conduct research, improve or develop concepts, theories and operational methods, and apply scientific knowledge relating to anatomy, biochemistry, biophysics, physiology, pathology, or pharmacology, in such fields as medicine, agriculture or industry.

**2212.10 Chemist, Biological; Biochemist** conducts tests and studies metabolic processes in plants and animals to determine

their nutrition requirements, their ability to detect and separate poisons from materials and composition to their biological fluids in order to develop and produce antibiotics, serum, vaccines and drugs. Performs basic tasks similar to **Chemist General** by applying modern techniques like chromatography, electrophoresis, spectrophotometry radioactive tracers and Warburg manometry for analysis of biological compounds under both normal and pathological conditions. Isolates enzymes and other active principles from tissues and studies their action and properties both at cultural stage and by actual application. Analyses and studies plant, animal and microbial materials to determine their composition of fat, proteins, carbohydrates, vitamins, trace elements etc. Studies biological fluids and materials such as blood, urine arebrospinal fluid, lever tissue and hormones and co-relates findings to normal or pathological conditions. Conducts studies for separation and qualitative detection of poison in body for pathological and other purposes. May specialise in particular field of work.

**2212.20 Chemist, Food** conducts research and analysis concerning chemistry of foods to develop and improve foods and beverages: Experiments with natural and synthetic materials or byproducts to develop new foods, additives, preservatives, anti-adulteration agents, and related products. Studies effects of various methods of processing, preservation, and packaging on composition and properties of foods, such as colour, texture, aroma, taste, shelf life, and nutritive content. Tests food and beverage samples, such as starch, sugar, cereals, beer, canned and dehydrated food products, meats, vegetables, dairy foods, and other products to ensure compliance with food laws, and standards of quality and purity. May perform, or supervise workers performing, quality control tests in food processing, canning, freezing, brewing or distilling.

**2212.30 Pharmacologist** studies effect of drugs on human beings and animals and evolves formula for manufacture of drugs and medicines for prevention and treatment of diseases. Experiments with animals such as dogs, cats, rabbits, rats, mice, guinea pigs, etc. to determine effects of various chemical

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substances on their vital processes and their influence in activating and retarding various life processes such as circulation, respiration, digestion, etc. Renders assistance in evolving and standardizing techniques of synthesizing and extracting useful chemical substances used in prevention and treatment of diseases of man and animals. Standardizes dosage of drugs and methods of immunization against disease by correlating results of experiments such as food preservatives and colouring matters to detect their toxic and non-toxic properties. Assists in detection of poisonous substances causing ill-effects, illness or death. Records and reports findings. May specialise in any branch of pharmacology such as study of effects of drugs on body, development of new drugs in treatment of particular disease of group of diseases and the like.

**2212.35 Toxicologist (Pharmaceutical)**

conducts research on toxic effects of cosmetic products and ingredients on laboratory animals for manufacturer of cosmetics: Applies cosmetic ingredient or cosmetic being developed to exposed shaved skin area of test animal and observes and examines skin periodically for possible development of abnormalities, inflammation, or irritation. Injects ingredient into test animal, using hypodermic needle and syringe, and periodically observes animal for signs of toxicity. Injects antidotes to determine which antidote best neutralizes toxic effects. Tests and analyzes blood samples for presence of toxic conditions, using microscope and laboratory test equipment. Dissects dead animals, using surgical instruments, and examines organs to determine effects of cosmetic ingredients being tested. Prepares formal reports of test results.

**2212.40 Pathologist, Medical** conducts chemical, microscopic and bacteriological tests in laboratory and examines blood, tissues, urine etc. of patients to find out causes of diseases. Obtains specimens of body material such as blood, tissues and other secretion of human body from patient and makes appropriate tests to determine source and nature of disease or disorder by using microscope and other instruments. Diagnoses nature of disease on basis of chemical analysis and reports findings to

Physician for treatment of patient. Plans and conducts experiments on suitable animals to study pathological processes. Performs autopsies (post mortem examinations of body) to study structural changes for correlating functional disorders of body. Reports his findings in medical journals etc. may specialize in study of pathology on specific fields of human organism such as laematology, Virology, Histopathology (microscopic recognition of disease condition of tissues removed at operation or autopsy), chemical pathology etc. and may be known as **Haematologist, Virologist, Histopathologist, Chemical Pathologist**, etc.

**2212.45 Malariologist, Medical** conducts research on causes and effects of malaria in human system by studies in laboratory and directs antimalarial operations. Plans, organises and undertakes measures for control and eradication of malaria. Studies causes and effects of malaria in laboratory by microscopic, biochemical and biological techniques in mosquitoes, mammals and other suitable animals to determine nature of disease, its pathological aspects and process of immunization as consequence of protracted attacks of malaria. Studies effects of insecticides on mosquitoes to evolve better techniques of their utilisation. Studies biology of mosquitoes, nature of its blood-meal and transference of malaria parasite to human body. Conducts surveys of malaria infested areas and arranges spraying of insecticides and treatment of malaria cases. May conduct night blood and entomological surveys and institutes suitable antilarval and others remedial measures. May specialise in any field of malariology, filariology, chemotherapy, serology, epidemicology, protozoology, etc.

**2212.50 Physiologist, Medical** studies normal functioning of different organs and tissue of human body and investigates effect of physical environments such as variations in altitude, speed, temperature, etc. on its vital functions. Conducts experiments on suitable animals to study effects of changing physical conditions on vital functions of body such as digestion excretions, genitals, cardiac system etc. studies limits of physical endurance and physiological reactions under extreme environmental conditions due to

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altitude; temperature, noise, nutrition, etc., using microscope or other instruments and finds cause and prevention of functional abnormality. Records and reports findings and uses them as basis for research into related problems. May specialize in study of any physiological system and be known as **Neurophysiologist** who specialises in physiology of human nervous system, **Cardiovascular Physiologist** who specialises in physiology of human circulatory systems etc. May conduct experiments to solve particular problems relating to human life.

**2212.60 Animal Pathologist** conducts research in animal diseases and records findings to facilitate diagnosis and treatment of sick animals. Studies nature and causes of animal diseases. Examines tissues and other diseased parts of animals using microscope to diagnose disease. Conducts pathological serological and bacteriological tests regarding origin and development of diseases; investigates causes of disease and effect of disease germs such as parasites, bacteria, virus etc. in animals. Conducts research in ectoparasites like mosquito, flies, lice, fleas, ticks etc. to assist development of insecticides. Observes action of bacteria on living tissues. Makes chemical analysis of culture solution of bacteria and determines biochemical properties of bacteria to assess its importance in causing diseases. Prepares reports on findings to be utilised for further research. Conducts post-mortem examination of dead animals to determine causes of death. May prepare serum and vaccine for prevention of various diseases. Is designated as **Veterinary Bacteriologist** if specialised in conducting research in viral, rickettsial and fungal disease of animals and evolving their preventive measures.

**2212.70 Plant Pathologist** conducts research into nature and cause of plant diseases and decay of plant products to evolve methods for their control and prevention. Examines and compares healthy and diseased plant to determine symptoms of diseased condition by means of microscope and other instruments. Inoculates healthy plants with culture of suspected organism from diseased plants to determine organism responsible for disease. Studies growth, habit

and life cycle of disease causing organism and devises methods for destroying or controlling it. Tests possible control measures in laboratory and field conditions for effectiveness, economy etc. Observes growth of plant under different conditions of soil, climate, temperature etc. Relates findings of prevention of diseases for use of disease resisting seeds, fumigation or spraying fungicides over stem and leaves for killing fungus, etc. and propagates plant protection methods. May specialise according to type of affected plant on which worked such as cereal crops, fruit, forest trees etc. or type of disease such as bacterial, virus, nematode or fungus.

**2212.80 Plant Physiologist** studies functional activities in living plants and determines factors affecting them. Conducts field and laboratory experiments to determine effects on plants of environmental conditions such as temperature, humidity, light, mineral nutrients etc. Corrects deficient symptoms in rate of growth, colour of leaves, quantum of yield etc. by administering nutrients such as nitrogen, phosphorus, iron, magnesium sulphur and other chemicals in soil or by folio spraying of plant, or pre-soaking seed with stimulant prior to planting. Studies effects of environmental conditions on storage life of fruits and vegetables. Studies life history of resistant species of plants and conducts research on physiological problems of Indian plants for land reclamation, sand dune fixation and desert and semi desert conditions, metabolism of parasite plants of India, special excretion of roots which controls plant growth, physiological study of germination of seeds and photoperiodism of Indian plants. Prepares and co-ordinates reports of physiological; studies for use by **Agronomists, Horticulturists, Plant Breeders** and other specialists in particular field of study such as agriculture crops, forest trees, fruit trees, flowers, fruits, seeds etc.

**2212.90 Pharmacologists, Pathologists and Related Professionals, Other** include all other Pathologists, Pharmacologists, and related scientists engaged in research in particular fields for practical application of results thereof, and manufacture of crude vaccines, not elsewhere classified.

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**2213 AGRONOMISTS AND RELATED PROFESSIONALS**

Agronomists and related professionals conduct research and improve or develop concepts, theories and operational methods and apply scientific knowledge relating to crop and animal husbandry.

**2213.10 Agronomist** conducts research in field crop culture; soil fertility and farm management to develop better scientific methods of cultivation and irrigation for securing increased yield and better quality. Studies problems relating to field crop culture. Plans and conducts experiments in fields or plots involving techniques and methods relating to manure, irrigation, sowing, sowing time, culture practices, fertilizer application, physiology of crops and plants, control of weeds etc., taking into consideration chemical and physical composition of soil, temperature, rainfall and regional topography which have direct or indirect bearing on qualitative and quantitative crop yield. Analyses research results and formulates crop rotation, cropping pattern, manuring schedules, water requirements of crops, irrigation practices etc., for improved production. Conducts different physiological experiments on crops in glass houses under controlled conditions of moisture, humidity and temperature and suggests improved agronomical practices for better crop. May look after or advise on storage of produce and farm management.

**2213.20 Horticulturist** conducts experiments to develop methods of breeding and cultivating improved varieties of fruits, flowers, vegetables, ornamental bushes, trees etc. preserving fruits and vegetables and preventing damage during storage, transportation, processing and marketing. Studies soil composition in relation to plant requirements. Conducts experiments under controlled conditions to determine factors beneficial to plant growth. Selects best varieties of seeds for cross-breeding to develop resistant and improved varieties. Develops methods of propagation of plants and maintenance of nurseries. Conducts experiments to develop better methods of sowing, manuring, processing, irrigation and spraying. Carries out experiments for mechanical, biological and chemical pest

control. Applies findings to save crop from pests or fungus in field and stores. Suggests methods for improving quality and increasing quantity of production of vegetables and flowers. May advise regarding location of farms, sowing time, preparation and layout of beds, etc. May arrange flower and vegetable shows. May be engaged in training or research work. May assist on planting of trees in town planning. May be designated as **Pomologist, Olericulturist, Floriculturist, Fruit Technologist** and **Vegetable Technologist** etc. according to specialisation in culture of fruits, vegetables and flowers respectively.

**2213.30 Soil Scientist** studies soil characteristics, classifies, determines land capabilities and applies findings to problems connected with agriculture, forestry, horticulture and construction of dams, roads, buildings, etc. Studies genesis and fertility of soil by examining their various layers. Examines particle size and porosity of soil to determine its physical characteristics. Conducts chemical analysis and constitution of inorganic and organic constituents of various soil layers. Conducts experiments to determine micro-biological nutrition in soil for optimum plant growth and recommends appropriate fertilizer doses. Develops methods for control of erosion, alkalinity, salinity, acidity etc. of soil and conducts soil survey and soil classification and indicates them on map. Investigates problems relating to stabilisation roads, dams, buildings, etc. May specialize in one or more branches such as Soil Biology, Soil Physics, Soil Chemistry, etc.

**2213.40 Soil Conservationist** specializes in study of soil for formulating and developing plans to control soil erosion and to maintain and raise soil fertility by correcting soil defects, application of manures and fertilizers, proper crop rotations, reforestation, drainage, etc. Examines soil properties and their characteristic by studying topography and climatic conditions. Investigates magnitude and causes of erosion such as rainfall and its distribution, drainage, floods etc. Conducts soil consecration surveys. Looks after maintenance of anti-soil erosion, soil structures, bunds, terraces, waste water weir. Introduces measures towards more efficient land managements



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and higher crop yields. Develops barren land into productive fields by use of suitable corrective measures for removing salinity and alkalinity of soils or proper drainage conditions. Suggests methods for improvement of pastureland such as enclosures, rotational grazing and reseeding. Suggests proper land use pattern. May do research or training work.

**2213.50 Silviculturist** conducts research in care and development of forests and evolves more efficient methods of cultivation, propagation and management of forests and utilization of forest products. Studies vital statistics concerning forests, indicating rate of growth, yield and general behaviour of different kinds of trees. Conducts experiments in nurseries, gardens and demonstrations in sample plots regarding seeding time, seed vitality, viability, seed collection, growth increment, plantation methods, natural and artificial regeneration and other items concerning crop replacement; reforestation and development. Conducts research on effects of climate, soil, physiographic and biotic factors upon growth, character and development of forest lands. Determines adaptability of different species to new environmental conditions. Examines composition of different types of forests and investigates relationship between various components of forest community such as trees, climbers, shrubs, herbs, bushes, grasses and various micro-organisms etc. Deals with forest influences on soil, climate as well as floods and combination of forestry with agricultural and pastoral farming, land management and soil conservation and farming of forest products other than wood. Studies silvicultural characters and requirements of indigenous trees including important exotics and determines factors necessary for their introduction. Suggests suitable species for roadside avenues, canal bankstrips, water logged areas and for ornamental purposes etc. Works out standardisation of techniques of field research and analysis of statistical and sample plot data as well as techniques of partial enumeration for estimation of growing stock for working plan purposes. Compiles volume and yield tables for timber by various processes like impregnation with resins, lamination, etc. and examines suitability of indigenous timbers for; various

purposes such as furniture making, construction and for specific uses in various industries. Investigates problems connected with seasoning of wood for use as scantlings, sleepers, veneers etc. Designs operation of timber seasoning kilns and studies formation, measurements and removal of drying trees in timber during kiln or air drying. Conducts experiments on samples of timber of different gardens for durability and hardness and to evolve more economic and effective methods of preservation in transit or storage against insects, decay, fire fungi and marine organism. Develops and suggests improved methods of converting wood into charcoal, veneer, plywood, etc, and for collection, exploitation, utilization of wood by products such as oils, gums, resins, dyes, waxes, fibres, camphor, etc. Develops adhesives from indigenous material like coconut shell, cashew-nuts and conducts experiments to produce building material from bamboo and wood wastes. Maintains xylarium (collection of specimens). May specialise in seasoning, preservation, composite wood, chemical wood and mechanical wood.

**2213.60 Wood Anatomist** studies anatomical structure of wood in relation to its properties and uses for identification and classification of different types of timbers and determines factors responsible for growth and development of trees. Examines different types of cells of wood, their arrangement and variation using microscopes to determine its structure. Estimates properties of different types of woods based on their anatomy. Prepares slides and photomicrographs of important indigenous timbers. Explores and collects research anatomical data for writing accurate descriptions, identification and classification of timbers. Investigates defects and causes of failure in wood. Suggests suitable indigenous substitutes for imported timbers for industrial purposes and detects fraud and adulteration by correctly identifying timber and plant products. Maintains collection of specimens and helps **Archeologists Geologists and Palaeobotanists** in exploring past vegetation and explains ancient culture.

**2213.70 Dairy Scientist** conducts research in selection, breeding, feeding, and management of dairy cattle: Studies feed requirements of dairy animals and nutritive

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value of feed materials. Carries out experiments to determine effects of different kinds of feed and environmental conditions on quantity, quality, and nutritive value of milk produced. Develops improved practices in care and management of dairy herds and use of improved buildings and equipment. Studies physiology of reproduction and lactation, and carries out breeding programmes to improve dairy breeds.

**2213.80 Poultry Scientist** conducts research in breeding, feeding, and management of poultry: Examines selection and breeding practices to increase efficiency of production and improve quality of poultry products. Studies nutritional requirements of various classes of poultry. Develops improved practices in incubation, brooding, feeding, rearing, housing, artificial insemination, and disease and parasite prevention and control. Studies effects of management practices and processing methods on quality of eggs and other poultry products. May specialise in artificial insemination.

**2213.90 Agronomists and Related Professionals, Other** include all other agronomists and related scientists engaged in research in particular fields for practical application of results their of, not elsewhere classified.

**2219 LIFE SCIENCE PROFESSIONALS, n.e.c.**

Professionals in this Family conduct laboratory and field research and studies concerning development of plant and animal life and include those not elsewhere classified.

**2219.90 Life Scientists, Other** include other life and related scientists engaged in research and laboratory experiments on plant and animal life and industrial processes not elsewhere classified.

**222 HEALTH PROFESSIONALS (EXCEPT NURSING)**

Health Professionals (except nursing) conduct research, improve or develop concepts, theories and operational methods, and apply scientific knowledge relating to

medicine, dentistry, veterinary medicine, pharmacy, and promotion of health.

**2221 PHYSICIANS AND SURGEONS, ALLOPATHIC**

Professionals in this Family diagnose human ailments and treat them allopathically by medicines and surgical operations and specialise in treatment of diseases of particular types or disorders of particular parts of human body.

**2221.10 Physician, General** diagnoses and treats ailments or disorders of human body according to scientific system of medicine. Examines patients using stethoscope, blood pressure measuring instrument or any other medical instrument according to symptoms available, and makes or arranges for clinical tests, x-ray and histo-pathological examination for correct diagnoses of disease or disorder. Prescribes medicines based on results of examination. Consults other physicians or specialists, as necessary, in complicated and difficult cases. Gives minor surgical or other treatment and advises patients on regimen required to restore and maintain health. Administers drugs and anesthetics, as required. Keeps records of patients examined, their ailments and treatment given or prescribed. May compound drugs and medicines.

**2221.15 Surgeon, General** diagnoses and treats injuries, diseases or disorders of human body by: prescribing medicines or surgical operations. Examines patients to determine nature and extent of injury or ailments for treatment; by medicine, through local application or operation. Gets patient X-rayed or histo-pathologically examined in serious and complicated cases. Decides upon patient's ability to withstand surgical operation. Obtains written permission from legal heir of patient before undertaking major operation for personal safeguards against death of patient and ensures that all precautions have been taken before operation. May administer drugs and anesthetics as required. May obtain opinion of other specialists before diagnosis and performance of major operations. May specialise in thoracic surgery, plastic surgery etc. and be designated accordingly.

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**2221.20 Anatomist, Medical** studies structure of human body and its parts to ascertain their position, function and relation to each other in order to provide basic knowledge in diagnosis and treatment of human disease. Examines organs of body and its minute structures, tissues, cell etc., using microscope wherever necessary. Prepares slides of different tissues for histological study. Studies growth and development of human and other mammalian embryo by utilizing X-ray, bio and cyto chemical methods wherever necessary and publishes his finding in medical journals, papers, etc. May specialise in any branch of anatomical study such as neuro-anatomy, embryology, anthropology, surgical anatomy etc. May undertake research on problems in field of biological sciences.

**2221.25 Anaesthetist** administers anaesthetics to patient undergoing surgical operation according to nature of operation. Examines patient to determine his capacity to withstand shock of operation and anaesthesia selects local or general type of anaesthetic to be administered, such as ether, chloroform or cocaine according to nature of operation. Checks apparatus for operational efficiency, and administers selected anaesthetic to patient. Informs surgeon of patient's readiness for operation. Feels pulse and watches respiration and eyeballs of patient while under anaesthesia and surgery to check his general condition with particular reference to patient's heart and lungs. Examines and treats patient for ill effects and weakness after operation. May make provision for blood and fluid transfusion during operation and oxygen therapy, if necessary. May specialise in any specialised anaesthetic technique for chest or neuro-surgery.

**2221.30 Psychiatrist** diagnoses and treats human mental diseases and disorders. Conducts examination of body for abnormal behaviour or mental activity and related abnormality to disease and disorder of other systems of body. Studies psychological test histo-pathological examination, X-ray observations and other clinical data along with history of diseases and other personal information and diagnoses disorder. Prescribes and conducts treatment of patient

as required by ailment; by medicinal or surgical methods. Helps patient adjust self and control emotions and habits. May refer patients to other specialists to diagnose disease relating to other parts of body. May specialise in any technique of treatment and diagnosis of disorder. May conduct child guidance clinics, marriage counselling and marriage guidance clinics, genetic guidance clinic, vocational guidance clinics and vocational selection clinics.

**2221.35 Neurologist; Nerve Specialist** diagnoses and treats nervous diseases of human beings. Conducts examination of different parts of nervous system to find cause of disorder or location of defect, and relates disorder to diseases or disorder in other parts/system of body. Studies clinical tests of cerebrospinal fluid, reports of histo-pathological examination, X-ray of skull and spinal cords and system, along with history of disorder/disease and possibility of inheriting nervous defects and diagnoses disease. Prescribes and conducts treatment of patient, as required, adopting medicinal and surgical methods. May consult other specialists to diagnose diseases. May specialise in any technique of diagnosing and treating particular type of nervous diseases.

**2221.40 Dermatologist** diagnoses and conducts treatment of ailment of human skin. Examines patients to locate cause of skin disorder and relate skin disorder to diseases or disorders in other parts/system of body. Conducts clinical tests, microscopic examination of scrapings of diseased part of skin, histo-pathological examination, patch test in case of allergic disorder along with history of disorder/disease and other relevant personal data and diagnosis disorder. Prescribes medicines for treatment of various kinds of skins diseases such as blemishes, scabies, eczema etc. May consult other specialist to diagnose disease.

**2221.42 Allergy Specialist** diagnoses and treats diseases and conditions with allergic or immunologic causes: Examines patient, utilizing medical instruments and equipment, patch tests, and blood tests as diagnostic aids. Elicits and records information about patient's history. Analyses reports and test results and prescribes treatment or medication for conditions, such as bronchial

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asthma, dermatological disorders, connective tissue syndromes, transplantation, and autoimmunity. Refers patients to ancillary and consultant services when indicated.

**2221.45 Ear, Nose and Throat Specialist** diagnoses and conducts treatment of diseases and disorders of ear, nose and throat. Conducts examination of ear, nose and throat for observable defect/symptoms, and relates disorder and disease to infection in other parts of body. Conducts clinical test and histo-pathological examination of diseased parts, alongwith other personal relevant particular and diagnoses diseases. Prescribes medicines and treats patients by medicinal or surgical methods as required. May obtain help of other specialist who diagnose disease.

**2221.50 Cardiologist; Heart Specialist** diagnoses and conducts treatment of diseases and disorder of heart and blood circulation system of human body. Examines blood circulation system to find cause of disorder or location of defects and relates disorder to diseases or disorder in other parts of body. Conducts clinical tests of blood, histo-pathological examination, X-ray examination of heart, blood pressure, electro-cardiogram test, cardio-catheterization examination and phonocardiogram tests of heart, alongwith history of disorder/disease and other relevant personal data, and diagnoses disorder. Prescribes medicines and conducts treatment of patient as required by ailment. May obtain help of other specialist for diagnoses of disease. May specialise in any technique of treating disease of blood circulatory system or diagnoses of particular kinds of blood diseases.

**2221.55 Radiologist** diagnoses diseases and disorders of human system by studying X-ray pictures of affected parts or seeing it on fluoroscopic screen and gives treatment such as therapeutic radiation of diseased part of body. Checks patients for nature of complaint and for allergy to drugs in radiation treatment. Decides on type of X-ray picture to be taken in respect of diseased or affected part of body such as ulcers, fractures, lung diseases, etc. Gives patient where necessary certain drugs orally or by injection like berium-meal, berium iodine, anema, etc. to render particular organ of

body opaque to X-rays. Takes X-ray picture or directs **X-RAY TECHNICIAN** to take X-ray picture of affected part. Studies developed Xray film in viewing box and assesses nature, location and magnitude of disease or injury. Advises type of therapeutic treatment to be given or gives such treatment at his own clinic. Adjusts and operates X-ray and other therapeutic machine such as deep X-ray, cobalt, Gama rays, etc. to direct rays of required intensity on affected part of body for specified period or applies radium needle when necessary. May treat ailments such as cancer, tumor, blood diseases, skin diseases, cardio-respiratory system, etc. May operate image intensifier for study of movements of certain parts of body like heart, lungs, etc.

**2221.60 Tuberculosis Specialist** diagnoses and conducts treatment of ailments due to infection by tubercular disease. Conducts examination of different parts of body to locate nature of disorder and relates disorder/disease to infections in other parts of body. Administers tuberculin test and conducts clinical tests of sputum, blood, lymph, etc. Takes X-ray of chest and other parts of body, alongwith history of disease. Prescribes medicinal or surgical treatment. May obtain help of other specialists to diagnose disease.

**2221.65 Ophthalmologist; Eye Specialist** diagnoses and conducts treatment of diseases and disorders of human eye. Conducts examination of eye ball and its related parts using ophthalmo-scope to locate cause of disorder or location of defect and relates defects to disease/disorder or other system of body. Conducts clinical tests, histo-pathological examination, X-ray observations, history of disease alongwith other relevant personal data and diagnoses disorder. Tests and prescribes spectacles, contact lenses or specialised glasses for visual defects. Tests and treats for muscular imbalances of eye. May refer patients to other specialists for consultation or advise. May specialise in any technique of treatment, medical or surgical or diagnoses of types of disorder.

**2221.68 Urologist** diagnoses and treats diseases and disorders of genitourinary organs and tract: Examines patient, using x-

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ray machine, fluoroscope, and other equipment to aid in determining nature and extent of disorder or injury. Treats patient, using diathermy machine, catheter, cystoscope, radium emanation tube, and similar equipment. Performs surgery, as indicated. Prescribes and administers urinary antiseptics to combat infection.

**2221.70 Venereologist;** diagnoses and conducts treatment of human venereal diseases. Examines patient and makes or arranges for special test e.g. blood, urine, stool, etc., and investigates into causes of infections and social diseases acquired venereally. Considers reports of tests, histo-pathological examination and prescribes medicine, both preventive and curative. May perform operation.

**2221.75 Obstetrician** diagnoses and conduct treatment of diseases and disorder of human female reproduction system during pre-natal, natal and post-natal periods: conducts examination of pelvic organs and girdle for integrity and adequacy. Obtains blood tests for hemoglobin and blood cell contact, blood pressure and clinical tests for urine, to evaluate course of pregnancy and to control untoward pregnancy manifestation. Supervises arrangements for proper delivery of child; and arranges for blood transfusion, if necessary. Provides external manipulation and uterine massage alongwith administration of drugs during labour. May perform operation or use forceps for delivery of child. May prescribe and induce therapeutic abortion in case of chronic diseases.

**2221.78 Gynaecologist;** diagnoses and conducts treatment of disease and disorder of female genital organs. Conducts examination of body for symptoms of disease and disorder of other systems of body. Considers clinical test, histo-pathological examination alongwith detailed history of ailment and diagnosis disorder. Treats ailments by medicinal or by surgical methods. May refer patient to other specialist to diagnose disease.

**2221.80 Paediatrician** diagnoses and conducts treatment of diseases peculiar to children. Studies nature of growth and development of children and establishes

form of growth. Investigates into cause of deviations by examining behaviour pattern, and conducting X-ray examination of growth of limbs and organs. Considers available hazards to normal growth and suggests preventive measures: examines body, considering clinical tests, histo-pathological examination and other necessary techniques of examination alongwith history of ailment and diagnoses disorder/defect. Prescribes and conducts treatment of patient, as required by ailment. May obtain help of other specialists to diagnose disease. May specialise in any field of paediatrics such as endocrinology or endocrinopathy (any disease due to disorder functions of endocrine glands).

**2221.85 Orthopaedist** diagnoses and conducts treatment and correction of diseases/deformities of skeletal system. Examines different parts of body structure to locate cause of disease/disorder and relates diseases or disorder to diseases of other parts/system of body. Considers clinical test of body, histo-pathological examination, X-ray reports of bony structure, alongwith history of disorder/disease and other personal data for diagnoses of disease. Corrects deformities by operation, physiotherapy or by other mechanical devices. May refer patient to other specialist for diagnoses of disease. May specialise in particular kinds of orthopaedic diseases or technique of treatment.

**2221.90 Surgeons and Medical Specialists, Allopathic.** Other diagnose and treat human ailments and include all other physicians, surgeons, and other medical specialists not elsewhere classified.

## 2222 PHYSICIANS AND SURGEONS, AYURVEDIC

Professionals in this family conduct medical examinations, making diagnosis, prescribing and giving other forms of medical treatment based on ayurvedic system of medicine.

**2222.10 Physician, Ayurvedic;** examines patients by interrogation, sight, feeling pulse rate etc. to diagnose ailment and prescribes necessary medicines according to ayurvedic system of treatment. Questions patient about nature of ailment, previous history of disease

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and ascertains condition of bowel movement, appetite, etc. Diagnoses ailments by feeling pulse, examine abdomen, colour of skin, eyes, tongue etc. of patient. Observes urine, stool and sputum, if necessary and applies findings for diagnoses and treatment. Decides time of treatment and prescribes medicines with instructions regarding their use and precautions especially with regard to diet to be observed. May prescribe medicines for general improvement of health and prevention of diseases. May prepare and sell tonics, patent and other indigenous medicines such as 'Bhasams', Asavs (extracts of medicinal herbs), etc.

**2222.90 Physicians and Surgeons, Ayurvedic, Other** diagnose and treat human ailments and include all other physicians, giving other forms of medical treatment based on ayurvedic system not elsewhere classified.

**2223 PHYSICIANS AND SURGEONS, HOMOEOPATHIC**

Professionals in this Family conduct medical examination making diagnosis, prescribing and giving other forms of medical treatment based on homoeopathic system of medicine.

**2223.10 Physician, Homoeopathic** examines patients to diagnose ailments and prescribes necessary medicines according to homeopathic system of treatment. Records history of disease or disorder, and patient's and his family's (both paternal and maternal) past and present, mental and physical reaction to heat, cold, food etc. by careful questioning, and obtains complete subjective and objective picture of symptoms expressed. Prescribes homoeopathic medicine to treat patient for symptoms exhibited. Instructs patients on diet restrictions during course of treatment. Keeps case history of patient and treatment prescribed alongwith progress report. Prescribes prophylactics in course of epidemics to safeguard against spread of infectious diseases and instructs healthy persons on general hygienic principles for preservation of health. May consider results of X-ray, clinical and pathological examination for proper diagnosis. May

dispense homoeopathic drugs and medicines singly and potentised form.

**2223.20 Physician, Bio-chemic** examines patients to diagnose ailments and prescribes necessary medicines according to bio-chemic system of treatment. Examines patient, records case history and studies symptoms to diagnose deficiency or imbalance of basic salt(s) in patient's system. Prescribes bio-chemic medicines along with necessary instructions, regarding diet, physical precautions etc. Keeps case history of patients and treatment prescribed. May consider results of Xray and pathological examinations for proper diagnosis.

**2223.90 Physicians and Surgeons, Homoeopathic, Other** diagnose and treat human ailments and include all other physicians, giving other forms of medical treatment based on homeopathic system not elsewhere classified.

**2224 PHYSICIANS AND SURGEONS, UNANI**

Professionals in this Family conduct medical examination making diagnosis, prescribing and giving other forms of medical treatment based on unani system of medicine.

**2224.10 Physician, Unani; Hakim** examines patients to diagnose ailments and prescribes necessary medicines according to unani system of treatment. Enquires patient about nature of his ailment, habits, previous history of his disease, hereditary factors and interrogates him about his appetite, bowel movement and any other discharges etc. Feels patients' pulse and examines his abdomen, chest, liver, spleen, urine, stool and sputum if considered necessary. Diagnoses disease and prescribes medicines according to patient's temperament. Gives necessary instructions regarding use of medicines, diet and other precaution to be taken. May prepare and sell tonics, and other medicines such as 'Kushtas' (ashes of burnt metal) 'Maul Laul Lahm' (extracts from birds meat, fruits, etc.).

**2224.90 Physicians and Surgeons, Unani, Other** diagnose and treat human ailments and include all other physicians, giving other

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forms of medical treatment based on unani system not elsewhere classified.

**2225 DENTAL SPECIALISTS**

Dentists conduct research, improve or develop concepts, theories and operational methods, and apply medical knowledge in the field of dentistry.

**2225.10 Dentist, Dental Surgeon** treats surgically and medically diseases and disorders of teeth, gums and soft tissues of mouth. Examines mouth and teeth of patients by clinical tests or arranges dental X-ray or clinical and bacteriological tests through **Radiologist and pathologist**, if necessary for correct diagnosis. Examines results of tests and adjacent tissues for minor diseases. Cleans teeth and cavities using scalers, excavators, dental engine, etc. as necessary. Fills cavities with cement, metal or plastic and ensures proper filling by observation and easy feel in chewing by patient. Gives local or general anaesthetics as necessary and prepares mouth for operation. Extracts loose decayed or impacted teeth using surgical instruments. Renders after care. Makes and fits artificial teeth. Advises patients on various corrective dental measures and on general dental health.

**2225.20 Oral and Maxillofacial Surgeon** performs surgery on mouth, jaws, and related head and neck structure: Executes difficult and multiple extraction of teeth. Removes tumors and other abnormal growths. Performs preprosthetic surgery to prepare mouth for insertion of dental prosthesis. Corrects abnormal jaw relations by mandibular or maxillary revision. Treats fractures of jaws. Administers general and local anesthetics. May treat patients in hospital.

**2225.30 Orthodontist** examines, diagnoses, and treats abnormalities in development of jaws, position of teeth, and other dental-facial structures: Plans treatment, using cephalometric, height, and weight records, dental x rays, and front and lateral dental photographs. Designs and fabricates appliances, such as space maintainers, retainers, and labial and lingual arch wires, to alter position and relationship of teeth and

jaws, and to realign teeth to produce and maintain normal function.

**2225.40 Periodontist** diagnoses and treats inflammatory and destructive diseases of investing and supporting tissue of teeth: Cleans and polishes teeth, eliminates irritating margins of fillings, and corrects occlusions. Performs surgical procedures to remove diseased tissue, using dental instruments. Establishes recall treatment program to monitor oral health practices

**2225.50 Prosthodontist** restores and maintains oral functions: Records physiologic position of jaws to determine shape and size of dental prostheses, using face bows, dental articulators, and other recording devices. Replaces missing teeth and associated oral structures with artificial teeth to improve chewing, speech, and appearance. Corrects natural and acquired deformation of mouth and jaws through use of prosthetic appliances.

**2225.60 Paediatric Dentist** provides dental care for infants, children, and adolescents: Fabricates space maintainers designed for patients. Treats primary and secondary teeth and constructs and places bridges, dentures, and obturating appliances suitable for growing arches. Manages patients with behavioral problems or handicapping conditions. Counsels and advises patients and family on growth and development of dental problems of patient. Provides preventive services through use of fluorides and sealants and instructs patient and family members on dental care.

**2225.90 Dental Specialists, Other** include all other dental specialists who apply medical knowledge in the field of dentistry not elsewhere classified.

**2226 VETERINARIANS**

Veterinarians conduct research, improve or develop concepts, theories and operational methods, and apply medical knowledge in the veterinary field.

**2226.10 Veterinarian, General Veterinary Doctor** investigates and treats diseases, injuries and ailments in animals and undertakes measures to improve livestock. Examines animals for sickness, injuries and

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other ailments to determine course of treatment and attends to them including surgical cases where necessary. Conducts castration, artificial insemination and treatment of infertility for controlled and better breed. Inoculates domestic animals, poultry, pet animals periodically against epidemics. Investigates causes of outbreaks of infections and takes preventive measures. Advises owners of animals in correct methods of breeding, feeding, rearing and disease control. Conducts research in laboratories on such subjects as pathology, anatomy etc. Performs post-mortem of dead animals to determine causes of death. May examine animals before and after slaughter for meat for any disease or infection. May conduct cattle and poultry shows, competition and calf rallies.

**2226.20 Veterinary, Surgeon** treats injuries and diseases of animals by surgical methods. Examines sick or injured animals to diagnose nature of injury, disability or sickness and determines course of treatment. Gives injections to animals where necessary. Operates affected part of body and prescribes necessary medicines. May take X-ray photograph of injured and affected part of body of animal. May set dislocated joints and fractured bones by applying plaster of Paris, splints of wood and bandaging them.

**2226.30 Animal Geneticist, Animal Breeder** conducts research in animal genetics and deals with problems concerning evolution of new breeds, rearing of livestock, genetically control of disease, artificial insemination, sterilization etc. Studies inherent traits in animals and analyses their causes such as environment, food, colour, growth, maturity, sterility, disease etc. Conducts experiments to develop better variety or strain of animal to resist disease, increase yield of milk, meat, egg etc. Selects animals of required character to cross different breeds to get required strains by natural breeding or artificial insemination. Maintains charts and records of crossings and breeds of animals for several generations. May specialise in breeding particular strain of animals, birds, wild animals in zoo etc. is designated as Animal Gynaecologist, if specialises in genetical diseases and artificial inseminated sterility in animals.

**2226.40 Zoo Veterinarian** plans, directs, and participates in health care programme of veterinary clinic in zoo: Establishes and conducts effective quarantine and testing procedures for all incoming animals to ensure health of collection, prevent spread of disease, and comply with government regulations. Conducts regularly scheduled immunisation and preventive care programmes to maintain health of animals and guard against communicable diseases. Provides immediate medical attention to diseased or traumatised animals. Participates with other personnel in planning and executing nutrition and reproduction programmes for animals in zoo. Develops special programs to encourage reproduction among animals designated as endangered species, based on knowledge of native habitat and instincts. Participates in employee training in handling and care of animals. Conducts postmortem studies and analyses. Cooperates with zoo and aquarium personnel to exchange information concerning care of animals, to arrange transfer, sale, or trade of animals, and to maintain nationwide inventory of animals of every species, including notation of live births. Acts as consultant to veterinarians in general practice seeking advice in treatment of exotic animals.

**2226.50 Veterinarian, Poultry** advises individual poultry raisers on poultry problems: Gathers from owner information on care, condition, performance, and action of birds. Inspects flocks, pens, and housing. Diagnoses disease and prescribes treatment. Culls undesirable birds from flock. Suggests feed changes to increase egg production or growth of fowls.

**2226.90 Veterinarians, Other** include all other veterinarians engaged in research and treatment of birds and animals, not elsewhere classified.

## **2229 HEALTH PROFESSIONALS (Except Nursing), n.e.c.**

This Family covers health professionals (excepting nursing) not classified elsewhere in Group 22, Health Professionals (except nursing).

**2229.10 Health Officer** plans, organises and



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executes curative and preventive measures against epidemics and infectious disease, maintains sanitary conditions according to prescribed standards within specified area and promotes community efficiency of physical, mental and social health standards. Supervises medical facilities provided through hospitals, dispensaries, child welfare and maternity centres. Regulates, restricts and controls sale of eatables, location and working condition of cinemas, factories and other establishments affecting public health and sanitation through licenses and by prescribing health and sanitation standards. Conducts regular and periodical inspection of public eating houses, premises and public conveniences. Checks food adulteration and prosecutes offenders. Organises anti-epidemic measures for prevention and control of outbreaks of epidemics and infectious diseases such as Cholera, smallpox, typhoid, measles, etc. and maintains vital statistics. Ensures safe water supply for drinking and other uses and disposal of refuse and excreta. Supervises and checks disposal of dead bodies by cremation or burial or grants permission for their removal outside corporation areas. Conducts publicity campaigns periodically to disseminate knowledge of health and hygiene. Organises school health service and public health laboratories. May initiate and conduct special campaigns against mosquitoes, flies, insects, and rodents etc. to prevent spread of infectious diseases. May participate in town planning activities of local body.

**2229.15 Administrator, Hospital** directs administration of hospital, nursing home, or other health care facility within authority of Governing board. Administers fiscal operations, such as budget planning, accounting, and establishing rates for health care services. Directs hiring and training of personnel. Negotiates for improvement of and additions to buildings and equipment. Directs and coordinates activities of medical, nursing, and administrative staff and services. Develops policies and procedures for various establishment activities. May represent establishment at community meetings and promote programmes through various news media. May develop or expand programmes or services for scientific research, preventive medicine, medical and

vocational rehabilitation, and community health and welfare promotion.

**2229.20 Naturopath Physician, Matroopathy;** examines patients to diagnose ailments and prescribes necessary treatment according to science of nature cure. Enquires patient about his nature and symptoms of ailment, previous history of his disease and keeps him under observation. Conducts routine tests to determine pulse rate, blood pressure, temperature, condition of heart, lungs, liver, etc. Diagnoses ailment and determines type of treatment to be administered such as Cosmo therapy, hydrotherapy, mud therapy etc, and advises patient for sun bathing, tub bathing, mud plastering of any part of body, massaging, regulating of diet, special physical exercises to be taken etc. as necessary for recovery.

**2229.30 Physician, Osteopathic** diagnoses and treats diseases and injuries of human body, relying upon accepted medical and surgical modalities: Examines patient to determine symptoms attributable to impairments in musculoskeletal system. Corrects disorders and afflictions of bones, muscles, nerves, and other body systems by medicinal and surgical procedures and, when deemed beneficial, manipulative therapy. Employs diagnostic images, drugs, and other aids to diagnose and treat bodily impairments. May practice medical or surgical speciality.

**2229.40 Physian, Sidha** examines patients by interrogation, sight, feeling pulse rate, etc. and uses panjabutha theory,<sup>96</sup> thathuvus, 8 kinds of tests to diagnose ailments and prescribes necessary medicines according to Sidha System of treatment. Questions patients about nature of ailment, previous history of disease, etc. Diagnoses ailments by feeling pulse, examining abdomen, colour of skin, eyes, tongue, etc., of patient. Observes urine, stool and sputum, if necessary, and applies findings for diagnosis and treatment. May use modern equipments also in diagnosing diseases. May prescribe medicines such as Legiams, Bhaspams, Kasayam, Chooranam, Senthooram eye ointment, etc. for treatment. May specialise in skin disease, eye disease, peptic ulser (without operation) etc. May prescribe medicines for general improvement of health

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and prevention of diseases. May instruct patients on the use of medicines, and precautions with regard to diet to be observed and gives symptomatic treatment.

**2229.90 Health Professionals (Except Nursing) , Other** diagnose and treat human ailments and include physicians and surgeons not elsewhere classified.

### **223 NURSING AND MIDWIFERY PROFESSIONALS**

Nursing and midwifery professionals apply medical concepts and principles relating to the delivery of babies and to nursing of the ill, injured or disabled and of mothers and their new born babies.

#### **2230 NURSING PROFESSIONALS**

Professionals in this Family provide professional, general or specialised nursing care for sick, injured and infirm for treatment of physical and mental disorders; give nursing care and advice; assist physicians and perform other nursing tasks and community health service in hospitals, clinics, sanatoria, schools, factories, medical establishments, private homes and elsewhere.

**2230.10 Nurse, Specialist** specialises in particular type of professional nursing in hospital, clinic, sanatorium or similar medical establishment. Performs tasks similar to those of **Nurse General**, but specialises in particular branch of nursing such as obstetric, orthopaedic, paediatrics or psychiatric nursing, or in particular nursing task, such as giving anaesthetics or assisting Surgeon during operations.

**2230.90 Professional Nurses, Other** include all other Nurses engaged in treatment of patients, disabled persons and invalids, not elsewhere classified.

### **23 TEACHING PROFESSIONALS**

Teaching Professionals teach the theory and practice of one or more disciplines at different levels, conduct research and improve or develop concepts, theories and operational methods pertaining to their

particular discipline, and prepare scholarly papers and books.

#### **231 COLLEGE, UNIVERSITY AND HIGHER EDUCATION TEACHING PROFESSIONALS**

College, University and Higher education teaching professionals teach their subjects at different levels after the termination of secondary education, conduct research and improve or develop concepts, theories and operational methods pertaining to their particular discipline, and prepare scholarly papers and books.

#### **2310 COLLEGE, UNIVERSITY AND HIGHER EDUCATION TEACHING PROFESSIONALS**

College, University and Higher education teaching professionals teach their subjects at some or all levels after the termination of secondary education, conduct research and improve or develop concepts, theories and operational methods pertaining to their particular discipline, and prepare scholarly papers and books.

**2310.10 University and College Teacher, Arts Subjects** teaches university students one or more arts subjects such as history, geography, anthropology, sociology, philosophy, psychology, economics, politics, Indian or Foreign language such as Hindi, Sanskrit, English, French etc. Deliver lectures and conducts seminars. Sets examination papers, conducts examination and evaluates answer books. May conduct research and guide research workers. Is designated as **LECTURER, READER, PROFESSOR** in subject concerned, according to level of responsibility held. May be designated as **DEAN OF FACULTY** if responsible for controlling and supervising teaching activities and management of institution.

**2310.15 University and College Teacher, Commerce Subjects** teaches university students one or more commerce subjects such as banking, accountancy, auditing, etc. Delivers lectures, sets examination papers, conducts examinations and marks papers. Is designated as **LECTURER, READER, PROFESSOR**, etc. in subject concerned,

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according to level of responsibility held. Is designated as DEAN OF FACULTY if responsible for controlling and supervising teaching activities and management of institution.

**2310.18 University and College Teacher, Management Subjects** teaches one or more management subjects, within prescribed curriculum. Prepares and delivers lectures to students, compiles bibliographies of specialised materials for out side reading assignments. Stimulates group discussions and assigns projects to students. Compiles, administers, and grades examinations, or assigns this work to others. Directs research of other teachers or graduate students working for advanced academic degrees. Conducts research in particular field of knowledge and publishes findings in professional journals. Performs related duties, such as advising students on academic and vocational curricula, and acting as adviser to student organisations. Serves on faculty committee providing professional consulting services to government and industry. May be designated according to faculty rank such as LECTURER, READER, PROFESSOR, etc.

**2310.20 University and College Teacher, Education** teaches sponsored Teachers and university students one or more subjects in education such as methods of teaching, educational psychology etc. Arranges for teaching practice classes and accompanies students to supervise and guide them. Conducts seminars and holds tutorial classes. May conduct research and guide research workers. May be designated as LECTURER, READER, PROFESSOR, etc. according to level of responsibility held. Is designated as DEAN OF FACULTY if responsible for controlling and supervising & teaching activities and management of institution.

**2310.30 University and College Teacher, Law** teaches university students one or more subjects relating to principles and practice of law. Delivers lectures, sets examination papers, conducts examinations and marks papers. May conduct or guide research work. Is designated as LECTURER, READER, PROFESSOR, etc. in subject concerned, according to level of responsibility held. Is

designated as DEAN OF FACULTY if responsible for controlling and supervising teaching activities and management of institution.

**2310.40 University and College Teacher, Science Subjects** teaches university students one or more science subjects such as chemistry, physics, botany, zoology, mathematics, statistics, geology etc. Delivers lectures, guides and supervises practical work in field or laboratory, sets examination papers, conducts examinations and marks papers. May conduct or guide research work. Is designated as DEMONSTRATOR, LECTURER, READER, PROFESSOR, etc. in subject concerned, according to level of responsibility held. Is designated as DEAN OF FACULTY if responsible for controlling and supervising teaching activities and management of institution (Excluded are university teachers in engineering, medicine and surgery, agriculture and veterinary science subjects).

**2310.45 University and College Teacher, Engineering** teaches university students one or more subjects relating to architecture, civil engineering, mechanical engineering, electrical engineering, telecommunication engineering, chemical engineering, metallurgy, mining, surveying, fuel technology, soap technology, textile technology or other branches of engineering, and technology. Delivers lectures, guides and supervises practical work in field or laboratory. Sets examination papers, conducts examination and marks papers. May conduct or guide research work. Is designated as Lecturer; Reader; Professor; etc. in subject concerned, according to level of responsibility held. Is designated as Dean of Faculty if responsible for controlling and supervising activities and management of institution.

**2310.48 University and College Teacher, Information Technology** teaches one or more Information Technology subjects, within prescribed curriculum. Prepares and delivers lectures to students, compiles bibliographies of specialised materials for out side reading assignments. Assists students in software development projects and finding solutions to software/hardware

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related problems. Stimulates group discussions and assigns projects to students. Compiles, administers, and grades examinations, or assigns this work to others. Directs research of other teachers or graduate students working for advanced academic degrees. Conducts research in particular field of knowledge and publishes findings in professional journals. Performs related duties, such as advising students on academic and vocational curricula, and acting as adviser to student organisations. Serves on faculty committee providing professional consulting services to government and industry. May be designated according to faculty rank such as **LECTURER, READER, PROFESSOR**, etc.

**2310.50 University and College Teacher, Medicine and Surgery** teaches university students one or more subjects relating to medicine and surgery, including dental science; according to any medical system such as Allopathy, Ayurveda, Homoeopathy or Unani. Delivers lectures, guides and supervises students in diagnosis of ailments and in practical work in ward, operation theatre, labour room and laboratory. Sets examination papers, conducts examinations and marks papers. May conduct or guide research work. Is designated as **Lecturer, Reader, Professor**, etc. in subjects concerned, according to level of responsibility held. Is designated as **Dean of Faculty** if controlling; activities and management of institution.

**2310.60 University and College Teacher, Veterinary Science** teaches university students one or more subjects relating to veterinary science. Delivers lectures, guides and supervises students in diagnosis and treatment of diseases and in laboratory work. Sets examination papers, conducts examination and marks papers. May conduct or guide research work. Is designated as **Lecturer, Reader, Professor**, etc. in subject concerned, according to level of responsibility held. Is designated as **Dean of faculty** if responsible for controlling and supervising teaching activities and management of institution.

**2310.70 University and College Teacher, Agricultural Subjects** teaches university

students one or more subjects relating to agronomy, horticulture, silviculture or other branches of agriculture. Delivers lectures, guides and supervises practical work in field or laboratory, sets examination papers. Conducts examination and marks papers. May conduct or guide research work. Is designated as **Lecturer; Reader, Professor**; etc. in subject concerned according to level of responsibility held. Is designated as **Dean of Faculty** if responsible for controlling and supervising teaching activities and management of institution.

**2310.80 University and College Teacher, Fine Arts** teaches university students principles and practice of one or more fine arts such as dance, music, painting, etc. Delivers lectures, gives practical demonstrations and guides and supervises practical work. Sets examination papers, conducts examinations and marks papers. Is designated as **Lecturer; Reader; Professor**; etc. in subjects concerned, according to level of responsibility held. Is designated as **Dean of Faculty** if responsible for controlling and supervising teaching activities and management of institution.

**2310.90 University and College Teachers, Other** teach university students one or more subjects and include those teaching subjects such as library science, journalism, public administration, military science, home science, , etc., not elsewhere classified.

## 232 SECONDARY EDUCATION TEACHING PROFESSIONALS

Secondary education teaching professionals teach one or more subjects, for educational or vocational purposes, at some or all levels between the termination of primary education and the beginning of studies at college.

### 2320 SENIOR SECONDARY AND SECONDARY SCHOOL TEACHING PROFESSIONALS

Professionals in this Family conduct classes in schools and vocational training institutes of secondary/higher secondary level of learning; teach classes in one or more subjects or in particular subject area, such as

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science, history, social studies, languages, arts and crafts; manage administration and execute educational programmes of such schools; and perform other related teaching functions.

**2320.10 Senior Secondary and Secondary School Teacher, Arts** teaches one or more subjects to students of high school, higher secondary school, multipurpose school in regional language or English, Teaches students of various standards, allots and corrects home work,. Conducts tests; and examinations and decides eligibility for promotion to higher standards. Maintains school registers and records. May collect fees, conduct sports and extracurricular activities such as scouting, hobby clubs, dramatics. May be in-charge of stores and equipment, hostel, transport, canteen, library, etc. Is designated as Arts Teacher for teaching history, geography, civics, social science, economics, psychology, etc.

**2320.12 Senior Secondary and Secondary School Teacher, Science** teaches one or more subjects to students of high school, higher secondary school, multipurpose school in regional language or English, Teaches students of various standards, allots and corrects home work, gives practical instructions in science subjects in laboratory. Conducts tests; and examinations and decides eligibility for promotion to higher standards. Maintains school registers and records, may collect fees; conduct sports and extracurricular activities such as scouting, hobby clubs, dramatics. May be in-charge of stores and equipment, hostel, transport, canteen, library, etc. Is designated as Science Teacher for teaching science subjects such as chemistry, physics, biology, mathematics, statistics etc.

**2320.15 Senior Secondary and Secondary School Teacher, Commerce** teaches one or more subjects of commerce such as banking, accountancy, auditing etc. to students of high school, higher secondary school, multipurpose school in regional language or English, Teaches students of various standards, allots and corrects home work. Conducts tests; and examinations and decides eligibility for promotion to higher standards. Maintains school registers and records. May collect fees; conduct sports and

extracurricular activities such as scouting, hobby clubs, and dramatics. May be in-charge of stores and equipment, hostel, transport, canteen, library, etc.

**2320.20 Language Teacher, Senior Secondary and Secondary School** teaches one or more Indian or foreign languages in high school, higher secondary school or multipurpose school. Teaches spellings, pronunciation and grammar of language, gives exercises in speaking and writing language. Conducts tests and examinations and decides eligibility for promotion to higher standards.

**2320.90 Senior Secondary and Secondary School Teachers, Other** include all other teachers engaged in teaching students of high and higher secondary schools, not elsewhere classified.

### 233 OTHER TEACHING PROFESSIONALS

Other teaching professionals conduct research and develop or advise on teaching methods and aids, or review and examine teachers' work and the result achieved in applying a particular curriculum programme and suggest changes and improvements, if necessary.

### 2331 EDUCATION METHOD SPECIALISTS

Education methods specialists conduct research and develop or advise on teaching methods and aids.

**2331.90 Education Method Specialists, Other** include all other specialists in education methods, not elsewhere classified.

### 2332 SCHOOL INSPECTORS

School inspectors review and examine teachers' work and the results achieved in applying a particular curriculum programme and suggest changes and improvements, if necessary.

**2332.10 School Inspector** performs variety of supervisory and executive tasks in any branch of public or private schools and ensures satisfactory working on procedural matters, records and registers to be

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maintained, policy decisions, connected rules and regulation, etc. and guides teachers and staff as necessary. Visits schools, checks records and connected papers; examines working conditions. Confers with the teaching staff on questions relating to curricula, teaching methods, equipments and other matters. Visits class rooms to observe teaching techniques and to evaluate teachers' performance, and scholastic results obtained. Preparing reports and making recommendations to educational authorities concerning possible changes and improvement in curricula, teaching methods, and other matters.

CIRCLE INSPECTOR SCHOOLS  
DISTRICT INSPECTOR OF SCHOOLS.

**2332.90 School Inspectors, Other** include all other school inspectors who review and examine teachers' work and the results achieved in applying a particular curriculum programme and suggest changes and improvements not elsewhere classified.

### 2339 OTHER TEACHING PROFESSIONALS

This Family covers teaching professionals not elsewhere classified in Group 233, Other teaching professionals.

**2339.10 Art Teacher** Drawing Teacher instructs school students in art subjects such as drawing and painting. Demonstrates to pupils methods and techniques of using drawing material such as brushes, scale, pencils and colours. Instructs them in model drawing in pencil and crayons and painting of objects, landscapes, plant life, murals, etc. Observes their work and makes corrections. May organise art exhibitions and visits to museums art galleries and places of artistic interest.

**2339.90 Teaching Professionals, other** include all other teachers engaged in teaching of specialised subjects like music, commercial practice, etc., not elsewhere classified.

### 24 OTHER PROFESSIONALS

Other professionals conduct research, improve or develop concepts, theories and

operational methods, or apply knowledge relating to information dissemination and organisation of business, as well as to philosophy, law, psychology, politics, economics, history, religion, language, sociology, other social sciences, and to arts and entertainment.

### 241 BUSINESS PROFESSIONALS

Business professionals improve, advise on or apply operational methods relating to organisation of business.

### 2411 ACCOUNTANTS

Accountants advise on accounting matters and perform accountancy services or audits.

**2411.10 Accountant** ensures proper maintenance of account books and records of business and financial establishments, private institutions, Government or Quasi Government Offices. Supervise subordinates e.g. Accounts Clerk engaged in maintenance of accounts and records. Scrutinises bills, receipts, payments, etc. for proper entries in Cash Book, Journal, Ledger and other records. Keeps record of all taxes, licenses, fees etc. required to be paid by organisation or establishment in which engaged and ensures that they are paid in time and kept up-to-date. Gets annual budget (or Budget for prescribed period) prepared and consolidated under his supervision and places it before 'Board' or appropriate authority for consideration. Prepares final accounts such as trial balance, profit annual loss statement and balance sheet etc. as required depending upon type of industry or organisation in which engaged. Sees that prescribed account procedure is followed by Offices, establishments and institutions and account books are properly maintained. Checks inventory, counts cash, examines documents in support of entries and reports to appropriate authorities in maintenance of accounts or loss of money, material etc. Ensures that instructions given or objections raised are carried out or rectified. Makes periodical and surprise checks of accounts. Advises appropriate authority on financial matters including revenue and expenditure such as procedure for procurement of raw materials, machinery and other purchases

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and also disposal of assets, write off, depreciation award of contract etc. May specialise in particular branches of accountancy and be designated as Chartered Accountant; Tax Accountant etc. May prepare tax returns and financial statements. May also perform secretarial work such as transfer of shares, registration etc.

**2411.20 Auditor** examines accounts books and records of business establishments, private institutions, Government or Quasi Government offices for accuracy and completeness of book keeping records and financial statements. Checks items of entries in day book or journal for correct recording. Scrutinises bills, vouchers and relevant entries in cashbooks. Verifies ledger entries against receipts for cash payment. Checks Arithmetic total for accuracy and counts cash in hand if required. Conducts test checks for proper observance of accounts procedure and ensures that all revenue and expenditure are brought to account under proper heads and that expenditure and disbursements are properly authorised, vouched and correctly classified. Acts as liquidator or arbitrator when required. Represents employees before tribunals, courts, etc. to clarify points regarding financial matters of companies and certifies financial statements as and when required by court of law or other authorities. Advises new or prospective firms in matters of account rules, taxation and procedure to be followed. Reports to appropriate authority irregularities in accounts and cases of losses of money, improper expenditure etc. May prepare financial statement and final accounts such as profit and loss statements, balance sheets, etc. for private and public undertakings.

**2411.30 Cost Accountant** devises and controls system of determining unit cost of products or services and calculates actual or average cost per unit considering various factors such as cost of raw materials, depreciation of machinery, payment of wages, rent and interest and other overhead expenses etc. Analyses cost records such as raw materials purchased, wages and salaries paid, depreciation of machinery and overhead charges to ascertain distribution of cost of various divisions of management and production. Determines performance of each unit by computing machine hour rate, labour

hour rate etc. to calculate output. Devises methods for finding out sources of wastage of material and unremunerative labour and suggests measure for eliminating or reducing wastage. Spots out financial weakness in methods of production and suggests measures for improvement. Assists management in setting standards for future cost and budgets for controlling expenses, deciding price structure, new investment, automation-making policy, etc. and also in deciding quantum of work to be assigned to employees. Ascertains proper bases for distribution of cost of various divisions of management. Classifies overhead charges into fixed and variable, controllable and uncontrollable etc. and suggests measures for their reduction or elimination. May work independently or supervise work of junior Cost Accountants and Cost Clerks performing routine phases of operations. May devise suitable form for determining quantum of work to be performed by each unit. May prepare statistical statement of costs and production. May specialise in Management Accounting.

**2411.40 Financial Examiner** enforces or ensures compliance with laws and regulations governing financial and securities institutions and financial and real estate transactions. May examine, verify correctness of, or establish authenticity of records. Direct and participate in formal and informal meetings with bank directors, trustees, senior management, counsels, outside accountants and consultants in order to gather information and discuss findings. Investigate activities of institutions in order to enforce laws and regulations and to ensure legality of transactions and operations or financial solvency. Prepare reports, exhibits and other supporting schedules that detail an institution's safety and soundness, compliance with laws and regulations, and recommended solutions to questionable financial conditions. Recommend actions to ensure compliance with laws and regulations, or to protect solvency of institutions. Resolve problems concerning the overall financial integrity of banking institutions including loan investment portfolios, capital, earnings, and specific or large troubled accounts. Review audit reports of internal and external auditors in order to monitor adequacy of scope of reports or to

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discover specific weaknesses in internal routines. Review balance sheets, operating income and expense accounts, and loan documentation in order to confirm institution assets and liabilities. Verify and inspect cash reserves, assigned collateral, and bank-owned securities in order to check internal control procedures. Confer with officials of real estate, securities, or financial institution industries in order to exchange views and discuss issues or pending cases. Establish guidelines for procedures and policies that comply with new and revised regulations, and direct their implementation.

**2411.50 Financial Analyst** conducts quantitative analysis of information affecting investment programmes of public or private institutions. Analyses financial information to produce forecasts of business, industry, and economic conditions for use in making investment decisions. Assemble spreadsheets and draw charts and graphs used to illustrate technical reports, using computer. Evaluates and compares the relative quality of various securities in a given industry. Interprets data affecting investment programmes, such as price, yield, stability, future trends in investment risks, and economic influences. Maintains knowledge and stays abreast of developments in the fields of industrial technology, business, finance, and economic theory. Monitor fundamental economic, industrial, and corporate developments through the analysis of information obtained from financial publications and services, investment banking firms, government agencies, trade publications, company sources, and personal interviews. Prepare plans of action for investment based on financial analyses. Present oral and written reports on general economic trends, individual corporations, and entire industries. Recommends investments and investment timing to companies, investment firm staff, or the investing public. Collaborates with investment bankers to attract new corporate clients to securities firms.

**2411.60 Budget Analyst** examines budget estimates for completeness, accuracy, and conformance with procedures and regulations. Analyses budgeting and accounting reports for the purpose of maintaining expenditure controls. Analyses

monthly department budgeting and accounting reports to maintain expenditure controls. Compiles and analyses accounting records and other data to determine the financial resources required to implement a programme. Directs the preparation of regular and special budget reports. Interprets budget directives and establishes policies for carrying out directives. Performs cost-benefits analyses to compare operating programmes, reviews financial requests, and explores alternative financing methods. Reviews operating budgets to analyse trends affecting budget needs. Summarises budgets and submits recommendations for the approval or disapproval of funds requests. Consults with managers to ensure that budget adjustments are made in accordance with programme changes. Matches appropriations for specific programmes with appropriations for broader programmes, including items for emergency funds.

**2411.70 Risk Management Analyst (Credit Card Portfolio)** researches ideas, formulates business intelligence, implement and quantifies the benefits. Makes recommendations to management in acquisition of new card members; manages existing portfolio and operational effectiveness. Responsible to develop scores to be applied to each stage within the lifecycle of the customer. Conducts research and analysis on the emerging trends and innovation in the industry to ensure competitiveness in the market place. The role includes coordination of several groups within the organisation to brainstorm ideas, assess benefits, prioritise and manage the development from concept to implementation.

**2411.90 Accountants, Other** includes all other accountants engaged in maintaining accounts, not elsewhere classified.

## **2412 PERSONNEL AND CAREER PROFESSIONALS**

Personnel and career professionals provide professional business services related to personnel policies such as employee recruitment or development, occupational analyses and vocational guidance.

**2412.10 Manpower Officer** assesses



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manpower supply and requirements, prepares schemes for meeting shortages, conducts enquiry into employment market trends and other man power problems and makes plans for efficient utilisation of human resources and achievement of nations major objectives. Plans, organises and conducts surveys for collection of data regarding manpower availability and utilisation in different spheres of economic activity, and analyses data from all available sources like census reports and special studies for preparation of reports on selected aspects of manpower problems. Identifies fields to which flow of manpower is not adequate and takes appropriate steps to accelerate flow. Studies problem; of manpower training, labour mobility, labour force participation, relationship of educational and training programmes to demand for special skills, and labour utilisation in different fields of economic activity. May specialise in any field of study like problems relating to availability and utilisation of scientific manpower, managerial personnel, technical and low-skilled personnel, or white-collar workers. May also examine recruitment and employment matters, service conditions etc., and advise on formulation of manpower policies.

**2412.20 Employment Officer** manages Employment Exchange carrying out placement and related activities. Interviews employment seekers to obtain factual details of job experience, training obtained etc., and registers them for placement against vacancies notified by employers. Selects registered applicants with appropriate qualifications specified for vacancies and directs or submits particulars of applicants to employers. Maintains liaison with trade unions, employing organizations and solicits notification of vacancies for better organisation of local employment market. Maintains contacts with local sources of labour supply and with mobile personnel in other places by circulating particulars of vacancies. Counsels applicants on employment opportunities available, suggesting suitable training and necessary mobility for early employment and also participates in career conferences. Submits statistical and ad hoc reports and conducts inspection of different sections and

exchanges as prescribed. Conducts local labour market surveys, and studies trends in employment opportunities, Provides expert advice to employers regarding availability of different categories of personnel and sources of labour supply. May carry out special surveys and conduct research on subjects connected with employment and manpower planning.

**2412.30 Human Resource Manager** plans, directs, and coordinates human resource management activities of an organisation to maximise the strategic use of human resources and maintain functions such as employee compensation, recruitment, personnel policies, and regulatory compliance. Administer compensation, benefits and performance management systems, and safety and recreation programmes. Advise managers on organisational policy matters such as equal employment opportunity and sexual harassment, and recommend needed changes. Allocate human resources, ensuring appropriate matches between personnel. Analyse statistical data and reports to identify and determine causes of personnel problems and develop recommendations for improvement of organisation's personnel policies and practices. Analyse training needs to design employee development, language training and health and safety programmes. Conduct exit interviews to identify reasons for employee termination. Develop, administer and evaluate applicant tests. Identify staff vacancies and recruit, interview and select applicants. Maintain records and compile statistical reports concerning personnel-related data such as hires, transfers, performance appraisals, and absenteeism rates. Negotiate bargaining agreements and help interpret labour contracts.

**2412.40 Vocational Guidance Officer; Vocational Counsellor** guides and counsels individuals in vocational choice vocational adjustment, vocational progress, etc. Interviews and collects information about client to assess his strength and weaknesses in relation to requirements of various occupations and educational training courses. Collects comprehensive information about occupations, employment market, educational and training facilities, scholarship facilities and other information

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relating to world of work. Conducts counselling interviews on vocational and occupational choices in relation to special aptitudes, interests and personality characteristics. Provides occupational information to all those seeking it in person or by post. Conducts group guidance programmes for purposes of disseminating occupational information and promoting vocational maturity. May administer psychological tests of aptitudes, interests, personality traits, etc. as aids in assessment of individual's strengths and weaknesses. May conduct surveys and studies concerning psychological requirements of different occupations and problems relating to adjustment and efficiency in different fields of activity. May conduct job analysis and study staffing patterns in different industrial and commercial organisations. May assist employers in their recruitment problems by using specialised techniques to determine aptitude, interest values, etc. May organise career week, career exhibition, etc. and deliver lectures on topics relating to vocational guidance to students in schools and colleges.

**2412.50 Counsellor; Teacher Counsellor** guides or counsels individuals in various problems such as educational, vocational, personal etc., and guides and coordinates activities of career masters in schools. Collects educational, occupational, employment, social and related information and studies relevant details of clients obtained from them and other sources. Administers tests of intelligence, aptitudes, interests, personality traits, etc. for obtaining data about individuals to be guided. Collects and studies information relating to environment involved in individual's adjustment. Interviews various persons for collecting information and counsels individuals needing such assistance accordingly, employing suitable techniques. Conducts group-guidance activities to serve various purposes of counselling. Carries out follow up studies on individuals guided, to render further assistance, and to evaluate guidance programme. Keeps himself abreast of guidance programmes in schools and coordinates their activities to ensure uniformity. May guide Career Masters and conduct research and surveys for purposes relevant to counselling.

**2412.60 Career Master** provides occupational and employment information to students of high or higher secondary and other institutions. Collects useful information from appropriate sources about occupations, employment opportunities, educational and training facilities, scholarships available, apprenticeship facilities etc., and classifies it according to subjects taught. Disseminates such information through class talks, career conferences, plans tours, career exhibitions, film and film strip displays, and class projects such as alumni survey, career conference etc. Maintains career information libraries in schools and encourages students to make use of literature. May collect relevant information about individual pupils and help maintain cumulative record cards. May interview parents to secure pupil information. May identify problem cases and refer them to appropriate agencies, and attend to follow-up work.

**2412.70 Job Evaluator** develops job evaluation schemes in commercial and industrial organisations, relating payments of wages to output, responsibilities, skills, physical demands, etc. Organises evaluation procedures to finalise scheme by defining evaluation factors, selecting and studying key jobs in organisation, and relating key-job wages to evaluation factors. Develops norms for evaluating variations in amount of responsibility and intelligence required for efficient performance of each job. Analyses existing and new jobs coming up in organization and relates job components to selected evaluation factors. Studies scope of introducing automatic procedures to minimise manual operations and suggests them to appropriate authorities for adoption. Undertakes study to assess workers' contribution and suggests methods to increase productivity. Determines payment in accordance with evaluation results. Executes scheme of job evaluation developed within organisation, considering appeals against it and problems of individual merit. Prepares job evaluation manual for utilisation by different categories of executive personnel within organisation as tool of sound industrial management. May assist in developing training programme of potentially capable individuals in organisation.

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**2412.75 Occupational Analyst; Job Analyst; Occupational Information Officer; Occupational Research Officer** collects, analyses and develops occupational data relating to job specifications and work characteristics for purposes of vocational counselling, wage evaluation, utilisation of workers and other personnel practices. Studies jobs being performed in industrial, commercial or other organisations and writes descriptions of elements of jobs and physical and mental qualities needed by worker. Analyses, classifies and correlates occupational data. Develops counselling aids and prepares interviewing aids to facilitate placement of workers. Utilises data to evolve wage-evaluation system and to recommend changes in pay-scale classifications of jobs. May prepare organisational and functional charts and develop testing devices for measuring occupational knowledge of workers.

**2412.90 Personnel and Occupational Professionals, Other** include all other personnel and occupational professionals, engaged in guidance, human resource management, job evaluation, etc., not elsewhere classified.

**2419 BUSINESS PROFESSIONALS, n.e.c**

This Family covers business professionals not classified elsewhere in Group 241, Business Professionals. For instance, here should be classified those who are engaged in studying, advising on and applying operational methods relating to various aspects of business undertakings, such as marketing, advertising, public relations, application of rules concerning patents, or steps to be taken in setting up and running a business, and home economics principles.

**2419.10 Publicity Officer** prepares publicity material and issues it through press, screen or Radio/TV to attain effective publicity for organisations, Government, business houses or other institutions. Prepares news releases, scripts. . salient features and other publicity materials to be published. Publicises publicity material through appropriate media such as display at important places, exhibitions, films, newspapers, radio/TV and personal contacts. Scrutinises newspaper and magazines to collect news and views to

ensure effective publicity relating to his publicised material. May tour area and contact public to promote mutual goodwill. May maintain liaison with press representatives.

**2419.20 Public Relation Officer; Liaison Officer** maintains liaison between organisation employing him and general public for promoting goodwill and better understanding. Distributes publicity material and issues press releases to popularise organisations activities. Studies news papers, journals etc. carefully and notes trends of public opinion on policies and activities of organisations. Explains and helps employer to understand public opinion and criticism of policies. Meets press and public representatives, explains special features of organisation employing him. Distributes publicity material, arranges film shows etc. to cultivate appreciation of organisation's activities and counteracts criticisms. Arranges visits of important persons and special parties to establishment for explaining their activities. Participates in exhibitions and displays posters, charts, models etc. to public. May select suitable publicity material; write special feature articles, reports or pamphlets. May participate and get photographs/video graphs taken of important functions and prepare other audio visual aids. May edit journals or periodicals for publicising activities of establishment or organisation. May maintain information centre and organise community relations activities.

**2419.30 Information Officer** collects and disseminates useful information connected with employer's activities and conducts information centre to educate and benefit public. Plans and prepares educational exhibits, charts, diagrams and other forms of audio visual aids. Displays publicity materials in information centre in attractive manner. Stocks books, pamphlets and other literature relating to activities of employer or institution for distribution or sale. Conducts persons and parties round information centre and explains charts and other exhibits to them. Distributes complimentary copies of literature or sells publications. Maintains proper accounts regarding sales and stock. Renders periodical reports to authorities concerned. May address public gatherings,

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private clubs and schools. May answer queries and explain achievements made.

**2419.40 Market Research Analyst**

researches market conditions in local, regional, or national areas to determine potential sales of a product or service. May gather information on competitors, prices, sales, and methods of marketing and distribution. May use survey results to create a marketing campaign based on regional preferences and buying habits. Collects and analyses data on customer demographics, preferences, needs, and buying habits to identify potential markets and factors affecting product demand. Conducts research on consumer opinions and marketing strategies, collaborating with marketing professionals, statisticians, pollsters, and other professionals. Develops and implements procedures for identifying advertising needs. Devises and evaluates methods and procedures for collecting data (such as surveys, opinion polls, or questionnaires), or arranges to obtain existing data. Forecasts and tracks marketing and sales trends, analysing collected data. Gathers data on competitors and analyze their prices, sales, and method of marketing and distribution. Measures and assesses customer and employee satisfaction. Measures the effectiveness of marketing, advertising, and communications programmes and strategies. Monitors industry statistics and follows trends in trade literature. Prepares reports of findings, illustrating data graphically and translating complex findings into written text.

**2419.50 Brand Manager** liaises with principals to negotiate product pricing and maintain relationships. Provides inputs with regards to product pricing and positioning through competitor analysis and market surveys/ benchmarking. Meticulously plans and executes marketing business plans, based on market trends to promote presence in the global market. Directs the sales team and designs innovative schemes to motivate them. Recruits and develops staff.

**2419.90 Business Professionals, Other** include professionals engaged in studying, advising on and applying operational methods relating to various aspects of

business undertakings, such as marketing, advertising, public relations, application of rules concerning patents, or steps to be taken in setting up and running a business, and home economics principles not elsewhere classified.

**242 LEGAL PROFESSIONALS**

Legal Professionals conduct research on legal problems, draft laws and regulations, advise clients on legal aspects of problems, and plead cases or conduct prosecutions in courts of justice, or preside over judicial proceedings and pronounce judgement in court of justice.

**2421 LAWYERS**

Lawyers give clients legal advice on a wide variety of subjects and plead cases or conduct prosecutions in court of justice, or instruct barristers or advocates to plead in higher court of justice.

**2421.10 Attorney General of India**

functions as highest legal adviser to Government of India and is consulted by Government of India on legal matters of highest importance involving such matters as interpretation of constitution and other laws. Studies references made to him by **Solicitor General of India** bearing comments of Ministry of Law and relevant instruction of administrative Ministry. Considers legal aspects of issue and advises Government as necessary. Studies briefs referred to him and appears in Supreme Court on behalf of Government to conduct important cases, especially those involving interpretation of constitution or other laws. Attends Parliament or any of its Committees when matters involving legal aspects are under consideration. May advise President on constitutional issues. May address or otherwise take part in Parliament for clarifying legal issues. May appear in any court of India.

**2421.20 Solicitor General of India** advises Government of India on legal matters and submits statement of important cases to **Attorney General of India** for his opinion or appearance in Supreme Court as necessary. Studies cases referred to him

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along with comments of Ministry of Law and instructions of Administrative Ministry. Examines merit of case, legal issues involved, interpretation of constitution or other laws and advises Government accordingly. Prepares statements of cases and submits them to Attorney General for India for his opinion or for conducting case in Supreme Court as appropriate. Files appeal or affidavit in Supreme Court as necessary and assists **Attorney General of India** or Government lawyer in conducting case. May appear in Supreme Court on behalf of Government for interpretation of constitution or other laws.

**2421.30 Advocate General** functions as Advocate of State Government and advises Government in legal matters referred to him including proposed legislation. Represents Government in suits and proceedings in original and appellate side of High Court. Appears on behalf of Government before High Court, Special Bench in Supreme Court or any other court as required. Advises Government on legal matters, and proposed legislation and performs other duties of legal character as may be assigned to him from time to time. Attends meetings of Legislature or Legislative Council and Committees thereof, as required. Gives opinion in matters referred to him by **Legal Remembrancer, Government Advocate, Public Prosecutor** and Heads of Secretariate Department. May advise Government Pleader in conducting criminal cases and act as leading counsel if directed by Government. May appear in private cases to which Government is not party.

**2421.40 Legal Remembrancer** advises State Government on legal matters, drafts bills and interprets legislative enactments, statutes and rules. Gives opinion on legal matters raised by Government departments. Interprets statutes, drafts bills for legislation and performs such other duties of legal character as are assigned to him by State Government. May act as Secretary to Government in Law Department.

**2421.50 Government Advocate, High Court, Standing Counsel High Court** conducts cases and pleads on behalf of Government in criminal appeals and civil cases in High Court and gives opinion on

matters referred to him by **Legal Remembrancer** and **Public Prosecutor**. Appears and defends Government in appeal cases and other criminal matters heard on appellate side of High Court. Presents appeals on behalf of Government for prosecution in cases of acquittal or lightening of sentence. Appears in any criminal case heard on appellate side of High Court in which Government's proprietary interests are concerned and applies for adjournment to get full information from appropriate District Officers before case is finally heard. Appears in civil appeals and original cases filed in High Court on behalf of Government. Gives advice in legal matters to Government Pleaders of different districts under jurisdiction of High Court and gives opinion on matters referred to him by **Legal Remembrancer**. May appear on behalf of Government in Mofussil Courts. May do private legal practice where Government is not involved.

**2421.60 Public Prosecutor; Government Pleader; District Government Counsel** represents State in sessions cases and lends advice to officers in districts in all legal matters when called for. Studies records of cases sent to Sessions Court by Trial Magistrate and ensures against omission and irregularities, which might vitiate proceedings in court. Presents evidence, conducts cross-examination and argues case for prosecution. Appears and pleads on behalf of prosecution in all appeal cases, application for reduction of sentences etc. Advises Government Officers in district regarding any civil or criminal proceedings and matters concerning Government interests. Allots legal work to **Assistant Public Prosecutors**. May appear for Government in civil and revenue cases if designated as **GOVERNMENT PLEADER**. May advise Government to withdraw prosecution in appropriate cases.

**2421.65 Police Prosecutor; Assistant Public Prosecutor** represents and conducts cases on behalf of Police Department in Magisterial Courts. Studies and examines charges prepared by investigating police officer. Prepares briefs and introduces further any evidence obtained after charges are formulated by police. Examines probable witnesses. Attends Court and conducts

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prosecution on behalf of police. Guides testimony of prosecution witnesses and introduces exhibits in support of case. Conducts preliminary arguments for framing of charges. Cross-examines defence witnesses. Argues prosecution case. May be called upon to discharge executive duties to maintain law and order.

**2421.70 Attorney at Law; Solicitor** gives advice in legal matters, prepares case for Advocates for conducting it on behalf of client and files legal proceedings in court of law. Receives instructions from clients and obtains necessary details from them. Studies documents or papers involved in case. Interviews witnesses, gathers full information and prepares case. Files case in court. Secures writ of summons and obtains court order permitting him to inspect and examine relevant documents. Collects testimony of witnesses and prepares brief for hearing before Judge. Discusses case with Advocate concerned and submits brief to him. Advises Advocate, attends court and assists Advocate in presenting case before judge. May function as Notary Public if so appointed by Government. May appear in court on behalf of client.

**2421.80 Advocate; Pleader; Bar-at-law; Vakil** gives advice on legal matters, files legal proceedings in court of law and pleads and acts on behalf of client in Court, income tax office, sales tax office, municipal office, tribunals, etc. on payment of fees. Studies facts and available documents pertaining to case and decides line of action. Advises client to procure evidence, further documents, etc. in support of case. Studies social customs and relevant acts, rules, rulings and precedents of courts of similar nature. Examines witnesses in chamber, gathers full information regarding case and prepares brief. Prepares and files plaint, complaint, written statement, affidavits, etc. on behalf of client, or defends accused in court of law. Examines and cross-examines witnesses of both sides in court and submits exhibits in support of his case. Advises party regarding course to be followed from time to time. Argues case for client. Performs conveyancing work such as preparing notices, bonds, wills, agreements, for clients.

**2421.90 Lawyers, Other** include lawyers

not classified elsewhere.

**2422 JUDGES AND MAGISTRATES**

Judges preside, hear and judge judicial proceedings in civil, administrative, industrial and other courts of justice; sit on bench of courts of law; and pronounce judgement in civil, criminal, administrative, industrial, consumer or other cases filed before them.

**2422.10 Judge, Supreme Court** sits on bench of Supreme court and decides cases in original and appellate jurisdiction of Supreme Court. Hears preliminary arguments for admitting cases. Obtains relevant records and judgement from High Court and issues notices to other party. Hears arguments of both parties and studies records and judgement of High Court. Discusses with other **JUDGES** on bench salient features of records, Judgement and arguments to arrive at decision. Delivers majority opinion of **JUDGES** on bench; while minority opinion is delivered later by dissident **JUDGES** separately. May consult with Attorney General of India particularly in constitutional cases. May allow persons to appear as *amicus curiae* (advisers to parties who act as consultants and suggest or state matter of law for assistance) to assist court in solving legal and constitutional points of national importance. Is designated as **CHIEF JUSTICE, SUPREME COURT**, if functions as head of judiciary in country and administers oath to **President and Vice President of India**. Renders judicial advice to President on constitutional matters referred to him by **President** and advises **President** on appointment of Supreme Court and High Court judges.

**2422.20 Judge, High Court; Puisne Judge** presides over court and decides, sitting singly or in bench of two or more judges, original or appeal cases allotted to him by **CHIEF JUSTICE, HIGH COURT**. Delivers judgement and issues directions, orders or writs to parties concerned. Hears pleadings of counsels of both sides and frames issues in dispute. Examines documents tendered by parties and admits relevant items as exhibits. Listens to arguments advanced by counsels of both sides and decides cases sitting singly or on bench of two or more judges in appeal

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cases. Examines records and judgement of lower court. Hears arguments of counsels, passes orders and delivers judgement. May discuss minor issues in chamber with counsels of both parties. Recommends to President appointments of **PUISNE JUDGES**, administers oath to them and to Governor on fresh appointment, constitutes benches for hearing cases, allots work to **PUISNE JUDGES** and advises Government regarding their appointments, transfers, promotions and other administrative matters of judiciary, if functions as head of judiciary in State and designated as **CHIEF JUSTICE, HIGH COURT**. May remand cases to lower court for retrial or refer matters for investigation if more facts are needed. May examine persons as court witnesses. May act as Administrative Judge and inspect lower courts such as session, civil and munsif courts.

**2422.30 District and Sessions Judge** functions as administrative and judicial head of all civil and criminal courts other than magisterial court in his district(s) and decides civil and criminal cases. Tries original civil cases and criminal cases committed to his court by magisterial courts. Listens to arguments of counsels of both sides, examines documents and formulates charges. Explains charges to accused in criminal cases and issues to litigants in civil cases. Records evidence of witnesses and admits documents as exhibits. Listens to arguments of counsels and delivers judgement. Hears appeals against judgement of lower courts, examines records and judgements, listens to arguments of counsels and delivers judgement. Attends to administrative matters and inspects subordinate courts as head of judiciary in district. May transfer cases from one court to another. May grant bail to accused in criminal cases. May allocate sessions cases between his court and civil and sessions court.

**2422.40 Munsif** tries and delivers judgement on civil cases of his sub-division filed in his court. Hears preliminary arguments and examines documents in support of complaint. Issues notices to other parties for filing written statements supported by affidavits. Frames issues, records evidence and admits relevant documents as exhibits.

Records evidence of plaintiff, defendant and their witnesses, listens to arguments of counsels of both sides and delivers judgement. May try criminal cases while under training.

**2422.50 Judge, Subordinate Court** tries and delivers judgement on cases filed in his court. Hears preliminary arguments and records statement of plaintiff to determine if *prima facie* case is made. Causes notices against other party to file replies duly supported by affidavits. Frames issues, proceeds with trial, records evidence of plaintiff and defendants' witnesses and admits relevant documents as exhibits. Listens to arguments of both sides and delivers judgement. May examine persons as court witnesses. Is designated as **CIVIL JUDGE** or **SUB-JUDGE** if tries only civil cases. Is designated as **CIVIL AND SESSIONS JUDGE** if vested with sessions power to try criminal cases. Is designated as **SPECIAL JUDGE** if presides over special courts.

**2422.60 Magistrate** presides over criminal court, decides cases and delivers judgement on judicial matters filed in or transferred to his court. Records statement of complainant to decide cognisance of *prima-facie* case. Issues summons or warrants to accused according to nature of alleged crime and grants remand to police to keep accused in police custody for investigation. Fixes dates of hearing. Issues summons to prosecution and defence witnesses, Records evidence of witnesses under oath, examines their statements given before police and admits documents or material as exhibits. Hears preliminary arguments of prosecution and defence counsels to decide as to whether any case has been made out against accused. Commits accused to stand trial in sessions court if offence is beyond competence of his court, or dismisses complainant if no case is made by prosecution. Proceeds with case if alleged offence is made out and within competence of his court. Formulates charges and explains them to accused. Records defence testimony of accused, evidence and cross examination of prosecution and disallows irrelevant questions. Hears arguments of counsels of both sides, evaluates evidence and delivers judgement. May inspect site of alleged offence. May call persons as court

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witnesses. May grant bail to accused at any stage of trial and exempt accused from personal appearance. May promulgate executive orders for maintenance of law and order. May do patrol duties with police. May order firing in serious disturbances. May be official witness at hangings in jail. May conduct identification proceedings in jail. Is designated as **DISTRICT MAGISTRATE, CHIEF PRESIDENCY MAGISTRATE, JUDICIAL MAGISTRATE, CITY MAGISTRATE**, according to authority vested in him. Is designated as **RAILWAY MAGISTRATE** if engaged in trying offences committed by ticketless travellers.

**2422.65 Magistrate Juvenile Court** presides over Juvenile Court and gives findings and observations on offences committed by juveniles Presides over court and studies complaint made by police. Commits delinquents to custody of **Probation Officer** and orders investigation of charges made. Studies report of **Probation Officer** and examines witnesses to find circumstances under which crime was committed and decides whether accused should be sent to Probation School or After Care Association or released in custody of guardians or receive medical treatment. Tries to maintain relaxed friendly atmosphere in court.

**2422.70 Chairman Administrative Tribunal** functions as administrative head of Administrative Tribunal and adjudicates disputes referred to it under various laws relating to service conditions, promotions, seniority, pay anomalies, administrative disputes etc. Presides over Tribunal and examines cases referred to it. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admit as exhibits documents tendered by parties. Evaluates all factors, makes decision and submit it to Government for implementation.

**2422.72 Member, Administrative Tribunal** gives decision in administrative disputes referred to his court under various service rules and Acts. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admits as exhibits documents tendered by parties. Visits place of work or

establishment if necessary for studying occupations, processes and working conditions. Gives decision in disputes after considering all material on record.

**2422.75 President, Industrial Tribunal; Presiding Officer Industrial Tribunal;** functions as administrative head of Industrial Court, Labour Court or Industrial Tribunal and adjudicates disputes referred to it under various laws such as Industrial Relations Act and Industrial Disputes Act. Presides over Court or Tribunal and examines cases referred to it. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admits as exhibits documents tendered by parties. Evaluates all factors, makes decision and submits it to Government for implementation. Adjudicates disputes in appeal arising from decision given by Labour Court or subordinate authorities as provided under Act. Constitutes Benches where necessary. Exercises administrative control over Labour Court and subordinate offices. May visit place of work or establishment to study process of work, working conditions or cause of dispute.

**2422.80 Member, Industrial Tribunal** gives decision in industrial disputes referred to his court under Industrial Relations Act and Industrial Disputes Act. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admits as exhibits documents tendered by parties. Visits place of work or establishment if necessary for studying processes and working conditions. Gives decision in disputes after considering all material on record. Functions as ADJUDICATOR (Industrial Tribunal) under Industrial Disputes Act and decides disputes referred to him under Act in some manner. Hears and decides matters or disputes in appeal including criminal charges arising from decisions given by Labour Court or subordinate authorities as provided under Act.

**2422.85 President, Consumer Redressal Forum** responsible for enabling consumer to secure speedy and inexpensive redressal of grievances, disputes and protecting large body of consumers from exploitation. Adjudicates consumer disputes referred to it



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under the consumer protection Act. Presides over Consumer Court and examines cases referred to it. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admits as exhibits documents tendered by parties. Evaluates all factors and makes decision in providing Redressal to consumer grievances in the matter of transport, telephones, electricity, constructions, banking, insurance, medical treatment etc.

**2422.87 Member, Consumer Redressal Forum** gives decision in consumer disputes referred to his court under Consumer Protection Act. Listens to arguments advanced by parties or their Advocates and notes important points. Records oral evidence and admit as exhibits documents tendered by parties. Visits place of work or establishment if necessary for studying consumer products, services and consultancy processes/conditions. Gives decision in disputes after considering all material on record. Functions as quasi judicial machinery under Consumer Protection Act and decides disputes referred to him under the Act in same manner. Hears and decides matters or disputes in the matter of transport, telephones, electricity, constructions, banking, insurance, medical treatment etc.

**2422.90 Judges and Magistrates, Other** includes all other judges and magistrates not classified elsewhere.

**2429 LEGAL PROFESSIONALS, n.e.c**

This Family covers legal professionals not classified elsewhere in Group 242, Legal Professionals. For instance, here should be classified those who perform legal functions other than pleading or prosecuting cases or presiding over judicial proceedings.

**2429.10 Prothonotary and Senior Master; Registrar** (Original Side High Court) controls all offices of Original side of High Court. Ensures proper filing of cases and appeals from Original side of High Court, scrutinises applications such as consent orders for adjournment, issue of writs, issue of certified copies etc. Exercises judicial powers delegated to him/her, such as issuing interlocutory orders in suit matters,

entertainmg of application under Company Law, issuing Pauper-Petitions, appointing of guardian *ad-litum* of minors and lunatics, settling index of Appeal Paper Books, acceding of plaints, and executes other functions assigned to him by Chief Justice and other Judges. Attends to important general correspondence of office and allots work to subordinates and ensures that they are properly executed. May look after accounts matters, sealing and keeping of records of original side of High Court, Examination of title of properties before sale, submission of report to court etc.

**2429.20 Registrar** (Appellate Side, High Court) functions as head and controlling officer of Appellate Side of High Court. Attends to all administrative matters pertaining to subordinate courts and to correspondence with Government, other High Courts and district and subordinate courts. Recommends postings of District, Sessions and Assistant Judges to Government as directed by Chief justice. Exercises quasi-judicial powers in respect of admission of appeals, granting time for filing of process fee, written process, deficit court fee, printing cost and making cases ready for hearing by bench. Attends to enrolment and disciplinary matters regarding Advocates and District Pleaders. Controls expenditure and acts as custodian of moneys deposited. Audits monthly returns received from district and subordinate courts. Supervises compilation of administrative report of Civil and Criminal Justice and High Court publications. Allots various court work to subordinates and ensures their proper execution.

**2429.25 Registrar; Clerk of the Court; Clerk of the State** assists Chief or Principal Judge in all administrative matters relating to court and functions as head of office of court. Reviews plaints, petitions, appeals, etc. received from parties and ensures that they are in proper order (that is court fee is properly levied, necessary documents are attached, appeal is competent and within time limit, etc.). Places papers before Chief Judge and admits them to file on his orders. Issues notices, summons, etc. to parties concerned and ensures that relevant papers are filed and gets Paper-Book prepared. Allots cases to Judges in consultation with

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Chief Judge and prepares advance schedule of cases. Examines drafts of decrees and orders passed by Court and ensures their correctness. Issues certified copies of judgement to Lower Courts and to High Courts in cases of appeals. Accepts affidavits, declarations, etc. Allots work to Deputy Registrars or Assistant Registrars and ensures proper execution of work. Answers correspondence addressed to court and keeps control over establishment and accounts of court. May also exercise certain judicial powers delegated to him such as granting of adjournment, deciding judicially certain matter, etc.

**2429.30 Master Official Referee and Registrar in Equity and Commissioner for taking Accounts** (High Court) decides matters judicially, relating to accounts in administration suits, mortgage suits, breach of contract matters, etc. referred to him by Judges sitting on Original Side of High Court. Examines accounts in administration suits and determines shares of parties. Settles particulars and conditions of sale of immovable property and conducts auction sale of property in mortgage suits. Determines amount of damage to be paid, etc. in breach of contract cases and submits report of findings to court when directed. May scrutinise accounts filed by guardians of minors and lunatics and Court Receiver, and Liquidator. May receive and record evidence if necessary and give decisions on points in dispute. May conduct proceedings either in general way or as specified in court order.

**2429.40 Taxing Master** (High Court) taxes parties, according to law, costs of Attorneys or costs ordered by court. Receives statements of cost from party and his Attorney or from winning party and losing party or bills payable to parties concerned from fund of particular estate or trust. Scrutinises bills and taxes according to set table of fees prescribed by rules of High Court on Original Side; and uses his discretion as regards item of fees payable to Attorney or Solicitor according to labour involved. Decides disputes regarding valuation of suits for purpose of court fees Hears Attorneys and gives decision in disputed cases of taxation. May suggest amount for which bill tendered should be settled.

**2429.45 Insolvency Registrar: Insolvency Judge** (High Court) functions as principal ministerial officer of Insolvency Court which sits in High Court on specified days for deciding matters relating to insolvents. Holds public examination of insolvents. Draws up orders of court and ensures that notice relating to them are published in High Court Gazette and newspapers. Prepares schedule of cases to be heard and attends each session of court. Entertains applications and issues insolvency notices after proper scrutiny. Exercises limited judicial functions delegated to him by Insolvency Court, such as adjudicating debtor declaring insolvent on his own application and holding public examination, etc.

**2429. 50 Official Assignee** (High Court) takes charge of insolvent estate and administers it under direction of court. Investigates affairs and conduct of insolvent in private examination and thereafter in public examination before insolvency Judge and submits report to court. Tries to convert insolvent's estate into as much money as possible and distributes it among various creditors according to law. Receives, scrutinises and admits or rejects claims of creditors as appropriate. Receives and scrutinises any scheme of settlement suggested by insolvent, discuss it amongst creditors and reports his opinion to court.

**2429.55 Court Receiver and Liquidator :** takes charge, administers and safeguards property in dispute and liquidates assets of company in liquidation for meeting claims of creditors. Collects rent, makes repairs, pays out taxes and conducts disbursements in respect of property placed under his charge by order of Court. Effects sale of property to execute court decrees or orders. Takes charge of estate of company in liquidation and investigates into its affairs. Receives and scrutinises claims of creditors as well as shareholders and submits his report to Court with recommendations. Converts estate into money under orders of court and distributes money realised amongst creditors according to law. Submits accounts of money realised through sale of estates to court for scrutiny and obtains formal orders of court for winding up company.

**2429.60 Sheriff** functions as honorary

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officer of State in big cities or towns for maintaining peace, administering justice under direction of courts and executing writs and other processes of court. Reads proclamation based on Government orders in important public places. Meets high officials of State to convey public opinion to them and public area. Entertains officially and convenes public meetings on request from citizens. Ensures proper serving executing and returning of all processes issued by High Court and maintenance of peace in courtrooms of High Court. Receives money during execution proceedings and makes payment pursuant to orders of Court. Is designated as DEPUTY SHERIFF if given power of attorney and functions on behalf of SHERIFF. Is designated as MARSHALL OF PRIZE COURT if engaged in execution of all processes of Prize Court, usually performed during war such as seizure of enemy ships, arrest of persons engaged in subversive acts etc.

**2429.65 Coroner** presides over Coroner's Court and holds inquest on bodies of persons alleged to have died by violence or accident. Hears testimony of doctor and any witnesses who may have been present at time of death. Examines relevant evidence and decides probable cause of death. Gives permission to dispose of dead body. Authorises police to arrange post-mortem examination in civil hospital in suspected cases. Sends records of findings to appropriate authorities for further investigation and trial if necessary. May visit site of occurrence to ascertain facts.

**2429.90 Legal Professionals, Other** includes all other legal professionals not classified elsewhere.

### **243 ARCHIVISTS, LIBRARIANS AND RELATED INFORMATION PROFESSIONALS**

Archivists, Librarians and Related Information Professionals develop and maintain the collections of archives, libraries, museum, art galleries, and similar establishments.

#### **2431 ARCHIVISTS AND CURATORS**

Archivists and curators conduct research, collect, appraise and ensure the safekeeping

and preservation of the contents of archives and artifacts of historical, cultural and artistic interest, and of art and other objects and organise exhibitions at museums and art galleries.

**2431.10 Archivist** acquires, maintains and supplies for reference manuscripts and supplies records of historical importance. Scrutinises public records and documents transferred to archives, according to historical significance, and enduring value. Recommends weeding unimportant material and analyses and prepares brief descriptions of contents of records and documents. Arranges them in chronological order department wise and prepares indices, guides, bibliographies and microfilm copies or documents as reference media. Acquires on payment or otherwise, documents of archival importance from private sources. Safeguards and preserves records, adopting modern means such as fumigation, lamination, air cleaning, microfilming etc. Acts as consultant to government agencies, academic institutions, research scholars by making available information and documents and locating reference materials obtainable elsewhere. Prepares compendia on selected subjects relating to public administration for use of administration.

**2431.20 Curator; (Museum),** collects, prepares and preserves objects or materials of historical, biological, geological, archaeological and antique importance and displays them for public view in museums or exhibition halls. Undertakes extensive tours of country and collects rare objects and materials of historical importance. Classifies collections under appropriate heads according; to genus, family and species (if animals) or to periods (if monuments). Prepares or gets prepared material for proper and effective display. Labels specimens or objects with proper descriptions. Preserves specimens in special media like Lysol, Formalin, etc. Displays objects in various exhibition hall of museum to give better effect. Conducts or carries out research to trace history of objects. Publishes research reports relating to museum collection for use by scholars. Provides facilities to research workers in identification and classification of objects. May conduct visitors to museum and explain to them history of articles, etc.

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**2431.30 Restorer Painting;** restores damaged and faded paintings and preserves paintings, using techniques based on knowledge of art and art materials: Examines surfaces of painting, using magnifying device, and performs tests to determine factors, such as age, structure, pigment stability, and probable reaction to various cleaning agents and solvents. Removes painting from frame. Applies select solvents and cleaning agents and uses predetermined method to clean surface of painting and remove accretions, discolorations, and deteriorated varnish. Stretches new linen backing, applies paste material to back of painting, and laminates parts together, using laminating press. Dries laminated painting under controlled conditions to prevent shrinkage. Applies beeswax or other substance to damaged or faded areas where restoration is needed. Studies style, techniques, colors, textures, and materials used by artist to maintain consistency in reconstruction or retouching procedures. Reconstructs or retouches damaged areas and blends area into adjacent areas to restore painting to original condition. Applies varnish or other preservative to surface of painting and dries under controlled conditions. May remove paint layer from backing and remount on canvas, wood, or metal support using pressure and special adhesives. May apply neutral colour powder to damaged areas for restoration.

**2431.40 Restorer, Lace and Textiles** restores and prepares ancient textile and lace materials for display in textile museum: Cleans fabric, using cleaning compounds and techniques based on historical knowledge of fabric manufacture and effect of cleaning upon fabric. Develops new cleaning compounds and methods when available means are inadequate or tend to harm fabric. Repairs and reweaves worn, torn, and decayed fabrics, using techniques based on knowledge of weaving and lace methods. Mounts fabric in frame or suitable background.

**2431.50 Restorer, Ceramic** Cleans, preserves, restores, and repairs objects made of glass, porcelain, china, fired clay, and other ceramic materials: Coats excavated objects with surface-active agents to loosen adhering mud or clay and washes

objects with clear water. Places cleaned objects in dilute hydrochloric acid or other solution to remove remaining deposits of lime or chalk, basing choice of solution on knowledge of physical and chemical structure of objects and destructive qualities of solvents. Cleans glass, porcelain, or similar objects by such methods as soaking objects in lukewarm water with ammonia added, wiping gilded or enameled objects with solvent-saturated swab, or rubbing objects with paste cleanser. Rubs objects with jewelers' rouge or other mild cleanser, soaks objects in distilled water with bleach or solvent added, or applies paste or liquid solvent, such as magnesium silicate or acetone, basing choice of method and material on age, condition, and chemical structure of objects, to remove stains from objects. Recommends preservation measures, such as control of temperature, humidity, and exposure to light, to curatorial and building maintenance staff to prevent damage to or deterioration of object. Impregnates surfaces with diluted synthetic lacquers to reduce porosity of material to increase durability of ancient earthenware. Restores or simulates original appearance of objects by such methods as polishing surfaces to restore translucency, removing crackled glaze and applying soluble synthetic coating, grinding or cutting out chipped edges and repolishing surfaces, or applying matt paints, gold leaf, or other coating to object, basing methods and materials used on knowledge of original craft and condition of objects. Repairs broken objects, employing such techniques as bonding edges together with adhesive, inserting dowel pins in sections and cementing together, or affixing adhesive coated strips to inner portions of broken objects. Replaces missing sections of objects by constructing wire frames of missing sections, shaping plasticene or other materials over frames, affixing modeled sections to objects with dowels or adhesive, and painting attached sections to reproduce original appearance. Constructs replicas of archaeological artifacts or historically significant ceramic ware, basing construction design on size, curvature, and thickness of excavated shards or pieces of objects available and knowledge of techniques and designs characteristic of period.

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**2431.55 Restorer, Paper-and-Prints** cleans, preserves, restores, and repairs books, documents, maps, prints, photographs, and other paper objects of historic or artistic significance: Examines or tests objects to determine physical condition and chemical structure of paper, ink, paint, or other coating, in order to identify problem and plan safest and most effective method of treating material. Cleans objects by such methods as sprinkling crumbled art gum or draft powder over surface and rotating soft cloth over cleaning agent to absorb soil (dry cleaning), immersing objects in circulating bath of water or mild chemical solution (wet cleaning), or applying solvent to remove rust, fly specks, mildew, or other stains, basing choice of method on knowledge of physical and chemical structure of objects and effects of various kinds of treatment. Preserves or directs preservation of objects by such methods as immersing paper in deacidification baths to remove acidity from papers and ink to prevent deterioration, sealing documents or other papers in cellulose cases and passing sealed objects through heated rollers to laminate them, spraying objects, storage containers, or areas with fungicides, insecticides, or pesticides, and controlling temperature, humidity, and exposure to natural or artificial light in areas where objects are displayed or stored. Restores objects to original appearance by such methods as immersing papers in mild bleach solution to brighten faded backgrounds, removing old varnish from such art works as engravings and mezzotints, or strengthening papers by resizing in bath of gelatin solution. Repairs objects by such methods as mending tears with adhesive and tissue, patching and filling worm holes, torn corners, or large tears by chamfering, inserting, affixing, and staining paper of similar weight and weave to simulate original appearance, or retouching stained, faded, or blurred watercolors, prints, or documents, using colors and strokes to reproduce those of original artist or writer.

**2431.60 Furniture Restorer** restores and preserves historical furniture in collection of museum or similar institution, using variety of hand tools and power tools and applying knowledge of antique fabrics and wood furniture: Examines furnishings to determine type of material, extent of deterioration or

damage, or date of construction to verify authenticity and plan restoration. Sets up and operates variety of woodworking machines to fabricate, repair, reinforce, and replace parts of furniture. Cuts, shapes, and attaches parts according to blueprints or drawings, using hand tools. Matches materials for colour, grain, and texture. Strips old finish from furnishings, using solvents and abrasives. Fills cracks, depressions, and other blemishes, using plastic wood or lacquer stick. Treats warped or stained surfaces to restore original contour and colour. Glues or replaces veneer sections. Smooths surfaces, using power sander or abrasive material. Washes or bleaches furniture surfaces to prepare surface for application of finish. Selects coatings, such as stain, lacquer, or varnish according to type wood, and brushes or sprays material onto surface to protect surface and produce desired appearance. Polishes, sprays, or waxes finished pieces. Removes damaged or deteriorated coverings from upholstered furniture. Repairs, reinforces, or replaces components, such as springs, webbing, and padding. Selects fabric for new covering, using knowledge of period and style of furniture or following instructions of CURATOR (museums). Tacks, sews, glues, or staples covering to furniture frame to attach upholstery. Refurbishes leather coverings of furnishings, using softeners, solvents, adhesives, stains, or polishes. Replaces damaged coverings with leather pieces of appropriate colour, grain, and weight. Stencils, gilds, emboss, or paint designs or borders on restored pieces to reproduce original appearance. May advise curatorial staff on environmental conditions necessary for preservation of furnishings in exhibit and storage areas. May fabricate replicas of period furniture for use in exhibits.

**2431.90 Archivists and Curators, other** include all other Archivists and Curators engaged in preserving and maintaining books, manuscripts, magazines, fossils, old seals and objects of historical, scientific and literary importance, not elsewhere classified.

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**2432 LIBRARIANS AND RELATED INFORMATION PROFESSIONALS**

Librarians and related information professionals collect and store recorded or published material, and retrieve and provide information as requested.

**2432.10 Librarian** organises and maintains systematic collection of books, periodicals and other printed matter in library and issues them to readers. Selects publications to be purchased and receives priced or complimentary copies of books, periodicals and other publications from authors or publishers. Classifies or supervises classification, indexing, cataloguing, shelving of books and other publications and maintains records of stock and issues. Guides readers in selecting books or in finding information required by them. Issues publications to readers. Examines books periodically for damage, if any, and decides which books are to be repaired or re-bound. Gives information from library sources on subjects of general or special interest to individuals or groups. Maintains liaison with other libraries and library associations. May make abstracts and summaries of important articles from incoming periodicals. May determine library policy. May look after organization and administration of academic, public and research libraries.

**2432.20 Librarian Films** organises and maintains collection of processed motion pictures for future use or reference. Receives films both 55 mm and 16 mm positive and negative as well as master positive, reference prints, library prints, etc. Prepares complete catalogue index and stores films by title or scene reference. Selects and issues films as per requisitions received from various departments such as editing, sound, direction, etc. Makes arrangement for loaning of films to private parties. Attends to queries received for purchase of stock shots and stock sound effects. May cut and assemble portions of positive films.

**2432.25 Tape Librarian** Maintains data on computer storage media such as magnetic tapes, floppies, discs, cartridge tapes, video discs, microfilms, maintains indexed cards, catalogues of the above stored data, issues the data device to users; keeps accounts of

issues and receipts of data devices; weeds out obsolete data as per instructions given by data owners/controlling officers; ensures required storing conditions and reports deficiencies to controlling officer; indents for gadgets and fixtures for maintaining the data devices. May be designated as Librarian, Tape; Media, Librarian.

**2432.30 Children's Librarian** manages library programme for children: Selects books and audiovisual materials of interest to children to be acquired by library. Assists children in selecting and locating library materials. Plans and conducts programmes for children to encourage reading, viewing, and listening and use of library materials and facilities. Confers with teachers, parents, and community groups to assist in developing programmes to encourage and improve children's communication skills. Compiles lists of materials of interest to children. Activities may include story telling, book talks, puppet shows, and film and multimedia programmes.

**2432.40 News Librarian** manages information resources library stored in files, on tape or microfilm, or in computers for use by news and editorial staff in publishing establishments, such as newspaper and magazine publishers, and in broadcasting establishments, such as radio and television stations: Directs activities of workers engaged in clipping, classifying, cataloguing, indexing, storing, editing, and retrieving library information, or performs these activities as needed. Researches, retrieves, and disseminates information in resource library or commercial data bases in response to requests from news or editorial staff, using knowledge of classification system or computer data base. Maintains records and statistics on use of databases and information services provided. May manage in-house database of news information, assign classification terms to news articles, input news articles into database, and research news information in in-house database. May develop databases for data storage and retrieval, according to needs of news staff. May hire, train, schedule, and evaluate library staff. May prepare library budgets. May promote and market library products and services to public. May coordinate activities of library with activities

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of other departments. May select and purchase reference books for library collection. May manage graphics library, assign classification terms to graphics, and research graphics.

**2432.90 Librarians and Related Information Professionals, Other** include all other Librarians engaged in cataloguing, preserving and maintaining books, manuscripts, magazines, of historical, scientific and literary importance, not elsewhere classified.

#### **244 SOCIAL SCIENCE AND RELATED PROFESSIONALS**

Social science and related professionals conduct research, improve or develop concepts, theories and operational methods, or apply knowledge relating to philosophy, politics, economics, sociology, anthropology, history, philosophy, language, psychology, and other social sciences, or they provide social services, to meet the needs of individuals and families in a community.

#### **2441 ECONOMISTS**

Economists conduct research to improve or develop economic concepts, theories and operational methods used to understand and describe the behaviour of national and international markets for goods, services and labour, and advise on or apply the knowledge to draw up economic policies and to formulate solutions to present or project economic problems.

**2441.10 Economist** makes studies, conducts research, prepares reports and formulates plans designed to aid in solution of economic problems arising from production and distribution of goods and services. Studies whole process through which man makes living and satisfies his wants for products, shelter, service or amusement and conditions favouring or hampering economic development. Devises methods for collection and analysis of economic and statistical data and compiles and interprets such data. Prepares reports and formulates plans based on studies in economic field and interprets and analysed data. Advises and consults private industrial concerns or government

agencies on matters such as operating efficiency, marketing methods and fiscal problems. May specialise in any branch of economics, such as agricultural, financial or industrial, international trade, labour or prices, or in taxation or market research and be designated accordingly.

**2441.20 Energy Economist** undertakes policy research and formulates policies and programmes for efficient use of energy and its conservation, strengthen energy auditing/energy management capabilities in the country, Assists in implementation of energy efficiency programmes, benchmark energy consumption in industry, power generation, transmission & distribution, promote energy efficient technologies, design and implement Standard & Labelling programme for appliances. Assists in preparation of Energy Conservation Building Codes and coordinates with State Authorities in implementation, promote awareness and implement programmes for school children, develop performance contract and promote Energy Service Companies. Develops innovative financial mechanism for adoption of energy efficiency in industries and commerce.

**2441.30 Home Economist** organises and conducts consumer education service or research programme for equipment, food, textile, or utility company, utilising principles of home economics: Advises homemakers in selection and utilisation of household equipment, food, and clothing, and interprets homemakers' needs to manufacturers of household products. Writes advertising copy and articles of interest to homemakers, tests recipes, equipment, and new household products, conducts radio and television homemakers' programmes, and performs other public relations and promotion work for business firms, newspapers, magazines, and radio and television stations. Advises individuals and families on home management practices, such as budget planning, meal preparation, and energy conservation. Teaches improved homemaking practices to homemakers and youths through educational programmes, demonstrations, discussions, and home visits. May engage in research in government, private industry, and colleges and universities to explore family relations

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or child development, develop new products for home, discover facts on food nutrition, and test serviceability of new materials. May specialise in specific area of home economics.

**2441.90 Economists, other** include those economists engaged in research on economic problems not elsewhere classified.

**2442 SOCIOLOGISTS, ANTHROPOLOGISTS AND RELATED PROFESSIONALS**

Sociologists, anthropologists and related professionals investigate and describe the social structure of societies, the origin and evolution of humanity, and the interdependence between environmental conditions and human activities, and make the knowledge obtained available as a basis for policy decisions.

**2442.10 Sociologist, General** investigates origin and development of community life and social relationships of groups of human beings. Studies origin and development and relationship of groups of human beings. Collects or supervises collection and tabulation of data relating to development of community organisations, social customs, etc. Processes and interprets data for use by administrators, law makers, educators and other individuals and organisations engaged in solving social problems. Studies urban problems such as unemployment, begging, suicide and collects data, assesses trend and attitude of society and observes social change in time and space. May specialise in any branch of sociology such as Social Pathology, Industrial Sociology, Tribal Welfare and Administration, Educational sociology, etc. and may be designated accordingly.

**2442.20 Social Ecologist** investigates effects of environments on distribution and activities of individuals and groups. Studies symbolic behaviour and social behaviour, interdependence of organism and environment leading to adjustments. Studies effects of environment on urban and rural growth, distribution, mobility and activities of individuals and groups. Assesses changes caused by various environment and evolves means for proper adjustment.

**2442.25 Clinical Sociologist** develops and implements corrective procedures to alleviate group dysfunctions: Confers with individuals and groups to determine nature of group dysfunction. Observes group interaction and interviews group members to identify problems related to factors such as group organisation, authority relationships, and role conflicts. Develops approaches to solution of group's problems, based on findings and incorporating sociological research and study in related disciplines. Develops intervention procedures, utilising techniques such as interviews, consultations, role-playing, and participant observation of group interaction, to facilitate resolution of group problems. Monitors group interaction and role affiliations to evaluate progress and to determine need for additional change.

**2442.30 Demographer** collects and analyses vital statistics related to population changes, such as births, marriages and mortality, and forecasts trends of increase or decrease in population. Analyses data on mortality, fertility, and migration of human population to study their level and trends. Evolves techniques of measuring population phenomena and evaluates their application. Studies customs, modes of living, nuptial procedures, fertility rates, birth control and public health measures, affecting demographic phenomena. Constructs life tables and studies economic and social characteristics of population in prescribed area. Writes reports on results of studies and maintains familiarity with other studies to improve techniques of analysis, refine concepts used, and methods of population analysis.

**2442.40 Criminologist** investigates origin, nature and causes of crimes and suggests methods of prevention. Studies social conditions and statistics of crime and traces origin, nature and causes of crime. Collects data and statistics about various types of conducts which constitute crime. Correlates crime prevalent in particular community under particular social conditions with actual crime committed. Views problems with socio-legal angle and suggest measures to prevent crimes through effective and modern penal mechanism. Evolves institution in society for preventing individuals from indulging in



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criminal behaviour.

**2442.50 Penologist** investigates and studies punishment of various crimes, discipline and management of penal institutions and rehabilitation of criminal offenders. Studies theory and objectives of punishment and criminality as suggested by Criminologist. Assigns different punishments for various crimes according to their nature and intensity, appropriate to crime and criminal. Individualises punishment with corrective treatment of criminals through proper prison management, maintenance of Juvenile institutions and settlement for habitual offenders. Enforces punishment with reformative and rehabilitative ideals, devising preventive measures.

**2442.60 Anthropologist, General** investigates evolution of human race by studying development of physical characteristics, religious and cultural practices, etc. at different periods of time. Identifies cultural periods with date in history by studying remains of culture recorded on stones, pottery, bones, etc. Undertakes excavations or exploration of pre-historic sites; preserves, reconstructs and classifies museum objects of cultural, physical, technological and aesthetic life of man, and arranges for their proper display and exhibition. Studies biological aspects of man within broad racial groups, traces genetical identity, similarities of physical characteristics amenable to accurate measurement and correlation between pathological phenomena and bodily form. Determines inter-relationship of psychological reactions to stresses of natural and social environment. Studies formation of language and discusses historical events, reflected in process and identifies independent stems in vocabulary of various languages to trace links between languages and cultures. Studies forms of social organisations and institutions like family and state, traces their development and conducts comparative studies to infer relationship between social requirements and institutional structures. Plans, organises and conducts sample surveys and case studies where necessary for collection of relevant data and utilises data collected to identify various characteristics of community and culture. Evaluates cause; and form of resistance to external change

within community. May utilise data for application in solution of social problems involving change and adaptation. May specialise in any particular field of anthropology and be designated as **Physical Anthropologist, Cultural Anthropologist** or **Archaeologist**.

**2442.70 Anthropologist, Physical** studies physical nature of man by observation and measurement of bodily variation and physical attributes of existing and pre-historical human types. Identifies and classifies human beings into broad types on basis of their physical characteristics by conducting field investigations. Studies in laboratory physical, physiological and biological characteristics, amenable to accurate measurement and comparison by tracing relationship between genetical structure and other physical characteristics like colour and structure of hair, eyes, ears, etc., and by observing correlation between pathological conditions of parts of body and bodily form. Identifies groups connected genealogically by genetical studies conducted among individuals related by blood. Plans, organises and conducts field investigation by various methods and techniques to obtain data on blood characteristics, genetic composition and physical measurements of body. Conducts bio-chemical studies of different parts of body to isolate and identify characteristics of cellular structure of different parts of body. Obtains measurements of bony structures of body like capacity of cranium, length of different bones with instruments, like spreading and sliding calliper. Observes other characteristics, which are easily identifiable and can be accurately measured for purposes of comparison between types. Studies characteristics of different parts of skin, specially ridges, patterns or whirls of palms of hand and sole of foot for purposes of identification and comparison. Infers relationship between environment and development of physical characteristics, traces relationship between man and higher animals like apes and monkeys for comparative studies by identifying similarities between physical characteristics and origin and spread of different racial group. Reconstructs fossil-remains after proper measurements, etc.

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**2442.75 Anthropologist Cultural; Social Anthropologist** plans, organises and conducts investigations into physical, social and mental characteristics of both past and present groups of human beings. Identifies regularities governing human cultural life and interprets cultural phenomena over large geographical areas and long time spans. Identifies and isolates cultural groups spread over large regions, and studies differences and similarities in characteristics of different cultural groups. Evaluates social institutions fulfilling requirements of human needs in different cultures. Identifies value systems, motivations and expressions of various human urges and requirements through institutional set ups. Initiates pilot studies into attitudes, values, technology, personality, etc., of cultural group by employing suitable scientific methods like interview, questionnaire, participant observation and genealogical studies to obtain detailed understanding of social structure and culture of particular group. Classifies data collected, analyses and writes reports. Makes comparison between different cultural groups to define typology of each culture and derives principles of group behaviour, forms of motivation, values upheld in different cultures for purposes of guidance and control in problems of social engineering. Traces cultural evolution and pattern of change over time, by studying remains of ancient cultures and records in history, changes in institutions, technology, law, religion, etc. Seeks application of data on special implications of cultural change and social adaptation in fields of education, tribal and rural community development, health and medicine, industrial relations and administration. May study folk dance, drama and music of tribal and peasant communities.

**2442.77 Genealogist** conducts research into genealogical background of individual or family in order to establish descent from specific ancestor or to discover and identify forebears of individual or family: Consults different genealogical tables and publications and documents, such as church and court records, for evidence of births, baptisms, marriages, deaths, and legacies in order to trace lines of descent or succession. Constructs chart showing lines of descent and family relationships. Prepares history of family in narrative form or writes brief

sketches emphasising points of interest in family background.

**2442.80 Archaeologist**, studies ancient art, architectural relics, monuments, excavations and other materials to determine social habits customs, religious practices, living conditions, etc., as existed in past and their influence on modern civilization. Visits place of antiquity to study monuments, relics and other materials that were in use in early times. Examines and analyses findings to determine period to which they belong. Conducts exploration, survey and systematic excavation work of ancient sites to discover hidden cities, structures and other antiquities. Collects objects of art, pottery, beads, ornaments and other relics from excavation bearing pre-historic or proto-historic culture. Classifies them according to period to which they belong. Undertakes research on findings and publishes reports on historical importance. Inspects and preserves ancient monuments like temples, forts, mosques, etc. in good order for architectural value. Prepares descriptive catalogues of articles collected and other exhibits in museums. May deliver lectures to students and other interested in archaeology. May undertake architectural survey of temples and monuments to study form and style of different periods.

**2442.85 Geographer** studies characteristics and use of earth's surface relating and interpreting inter-action of physical and cultural phenomena. Investigates nature of physical and climate environment of selected areas by obtaining data with application of various sciences such as physics, geology, oceanography, meteorology and biology. Analyses human activity in its social aspects, such as political, economic, movement and growth of population etc. and deduces relationship between such activity and geographical environment. Conducts cartographic surveys and draws maps to required scales. Provides expert opinion to Government and other organizations on problems of economic exploitation of geographic regions determination of political boundaries and related problems. May specialise in any branch of geography such as study of relationship of economic activities to geographical location and climate movement of population, problems

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of land utilisation in urban growth and town planning preparation of maps, geographical factors influencing national and international problems and may be designated as ECONOMIC GEOGRAPHER. POLITICAL GEOGRAPHER, PHYSICAL GEOGRAPHER, URBAN GEOGRAPHER. CLIMATOLOGIST, GEOMORPHOLOGIST, METHODOLOGIST etc.

**2442.90 Sociologists, Anthropologists and Related Professionals, other** include all other professionals who investigate and describe the social structure of societies, the origin and evolution of humanity, and the interdependence between environmental conditions and human activities, and make the knowledge obtained available as a basis for policy decisions not elsewhere classified.

### 2443 PHILOSOPHERS, HISTORIANS AND POLITICAL SCIENTISTS

Philosophers, historians and political scientists work, mostly by reasoning, in the field of epistemology, metaphysics or ethics. They conduct research and describe past events and activities, including the development of social and economic structures, or cultural and political institutions and movements, and make the knowledge obtained available as a basis for political, diplomatic and related policies.

**2443.10 Historian** studies, interprets and prepares chronological records dealing with past and current events connected with origin and progress of nation, state, region, institution, etc. Visits places of historical importance, collects historical data from different sources such as archives, court records, diaries, files and other published and unpublished materials. Evaluates data on authenticity and relative significance. Assembles his torical data in systematic form relating them to time, place and sequence of cause and effects. Aims at objective statement of facts and writes history in narrative form from assembled data to denote events as they occurred. May specialise in writing history of a particular country or period of time. May conduct research.

**2443.20 Biographer** studies life of

important person and narrates events, interests, behaviour, activities and achievements of individual which enable proper understanding of his character and constitution. Specialises in writing career or phase of life of an individual from available records and other materials. Collects materials from news accounts, diaries, personal paper, correspondence and other details giving account of events in which participated. Consults friends and relatives of individual to get further particulars about person whose biography is to be written. Writes in narrative form life history of person portraying his character and events. May reveal through biography relevant events and developments of contemporary time.

**2443.30 Epigraphist** studies inscriptions on ancient monuments, temple walls, stone slabs, rocks, copper plates and other media and deciphers writing to depict historical evolution of country, people and place and to reveal lost history of past and early rulers, their culture, social and religious systems etc. Visits historical and other important places and examines inscriptions on rocks, copper plates, temple walls, images, coins, seals, etc. Takes ink impression of inscriptions found on walls, stone slabs, pillars, etc. on paper; deciphers or decodes contents of such inscriptions written in various languages and scripts. Publishes results of investigations reflecting on history on civilisation. May furnish required information to scholars and research workers.

**2443.40 Numismatist** specialises in collection, reading inscription, study and interpretation of rare old coins of historical and antique importance. Tours country, collects rare coins and reads and deciphers old coins. Classifies coins according to period of existence. Arranges and displays coins in exhibition halls, museums etc. Undertakes research on origin and history of old coins and publishes reports and articles in scientific journals. Conducts visitors around exhibits and explains historical importance of coins to them. May sell rare coins for profit. May deliver lectures on historical and cultural importance of coins.

**2443.50 Philatelist; Stamp Collector**

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specialises in collection of postage stamps for study or resale. Collects used and unused postage stamps relating to different periods and pertaining to different countries. Classifies them according to periods of issue and country of origin. Conducts exhibition of stamp collection for public view. May undertake systematic research in postal history, printing methods, difference in papers, etc. May sell stamps for profit.

**2443.60 Political Scientist** studies development of political institutions and interprets various political events from national, international point of view and formulates political theories to deal with principles of Government or States. Supervises collection of information relating to origin, development and inter-relationship of political institutions. Studies effect of various phenomena such as political philosophy, public laws and administration, party systems, public opinion, relationship between Government and business, international laws, civic administration, etc. Processes and interprets such data and information to formulate theories and principles for adoption by Government or political parties. May conduct survey of public opinion. May organise and mould public opinion. May specialise in any particular field.

**2443.90 Philosophers, Historians and Political Scientists, Other** include all other professionals who conduct research and describe past events and activities, including the development of social and economic structures, or cultural and political institutions and movements, and make the knowledge obtained available as a basis for political, diplomatic and related policies not classified elsewhere.

#### **2444 PHILOLOGISTS, TRANSLATORS AND INTERPRETERS**

Philologists, translators and interpreters study the origin, development and structure of languages, and translate or interpret from one language in to another.

**2444.10 Language Specialist;** specialises in one or more Indian or foreign languages. Collects literature from archives, libraries on languages and studies their structure and

development. Traces origin and evolution of words and deciphers writings and ancient languages found in archaeological remains of past civilisation. Analyses ancient languages and compares them with modern languages. Writes theses and prepares dictionaries. May be designated as **PHILOLOGIST** if engaged in study of structure and development of languages or **LEXICOGRAPHER** if engaged in compiling dictionary in one or more languages.

**2444.20 Translator** translates written or printed material from one language to one or more other languages. Scrutinises reports, publications, journals, court judgements, rules and other documents written or printed in one language and translates them into required languages.

**2444.30 Interpreter** interprets, converts or elucidates spoken language or words into, one or other required languages for being understood by those who do not understand that language. Listens to speaker attentively and renders quickly and fluently translation of spoken language in specified language. May take short notes to enable correct interpretation. May translate written or printed material into specified language.

**2444.90 Philologists, Translators and Interpreters, other** include all philologists, translators and interpreters who study the origin, development and structure of languages, and translate or interpret from one language in to another not classified elsewhere.

#### **2445 PSYCHOLOGISTS**

Psychologists research in to and study mental processes and behaviour of human beings as individuals or in groups, and apply this knowledge to promote personal, social, educational or occupational adjustment and development.

**2445.10 Psychologist** studies mental, emotional and cognitive characteristics of human beings and determines principles which govern human behaviour. Investigates factors that affect thought and conduct of human being, and growth and development of individual personality such as heredity, cultural and economic environments, etc.

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Deals with psychological problems involved in diagnosis, treatment and prevention of mental illness and emotional and personality disorders. Conducts personal interviews or examines individuals to determine their maladjustment and to suggest corrective measures. Develops psychological tests and experiments designed to measure mental characteristics of human beings. Administers psychological and other tests to individuals to evaluate and measure their intelligence, aptitude, ability, interests and other personal characteristics. Formulates methods to train gifted or physically and mentally handicapped persons and children. May render individual counselling and group guidance to persons and students to assist them in selection of their career and courses, inter-personal relationship etc. May teach in institutions and do research work or perform administrative services. May assist Psychiatrist or Physician in diagnosing and treating mental cases. May be known as **CHILD PSYCHOLOGIST, PSYCHOPATHOLOGIST**, etc., according to area of specialisation in which engaged.

**2445.20 Psychometrist;** administers, score; and interprets intelligence, aptitude, achievement and other psychological tests. Acquires necessary psychological tests and keeps them in his personal custody. Gives psychological tests to individuals, as required by situation, under standard conditions. Times tests and records results. Interprets test results in light of standard norms and limitations of test in terms of variability and reliability. May be engaged in construction and standardization of psychological tests.

**2445.30 Psychologist, Engineering** conducts research, development, application, and evaluation of psychological principles relating to human behaviour to characteristics, design, and use of environments and systems within which human beings work and live. Collaborates with equipment designers in design, development, and utilization of man-machine systems to obtain optimum efficiency in terms of human capabilities. Advises on human factors to be considered in design of man-machine systems, military equipment, and industrial products. Participates in solving such problems as

determining numbers and kinds of workers required to operate machines, allocation of functions to machines and operators, and layout and arrangement of work sites. Analyses jobs to establish requirements for use in classification, selection, placement, and training of personnel. Develops training methods and materials, such as curriculums, lectures, and films, and prepares handbooks of human engineering data for use by equipment and system designers. May conduct research to develop psychological theories concerning such subjects as effects of physical factors (temperature, humidity, vibration, noise, and illumination) on worker's behaviour; functional design of dials, scales, meters, and other instruments to minimize sensory requirements; specifications for optimal size, shape, direction and speed of motion, and location of equipment controls; and effects of environmental, organismic, and task or job variables on work behavior and life quality.

**2445.40 Psychologist, Educational** investigates processes of learning and teaching and develops psychological principles and techniques applicable to educational problems to foster intellectual, social, and emotional development of individuals. Conducts experiments to study importance of motivation in learning, implications of transfer of training in teaching, and nature and causes of individual differences in mental abilities to promote differentiated educational procedures to meet individual needs of students. Analyses characteristics and adjustment needs of superior and inferior students and recommends educational programme to promote maximum adjustment. Formulates achievement, diagnostic, and predictive tests to aid teachers in planning methods and content of instruction. Administers standardised tests to diagnose disabilities and difficulties among students and to develop special methods of remedial instruction. Investigates traits and attitudes of teachers to study conditions that contribute to or detract from optimal mental health of teachers. Studies effects of teachers' feelings and attitudes upon pupils, and characteristics of successful teachers to aid school administrators in selection and adjustment of teachers. Collaborates with education specialists in developing curriculum content

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and methods of organising and conducting classroom work. May specialise in educational measurement, school adjustment, school learning, or special education.

**2445.50 Psychologist, Social** investigates psychological aspects of human interrelationships to gain understanding of individual and group thought, feeling, and behavior, utilising behavioral observation, experimentation, or survey techniques: Evaluates individual and group behaviour, developing such techniques as rating scales and sampling methods to collect and measure data. Conducts surveys and polls to measure and analyse attitudes and opinions as basis for predicting economic, political, and other behaviour, using interviews, questionnaires, and other techniques, and adhering to principles of statistical sampling in selecting people. Observes and analyses relations of individuals to religious, racial, political, occupational, and other groups to evaluate behaviour of individuals toward one another in groups, attitudes that exist in groups, and influence of group on individual. Investigates social behavior of individual's to study such problems as origin and nature of prejudice and stereotyping, transmission of values and attitudes in child rearing, and contribution of factors in social environment to individual mental health and illness. Conducts experimental studies on motivation, morale and leadership and prepares reports on findings.

**2445.60 Clinical Psychologist** diagnoses or evaluates mental and emotional disorders of individuals, and administers programmes of treatment: Interviews patients in clinics, hospitals, prisons, and other institutions, and studies medical and social case histories. Observes patients in play or other situations, and selects, administers, and interprets intelligence, achievement, interest, personality, and other psychological tests to diagnose disorders and formulate plans of treatment. Treats psychological disorders to effect improved adjustments utilising various psychological techniques, such as milieu therapy, psychodrama, play therapy and hypnosis. Selects approach to use in individual therapy, such as directive, nondirective, and supportive therapy, and plans frequency, intensity, and duration of

therapy. May collaborate with PSYCHIATRIST and other specialists in developing treatment programmes for patients. May instruct and direct students serving psychological internships in hospitals and clinics. May develop experimental designs and conduct research in fields of personality development and adjustment, diagnosis, treatment, and prevention of mental disorders. May serve as consultant to industrial, social, educational, welfare, and other agencies on individual cases or in evaluation, planning, and development of mental health programmes. May specialise in behaviour problems and therapy, crime and delinquency, group therapy, individual diagnosis and therapy, mental deficiency, objective tests, projective techniques, or speech pathology.

**2445.70 Industrial-Organizational Psychologists** apply principles of psychology to personnel, administration, management, sales, and marketing problems. Activities may include policy planning; employee screening, training and development; and organizational development and analysis. May work with management to reorganize the work setting to improve worker productivity. Analyze data, using statistical methods and applications, in order to evaluate the outcomes and effectiveness of workplace programmes. Conduct research studies of physical work environments, organizational structures, communication systems, group interactions, morale, and motivation in order to assess organizational functioning. Develop and implement employee selection and placement programmes. Develop interview techniques, rating scales, and psychological tests used to assess skills, abilities, and interests for the purpose of employee selection, placement, and promotion. Formulate and implement training programmes, applying principles of learning and individual differences. Identify training and development needs. Observe and interview workers in order to obtain information about the physical, mental, and educational requirements of jobs as well as information about aspects such as job satisfaction.

**2445.80 Psychologist, Counselling** provides individual and group counselling services in

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universities and colleges, schools, clinics, rehabilitation centers and industry to assist individuals in achieving more effective personal, social, educational, and vocational development and adjustment. Collects data about individual through use of interview, case history, and observational techniques. Selects and interprets psychological tests designed to assess individual's intelligence, aptitudes, abilities, and interests, applying knowledge of statistical analysis. Evaluates data to identify causes of problem of individuals and to determine advisability of counselling or referral to other specialists or institutions. Conducts counselling or therapeutic interviews to assist individual to gain insight into personal problems, define goals, and plan action reflecting interests, abilities, and needs. Provides occupational, educational, and other information to enable individual to formulate realistic educational and vocational plans. Follows up results of counselling to determine reliability and validity of treatment used. May engage in research to develop and improve diagnostic and counseling techniques. May administer and score psychological tests.

**2445.90 Psychologists, other** include all other psychologist, who study mental processes and behaviour of human beings as individuals or in groups, and apply this knowledge to promote personal, social, educational or occupational adjustment and development not elsewhere classified.

#### **2446 SOCIAL WORK PROFESSIONALS**

Social work professionals provide guidance to clients in social and related matters to enable them to find and use resources to overcome difficulties and achieve particular goals.

**2446.10 Labour Welfare Officer** executes policy regarding working conditions, welfare, etc., of workers in industrial undertakings, maintains liaison between management and labour and promotes harmonious relations between them. Brings grievances of workers to notice of management. Interprets labour laws to workers and advises management on various statutory obligations. Promotes harmonious relations between management and workers

to ensure efficiency in production, help in formation of welfare activities such as recreational facilities, sanitation, education of children, etc. Helps in formulating employment and recruitment policies in consultation with management and workers representatives. Uses his good office to bring about settlement by conciliation in event of dispute between workers and management. Ensures all administrative action on part of management in case of labour trouble. May assist employees' in their personal problems.

**2446.20 Women's Welfare Officer** guides and supervises social and welfare activities of women, encourages them to develop community life and utilise their spare time in useful trades and crafts to supplement their family income. Visits welfare centres and institutions and guides their activities. Formulates and implements welfare measures according to need of women workers in factories, institution, prisons, etc, Supervises work of **Women's Welfare Organisations** and **Gramasevikas**. Recommends proposals of welfare institutions applying for Government aids. Investigates cases of deserted wives, destitute widows, orphans, etc., and recommends admission to care institution in deserving cases. Contacts institutions and persons to secure employment, hospitalisation, and admission to schools. etc. Assists in marketing of finished articles prepared by women welfare organisations. May maintain case history; of women-prisoners and functions as medium of communication between them and their relatives outside, if engaged as **LADY WELFARE OFFICER** in jail.

**2446.30 Probation Officer, Aftercare Officer, Probation** studies and investigates problems of ex-convicts and suggests and undertakes suitable measures towards their rehabilitation as useful citizens. Studies background and environments of offenders to ascertain causes of delinquency and maladjustment and reports to court to determine their probation period and corrective measures to be taken. Undertakes aftercare of ex-inmates of certified and juvenile schools. Encourages discharged prisoners to join aftercare homes and service centres to learn craft or profession. Assists ex-convicts in their rehabilitation. May

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maintain information of convict to ensure that they do not turn habitual offenders. May be designated as WELFARE OFFICER (Jails) if looks after welfare of prisoners in jail and their families outside and maintains liaison between them.

**2446.40 Medical Social Worker** assists in solving social and emotional problems of individuals in relation to illness. Acts as Liaison between patients and Physicians, Occupational Therapists and other medical service workers to facilitate treatment. Discusses with physicians so that their understanding of patient's social problems is adequate. Visits homes to assist in preparing proper environment for patients. Assists patients and their families in developing mental and emotional adjustments to illness. Attempts to eliminate fears, prejudice and other attitudes that are obstacles to acceptance of medical care and continuation of treatment. Facilitates effectiveness of treatment or recuperation by assisting patients to regulate their lives so that harmful factors such as overwork, strenuous recreational activities, inadequate diet and worries are removed. Refers patients to community resources that may expedite their rehabilitation. May participate in research programmes related to medico-social problems.

**2446.42 Child and Family Social Workers** provide social services and assistance to improve the social and psychological functioning of children and their families and to maximise the family well-being and the academic functioning of children. May assist single parents, arrange adoptions, and find foster homes for abandoned or abused children. Interview clients individually, in families, or in groups, assessing their situations, capabilities, and problems, to determine what services are required to meet their needs. Counsel individuals, groups, families, or communities regarding issues including mental health, poverty, physical abuse, rehabilitation, social adjustment, child care, and/or medical care. Maintain case history records and prepare reports. Consult with parents, teachers, and other school personnel to determine causes of problems such as truancy and misbehavior, and to implement solutions. Counsel parents with

child rearing problems, interviewing the child and family to determine whether further action is required. Develop and review service plans in consultation with clients, and perform follow-ups assessing the quantity and quality of services provided. Collect supplementary information needed to assist client, such as medical records, or school reports. Address legal issues, such as child abuse and discipline, assisting with hearings and providing testimony to inform custody arrangements. Provide, find, or arrange for support services, such as child care, prenatal care, substance abuse treatment, job training, counseling, or parenting classes, to prevent more serious problems from developing.

**2446.45 Health Educators** Promote, maintain, and improve individual and community health by assisting individuals and communities to adopt healthy behaviors. Collect and analyse data to identify community needs prior to planning, implementing, monitoring, and evaluating programmes designed to encourage healthy lifestyles, policies and environments. May also serve as a resource to assist individuals, other professionals, or the community, and may administer fiscal resources for health education programmes. Collaborate with health specialists and civic groups to determine community health needs and the availability of services, and to develop goals for meeting needs. Design and conduct evaluations and diagnostic studies to assess the quality and performance of health education programmes. Develop and present health education and promotion programmes such as training workshops, conferences, and school or community presentations. Develop operational plans and policies necessary to achieve health education objectives and services. Develop, conduct, or coordinate health needs assessments and other public health surveys. Prepare and distribute health education materials, including reports, bulletins, and visual aids such as films, videotapes, photographs, and posters. Provide guidance to agencies and organisations in the assessment of health education needs, and in the development and delivery of health education programmes. Provide programme information to the public by preparing and presenting press releases, conducting media campaigns,



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and/or maintaining programme-related web sites. Develop and maintain cooperative working relationships with agencies and organisations interested in public health care. Develop and maintain health education libraries to provide resources for staff and community agencies.

**2446.50 Women's Welfare Organiser**

attends to activities relating to welfare of women such as teaching better methods of housekeeping, hygiene and sanitation, helpings to learn crafts to improve their earnings, assisting in getting medical aid, conducting classes to promote and improve literacy, etc. Visits women at home or in women's welfare institutions and advises them on childcare, sanitation, diet, etc. Conducts community service centres encouraging women to participate in them. Assists in conducting classes to promote and improve literacy or craft skill. Arranges admission of children to schools, orphanages etc., where required. Investigates cases of deserted wives, widows etc. for monetary grant or other assistance.

**2446.55 Child Welfare Organiser** develops programme content, organises and leads activities planned to aid parents with child rearing problems and children with difficulties in social adjustments. Visits homes in slum areas and crowded quarters to investigate home conditions to protect children from harmful environment and disseminate information on rearing children in healthy condition. Helps parents through individual or group conferences to understand, accept and follow medical recommendations on child welfare and hygiene. Arranges exhibitions and film shows on child health. Organises 'Balwadis' (children play centres) and arranges day-care-service for children. May place children in foster homes, institutions, medical treatment centres and provide counselling to children and parents on social adjustment. May work in collaboration with other social organisations. May refer juveniles to community agencies and health clinics for mental, physical and social rehabilitation and be designated as SOCIAL WORKER, DELINQUENCY PREVENTION.

**2446.60 Family Planning Organiser** advises married couples in spacing children

and to limit size of family by adopting various birth control methods. Visits homes and community centres; collects necessary data and enlightens clients' on benefits of Planned Parenthood. Advises clients in use of contraceptives and assists them to visit family planning centres. Suggests surgical operations or other methods to limit size of family and guides them to family planning clinics. Undertakes follow-up action to obtain results and reports cases to appropriate authorities. Participates in family planning exhibitions and related publicity campaigns and distributes relevant literature and materials. May demonstrate use of contraceptives by diagrams and models.

**2446.80 Vocational Rehabilitation Counsellor**

counsels handicapped individuals to provide vocational rehabilitation services. Interviews and evaluates handicapped applicants, and confers with medical and professional personnel to determine type and degree of handicap, eligibility for service, and feasibility of vocational rehabilitation. Accepts or recommends acceptance of suitable candidates. Determines suitable job or business consistent with applicant's desires, aptitudes, and physical, mental, and emotional limitations. Plans and arranges for applicant to study or train for job. Assists applicant with personal adjustment through rehabilitation programme. Aids applicant in obtaining medical and social services during training. Promotes and develops job openings and places qualified applicant in employment. May specialise in type of disability, such as mental, hearing and visual impairment.

**2446.85 Counsellor, Marriage and Family**

provides individual, marital, and family counselling services to adults and children, to assist clients to identify personal and interactive problems, and to achieve effective personal, marital, and family development and adjustment. Collects information about clients (individuals, married couples, or families), using interview, case history, and observation techniques, appraisal and assessment methods. Analyses information collected to determine advisability of counselling or referral to other specialists or institutions. Reviews notes and information collected to

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identify problems and concerns. Consults reference material, such as textbooks, manuals, and journals, to identify symptoms, make diagnoses, and develop treatment plan. Counsels clients, using counselling methods and procedures, such as psychotherapy and hypnosis, to assist clients in gaining insight into personal and interactive problems, to define goals, and to plan action-reflecting interests, abilities, and needs. Evaluates results of counselling methods to determine reliability and validity of treatment used.

**2446.90 Social Work Professionals, other** include workers engaged in social welfare activities such as welfare of slum dwellers, organising social functions in honour of distinguished persons, etc. not elsewhere classified.

## 245 WRITERS AND CREATIVE OR PERFORMING ARTISTS

Writers and creative or performing artists conceive and create or perform literary, dramatic, musical and other works of art. Task performed usually includes writing literary works; appraising merits of literary and other works of art; collecting information about current affairs and writing about them; sculpting, painting, engraving, or creating cartoons; restoring paintings; composing music; dancing or acting in dramatic productions or directing such productions. Supervision of other workers may be included.

### 2451 AUTHORS, JOURNALISTS AND OTHER WRITERS

Authors, journalists and other writers write literary works for publication or presentation in dramatic form, appraise merits of artistic productions, or literary and other works of art, or write and edit news, stories and commentaries.

**2451.10 Author** writes original literary works such as articles, stories, fictions, dramas, essays, poems, plays etc. Collects necessary data, arranges it in required form for writing. Writes stories essays, poems, plays, etc. in literary or in his own style. May write on technical subjects. May be known as Novelist, Poet, Essayist, and Playwright etc. according to type of literature written.

**2451.15 Critic; Reviewer** writes critical reviews on merits of literary or artistic works, for newspapers or periodicals. Reads books, attends art exhibits, or stage, screen, and musical performance and forms critical opinions of them based on knowledge, judgement and experience. Writes criticism, usually making comparisons with other works or productions and discussing such pertinent factors as artistic motif, expression and technique. May be designated according to major field of interest **Art Critic; Book Critic; Drama Critic; Movie Critic** and **Music Critic**.

**2451.20 Editor** edits or directs editing of newspapers, journals, books and leading articles on contemporary events. Plans layout of publications, assigns and coordinates work of different sections and staff such as **Sub Editor, Reporter, Photographer**, etc. Examines written material, Scrutinises and edits reports of meetings, important events etc., received from correspondents for publication. Writes leading articles on important subjects or events in accordance with prescribed policy. Is designated as **News Editor** if engaged in editing news items; **Commercial Editor** if engaged in editing commercial, financial or trade news; **Sports Editor** if editing sports news; **Feature Editor** if engaged in writing special feature articles; **Literary Editor** if engaged in reviewing literary works. Is also designated as **Chief Editor; Assistant Editor** according to level of responsibility held. May be known as **Leader Writer** if exclusively engaged in writing leading articles on topics of general interest.

**2451.25 Sub-Editor** selects and processes material for publication in conformity with policy of management. Selects news reports, revises or summarises them to fit into space allotted, gives proper headlines, arranges report for effective display and corrects proof. May specialise in particular fields such as foreign news, sports, films, etc. and be designated accordingly. Is designated as **Chief Sub-Editor** if responsible for assigning co-coordinating and supervising work of different Sub-Editors.

**2451.30 News Reporter; News Correspondent** collects news by touring area allotted to him, interviewing persons,

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attending public functions and law courts, investigating events of public interest or by other means and transmits news to Editor for publication. Attends public meetings and press conferences, interviews important public men to collect news and to ascertain their views on contemporary events. Reports or transmits news item to Editor giving background history and comments. May specialise in reporting particular types of news such as those relating to political events, commerce, sports, theatre etc. and be designated accordingly: Is designated as Chief Reporter if responsible for allocating and coordinating work of different Reporters.

**2451.35 Columnist** reviews events, developments etc. of public interest periodically in particular columns of newspapers or magazines. Reviews contemporary events by interviewing persons, observing events, attending public meetings, parliamentary debates etc. if necessary. May write in humorous or critical style.

**2451.40 Freelance Journalist** contributes to newspapers or magazines, occasionally, special articles on subjects of his choice for publication. Writes articles on selected subjects occasionally besides his normal avocation. May write feature articles.

**2451.45 Commentary Writer (Motion Picture)** writes commentary to describe visuals of motion picture. Studies general background of material to be commented reads script and sees film to understand theme. Writes commentary to interpret or describe each event to assist audience to grasp meaning of theme of film. Uses literary acumen to make commentary more meaningful. Infuses emotional effect in writing to suit mood and tempo of visual.

**2451.47 Caption Writer** writes caption phrases of dialogue for hearing-impaired and different Indian language-speaking viewers of movie or television productions. Writes captions to describe music and background noises. Watches production and reviews captions simultaneously to determine which caption phrases require editing. Enters commands to synchronize captions with

dialogue and place on the screen. Translates different Indian language dialogues into English language captions or English dialogue into different Indian language captions. Operates computerised captioning system for movies or television productions for hearing-impaired and different Indian language speaking viewers. Oversees encoding of captions to master tape of television production. Discusses captions with directors or producers of movie and television productions. Edits translations for correctness of grammar, punctuation, and clarity of expression.

**2451.50 Advertisement Writer; Copywriter** composes wording of advertisement, either in descriptive style or in form of slogans, captions, etc., for popularising particular product or establishment. Receives advertisement matter from customer. Writes descriptive matter or slogans in attractive form to advertise merits of product or establishment.

**2451.52 Creative Writer** develops basic presentation approaches and directs layout design and copy writing for promotional material such as books, magazines, newspapers, television, posters and packaging. Reviews materials and informations presented by client and discusses various production factors to determine most desirable presentation concept. Confers with heads of art, copy writing and production departments to discuss client requirements and scheduling, outline basic presentation concepts and coordinate creative activities. Reviews and approves art and copy materials developed by staff and presents final layouts to client for approval.

**2451.55 Radio Commentator** gives running commentary on events of national importance, sports events, festivals, etc. over broadcasting system. Obtains general background of events or occasion, which has to be covered, by consulting relevant literature, interviewing people and visiting locale. Occupies vantage position to obtain clear unobstructed view to what happens. Describes locale personalities, sequence of events, etc. pinpointing important aspects of occasion by modulating tone of speech. Narrates events commenting on important

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aspects of occasion and events to maintain continuous interest and provide comprehensive picture of event. May specialise in commenting on particular event(s). May keep himself informed of important day-to-day happenings and events and broadcast his comments on radio according to set programme for general information. May record commentary by speaking into portable tape recorder by visiting and moving about at site of activity. May be designated as **Television Commentator** if engaged on rendering commentary in television programmes.

**2451.60 Commentator (Motion Picture)** gives running commentary to interpret or to describe visuals of motion picture. Obtains general background of material to be covered. Studies narration, and sees film to grasp subject, visuals and mood. Narrates events, synchronizing commentary with visuals using trained voice and tone to suit subject and mood. Dramatises narration under guidance of Director Theatrical by infusing emotional effects in tone and in harmony with mood and tempo of visuals. May himself write commentary.

**2451.65 Poet** Writes narrative, dramatic, or lyric poetry for magazines, books, and other publications: Chooses subject matter and suitable form to express personal feeling and individual experience, or to narrate story or event. May write doggerel or other type verse.

**2451.70 Script Writer (Motion Picture)** writes script (plan of shooting) to facilitate shooting of films. Studies story and divides it into different scenes and shots. Prepares data, scene by scene, including time and location of shooting, costumes and other details. Consults Director, Theatrical and Cinematographer. May visit location of shooting to make script more practicable.

**2451.90 Authors, Journalists and other Writers** who write literary works for publication or presentation in dramatic form, appraise merits of artistic productions, or literary and other works of art, or write and edit news, stories and commentaries not classified elsewhere.

**2452 SCULPTORS, PAINTERS AND RELATED ARTISTS**

Sculptors, painters and related artists create and execute works of art by sculpting, painting, drawing, creating cartoons, engraving or using related techniques.

**2452.10 Sculptor** carves figures, statues, monuments and other imaginative designs in abstract forms by chiselling stone or carving wood or modelling clay or any other material either direct from original or from models prepared by him or Modeller. Selects material such as stone, wood, clay, ivory, marble, wax, etc. according to requirements. Sketches design and makes scale model in wax or plaster. Transfers measurements to block. Carves, or shapes block using different tools achieving unity and harmony. Is designated as **Sthapathi** if engaged in designing, carving and drilling holes in stones to make Idols for use in temples from mental perception as described in '**Sasththras**' (holy scriptures of Hindus) by dreft use of hammer and chisels only. May sharpen tools by hand or on machine. May inscribe decorative lettering and monumental sculptures on models. May make clay or wax models and caste same in plaster of paris or bronze.

**2452.20 Modeller (Except Stone)** makes clay or plaster of Paris models of pottery, porcelain and models of anatomical studies according to drawing and specifications, for mass production. Prepares clay, wax or plaster of Paris foundation. Carves material, using shaping tools, lathe or potter's wheel to resemble model to exact size and other specifications. May prepare model of important persons by observing person's facial expression and features, and carving and shaping material to required size and form. May create own designs.

**2452.30 Stone Modeller; Stone Statue Maker** carves out features, statues, models, idols and other artistic designs on stone slabs, blocks or pillars for construction of temples, monuments, fountains, buildings etc. using hand tools. Studies nature of carvings to be done from drawings, photographs, written descriptions etc. or receives instructions from **Sthapathi** or other appropriate authority. Forms mental

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picture of carving to be done and selects required type of stone such as marble, soapstone, granite, green stone, etc. Chips off unwanted portions of stone with hammer and chisel and marks outline of figures with chalk, pencil or ochre solution by free hand sketching using drawing and measuring instruments. Places stone in working position, applies oil over its surface if working on granite and carefully carves out figures, statues, idols, models etc. as designed using hammer and chisels of different sizes. Marks portion with paint otherwise to indicate stages of work and facilitate carving and gives smooth and finishing touches to carved figures using fine chisels. Cuts slits and drills holes as designed using saw blades and hand drills or with hammer and chisels depending on specifications and nature of work done particularly for carvings of idols and images meant for temples. Brushes off dust and waste material from object and sprinkles water on it, as necessary, while carving. May carve numbers and letters and create designs. May make clay model of statue or image to be carved to ensure accuracy and facilitate working.

**2452.40 Painter, Fine Art** paints portraits, scenery or depicts objects or scenes on different surfaces in oil, pastel or watercolour using brush. Prepares surface of canvas, wood, paper, wall or other material by priming it with starch, glue, gelatine, linseed oil, zinc oxide, etc. for painting. Selects and mixes paints to required colour and sketches preliminary outlines or drawing of object to be painted on surface, Paints with required colours using brush to obtain clear line and design. Varnishes finished painting when dry for effect and preservation. May touch or re-touch faded portions of paintings with appropriate colour to give original effect. May use chemical colours for painting on porcelain.

**2452.50 Renovator, Paintings** restores damaged, soiled or faded paintings to original shape and colour by cleaning, repairing, retouching etc. Cleans faded or damaged portion to remove dirt using brush or duster. Mixes paint to required colour. Paints faded portions with appropriate colour to revive original appearance and shine. Renovates damaged painting or part thereof

by transferring entire painting to fresh canvas by scientific method. Retouches blemishes and damaged parts of painting.

**2452.55 Cartoonist** draws cartoons or caricature of persons and events in humorous or satirical manner for publication in newspapers, journals etc. or for production of cartoon films. Reads news items, books etc. and observes events to obtain ideas for subject matter to be sketched. Draws out lines of caricature and sketches on paper or cardboard, using pencil, ink or brush. Completes caricature or sketch by shadings with pen and brush. Sends cartoons to process department for engraving or for photographing. May discuss with employer regarding broad policies to be adopted in drawing cartoons to portray events. May give captions or descriptive titles to cartoons.

**2452.60 Commercial Artist** prepares designs for advertising articles or draws illustrations for books, magazines, posters, charts, hoardings etc. in suitable columns. Studies specifications and discusses details and cost with client. Determines subject matter in consultation with client and draws designs and sketches with or without colour to desired effect. Executes approved design in required medium such as paints, oils, water-colour etc.

**2452.70 Multi-Media Artists and Animators** create special effects, animation, or other visual images using film, video, computers, or other electronic tools and media for use in products or creations, such as computer games, movies, music videos, and commercials. Apply story development, directing, cinematography, and editing to animation to create storyboards that show the flow of the animation and map out key scenes and characters. Assemble, typeset, scan and produce digital camera-ready art or film negatives and printer's proofs. Convert real objects to animated objects through modeling, using techniques such as optical scanning. Create and install special effects as required by the script, mixing chemicals and fabricating needed parts from wood, metal, plaster, and clay. Create basic designs, drawings, and illustrations for product labels, cartoons, direct mail, or television. Create pen-and-paper images to be scanned, edited, coloured, textured or animated by computer.

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Create two-dimensional and three-dimensional images depicting objects in motion or illustrating a process, using computer animation or modelling programmes. Design complex graphics and animation, using independent judgment, creativity, and computer equipment. Develop briefings, brochures, multimedia presentations, web pages, promotional products, technical illustrations, and computer artwork for use in products, technical manuals, literature, newsletters and slide shows..

**2452.80 Web Designer** provides strategic and sustainable aesthetic to the web site that supports business goals, information architecture, customer service applications, and brand strategy. Drives visual recommendations and solutions to both current page type and future redesign efforts. translates complex concepts to convincing and compelling visualisations. Determines look- and-feel of web site efforts, online products, and other interactive initiatives. Creates original graphics and icons for use on the site and other group projects. Defines and implements web design parameters, style guides, and visual standards. Establishes and produces graphic material for use online advertising and promotion of services and products. Builds strong collaborative relationships with team and client. Documents strategic decisions using diagrams and text. Documents design and creation. Hand-draws, hand-letter storyboard and design forms where needed. Manipulates images, style photos, provide art direction, and acquire photos.

**2452.90 Sculptors, Painters and Related Artists, other** include all other sculptors, painters and related artists engaged in specialised fields of painting, sculpture, modelling etc. not elsewhere classified.

### **2453 COMPOSERS, MUSICIANS AND SINGERS**

Composers, musicians and singers compose and adapt musical works and conduct or participate in performance of them.

**2453.10 Music Composer; Lyricist** creates and writes classical or light songs and sets them to music. Studies different laws and

principles of melodies, harmonies and other scientific aspects of music and transcribes songs in to musical notations. Writes original music compositions in different styles for radio, stage or screen. May write musical scores for **Instrument Musician**. May conduct research in history of songs and musical compositions.

**2453.20 Orchestra Conductor; Bandmaster** conducts or directs orchestra, chorus or other musical performances by directing and controlling various instrumentalists in rendition of music. Selects musical composition to be rendered. Arranges location of different instrument players to get harmonious music. Directs group by beat of hand or other signals for rendering of music by all members in harmony and melody. May play one or more instruments himself. May conduct research in different types of musical composition and devise new types of music suitable for orchestra or other musical performances. May train musicians or bandmen.

**2453.30 Singer; Vocal Musician; Vocalist** sings Indian or Western music either alone or in-group, with or without musical accompaniments. Sings classical or light songs with other accompaniment such as violin, mridangam, sarangi, tabla, piano, flute, harmonium etc. May act and dance while singing songs. May compose own poems and write books on music. May play on musical instruments while singing.

**2453.40 Instrumental Musician, String Instrument** plays musical string instruments of Indian or Western origin by movement of fingers or bow on strings. Rehearses music on musical stringed instruments. Tunes instrument to required pitch and harmony with other instruments. Plays singly or in accompaniment with other singers or musicians as member of orchestra, by set movements of fingers or bow on strings. May compose own music or invent own instrument to produce special effects. May be designated according to instruments played such as **VEENA PLAYER, SITAR PLAYER, SARANGI PLAYER, SAROD PLAYER, VIOLINIST /BASS PLAYER, HAPIST**, etc.

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**2453.50 Instrumental Musician Percussion**

**Instrument** plays musical percussion instruments such as **Tabla, Drum, Pakhawaj** etc. by hands or sticks usually to provide rhythmic company to other musicians. Tunes instrument to required pitch by tightening or loosening cords holding leather pieces fixed atop or at both ends of instrument. Plays instrument gently with hand or stick or both to provide rhythm, alone or in accompaniment to other musical instrument(s). May sing classical or light songs while playing instrument. May be known as **TABLA PLAYER, DRUMMER, MRIDANGIST, PAKHAWAJ PLAYER, CYMBALIST**, etc. according to instrument played.

**2453.60 Instrumental Musician, Wind**

**Instrument;** plays musical wind instruments of Indian or Western origin by blowing with mouth and using fingers to produce desired effect. Blows instrument by mouth and allows wind to pass through reeds by systematic movement of fingers on holes or keys of instrument to produce melodious tune. May play wind instrument alone or in accompaniment of other musicians. May be known as **FLUTE (Bansri) PLAYER; SHAHNAI PLAYER; CLARINETTIST; OBOIST; SAXOPHONIST; TRUMPETER; TROMBONIST; BAGPIPER**, etc. according to instrument played.

**2453.90 Composers, Musicians and Singers, other** include all other composers, musicians and singers engaged in composing, production and rendering music, not elsewhere classified.

**2454 CHOREOGRAPHERS AND DANCERS**

Choreographers and dancers conceive and create or perform dances.

**2454.10 Choreographer** designs dances, specially ballet, for stage or film production. Selects suitable theme for dance. Plans dance, works out movement and arrangement of dancers on stage by drawing sketches of sequences and different situations on paper and by observing dancers in action. Discusses requirements of stage setting; music and costumes with other stage specialists to convey correct interpretation of

theme to audience. May conduct rehearsals and design costumes for dancers.

**2454.20 Nattuvan** rehearses, teaches and conducts Bharathanatya performances. Studies different types of musical compositions suitable for dance performance. Originates and plans dances. Teaches **Dancer** in the art of Bharathanatya (movement of body and limbs to keep step with rhythm to music). Trains and rehearses members of dance troupe according to required theme and gives personal demonstration to pupils in movement of limbs and facial expression to interpret moods, grace, pose, poise etc. Renders vocal music and or conducts orchestra for Dancer to dance according to music.

**2454.30 Dancer** performs dances either alone, with partner or in groups to entertain audience. Puts on required dress and make up and performs classical, modern or acrobatic dances, coordinating body movements and facial expressions with musical accompaniment to express theme of dance. Rehearses dance routines developed by Choreographer. May perform original dances. May sing and provide other forms of entertainment. May specialise in particular style of dancing and be designated according to speciality as **BHARATANATYAM DANCER**, if dances in "Bharatanatyam", style; **KATHAKALI DANCER**, if dances in "KATHAKALI", style; **KATHAK DANCER**, if dances in "Kathak", style; **MANIPUR DANCER**, if dances in "Manipur", style; **BALLET DANCER, WESTERN STYLE**, if dances in "Western style", expressing theme or story by moving on toes, rhythmic leaps, quick movement of body, legs and arms; **ACROBATIC DANCER**, performs style of dancing characterized by difficult gymnastic feats; **BALL ROOM DANCER** performs original or interpretative modern dances, usually with opposite sex. May conduct classes to teach various dances.

**2454.90 Choreographers and Dancers, other** include all other choreographic and dancing professionals not classified elsewhere.

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**2455 FILM, STAGE AND RELATED ACTORS AND DIRECTORS**

Film, stage and related actors and directors act in, or direct, motion pictures, television or radio productions and stage shows.

**2455.10 Director, Theatrical** selects suitable Actors and Actresses for motion picture or stage, interprets respective roles to them, directs rehearsals, supervises and coordinates activities of cameramen, scenery designers, sound technicians, property men etc. Studies selected script or story, and selects Actors and Actresses and other technical staff according to requirements. Assigns roles to different Actors and Actresses according to their suitability. Holds rehearsals and directs actions, gestures, dialogues etc., of Actors and Actresses. Selects location for outdoor shooting of film, as necessary. Supervises setting up of sets and stage. Coordinates work of different staff engaged in producing film or stage performance. May attend to business' management such as payment to staff, purchase of material, arranging transport for staff and equipment. May specialise in directing mythological, social or historical films or stage performances. May be known as **FILM DIRECTOR, STAGE DIRECTOR OR STUDIO DIRECTOR**, according to field of work.

**2455.20 Music Director** selects music, singers and instrumental musicians in consultation with Director Theatrical and Music Composer for purposes of stage or film production and directs effective rendering of music. Consults Director Theatrical and Music Composer regarding music composed, and situations, events, scenes etc., where songs and music are to be played. Sets music to required tunes to portray particular situation or event. Selects and fixes suitable artist to render composed music to set tunes. Conducts rehearsals frequently with artists for proper rendition of songs. Supervises recording of playback music and its synchronization with story of film. May play one or more musical instruments or render vocal music. May specialise in directing group or orchestral music.

**2455.30 Dance Director;** selects dances, suitable dancers and orchestra for purposes of stage or film production, decides costumes settings and directs performance. Consults **Director, Film** regarding script, story and songs. Studies sequence scenery, situation of events etc. in motion picture and decide tunes, costumes and stage settings. Assigns different roles to dancers. Trains Dancers to display them and events. May specialise in oriental or western dances.

**2455.40 Director, Research (Motion Picture; Radio-TV)** directs activities of motion picture or television production research department, and conducts research on various subjects to ensure historical authenticity of productions: Researches specific period, locality or historical event to obtain authentic background for production, such as customs, speech characteristics, or dress, and architectural style of era. Advises members of production staff on matters relating to historical details of subject being photographed or recorded. Reviews and collects data, such as books, pamphlets, periodicals, and rare newspapers, to provide source material for research. Approves or recommends purchase of library reference materials for department, and coordinates activities of workers engaged in cataloguing and filing materials. May translate or request translation of reference materials.

**2455.50 Actor and Actress** plays roles in dramatic, cinema, radio and television productions portraying characters and events by gestures or other actions. Rehearses frequently roles assigned and memorizes dialogues or actions to be portrayed, Puts on required dress and make up. Acts or plays assigned role either before audience or before filming camera. Portrays different characters by dialogues, gestures and impersonation. May sing or dance.

**2455.60 Extra** plays minor roles in dramatic or film production for maintaining continuity of story. Obtains instructions from Manager or Director, Theatrical regarding part to be played. Puts on appropriate costumes and make-up and plays assigned role. May perform different roles in same play. May perform both serious and humourous roles. May perform other duties such as prompting, setting of stage etc.



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**2455.90 Stage and Film Directors, other** include all other stage and film directors engaged in directing and producing dramas. motion pictures of stage and television shows not elsewhere classified.

**246 RELIGIOUS PROFESSIONALS**

Religious professionals function as perpetrator of the sacred traditions, practices and beliefs and celebrate or administer at the rituals of initiation, preside over ritual reenactments of creative, redemptive or salvatory events, and offer sacrifices to the God.

**2461 ORDAINED RELIGIOUS WORKERS**

Professionals in this Family conduct religious worship, prayers and service in temples, churches, mosques and other places of worship; provide spiritual guidance and consolation and perform rituals and sacerdotal functions associated with beliefs, practices, conventions, ordinances, etc. of various religious orders, faiths, denominations, etc; and administer and perform lay duties to assist ordained religious leaders and workers in conducting such services of worships; and perform rites on occasions like marriage, death, etc.

**2461.10 Priest Clergyman; Minister; Pastor; Rector; Father; Parish Priest** conducts religious worship and performs rites in accordance with religious scriptures and recognised practices in temple, church, mosque or other places of worship. Arranges and conducts regular prayers in places of worship, delivers sermons, recites verses, mantras from holy books and performs Baptism, Communion. Matrimony, etc. according to one's religion and faith. Administers sacraments, last rites etc. Helps community responsibilities by taking part in committees, delivering addresses etc. and undertakes charitable works. May visit sick, poor to render necessary help. May administer property of Parishes or religious institutions. May teach in school, college or any religious institutions. May inspect schools under orders of Diocese or Archdiocese and be placed in-charge- of an ecclesiastical district. Is designated as Poojari when professes Hindu faith; Padre; Father; Reverend; Bishop etc. if belongs to Christianity; Imam or Moulvi if belongs to

Islam. Dastoor if belongs to Zoroastrianism; Rabbi if follower of Judaism, Granthi if follower of Sikhism, etc.

**2461.90 Ordained Religious Workers, other** includes all other religious professionals not elsewhere classified.

**2462 NON- ORDAINED RELIGIOUS WORKERS**

Professionals in this Family perform or assist in performance of religious rites and ceremonies of Hindus.

**2462.10 Purohit** performs religious rites and ceremonies of Hindus on behalf of persons engaging him on religious and other social occasions such as marriage, birth of child, sacred thread ceremony, and religious festivals. Performs rites, marriage, birth of child, sacred thread ceremony, etc. by chanting religious hymns. Pasages from scriptures and or performing Havans, Kirtans, etc. to invoke divine blessing-. May worship particular Deity in temple.

**2462.90 Non-Ordained Religious Workers, other** assist ordained religious workers in conducting worship, performing religious rites in places of worship and on special occasions such as marriages, births, deaths, etc. and include those not elsewhere classified and is designated as:- Maha Brahmin; Mahapatra if performs last rites of deceased persons belonging to Hindu faith at cremation ground. Sets pyre, chants religious hymns. May maintain record of dead bodies cremated. May arrange for firewood, ghee and other articles required for cremation. **Moazzen** calls **Azan** (Prayer call) in mosques at fixed times before each prayer. Looks after cleanliness of mosque and makes arrangements of water for worshippers to wash before prayer (wazoo). May lead prayer in absence of Imam (leader in group prayers). **Sexton** looks after church property; rings church bell for periodic services, and takes care of church graveyard. May assist Pastor or priest in performance of religious rites.