TAMIL NADU PUBLIC SERVICE COMMISSION

Geology Code :394

(Under Graduate Degree Standard)

UNIT I - GENERAL GEOLOGY

Solar System - Origin, Interior and Age of the Earth - Weathering - Types and products - Geological work of Wind, River, Sea and Groundwater - causes and effects of Volcanoes and Earthquakes - Seismic zonation - Richter Scale - Principles of Plate Tectonics - Island arcs, deep sea trenches and mid-ocean ridges - Continental drift evidences and mechanics - Sea floor spreading - Isostasy, Orogeny and Epeirogeny - Continents and oceans – Fundamental of Geomorphology.

UNIT II – STRATIGRAPHY

Principles of Stratigraphy, code of stratigraphic nomenclature, lithostratigraphy, biostratigraphy, chronostratigraphy, Correlation – Geological Time Scale - Distribution and classification of Precambrian - Dharwar and Proterozoic rocks - Cuddapah and Vindhyan of India - Study of stratigraphic successions, lithology, fauna, flora and economic importance of Phanerozoic rocks of India - Triassic of Spiti, Jurassic of Kutch, Gondwana and Cretaceous of Tiruchirappalli erstwhile Trichinopoly, Tertiary of Assam - Major boundary problems – Cambrian/ Precambrian and Cretaceous/ Tertiary - Tectonic framework of India - Evolution of the Himalayas.

UNIT III - STRUCTURAL GEOLOGY

Stress and Strain - Stress strain relationship of elastic, plastic and viscous materials – Planar and linear structures – Shear Zones - Description and classification of Folds – Faults – Joints – Unconformities – Recognition of overturned beds – Attitude of beds – Measurement of dip, apparent dip, strike using Clino and Brunton compass.

UNIT IV – PALEONTOLOGY

Species – definition and nomenclature - Megafossils and Microfossils - Modes of preservation of fossils - Different kinds of microfossils - Application of microfossils in correlation, petroleum exploration, paleoclimatic and paleoceanographic studies - Morphology, Classification, evolutionary trends and geological history of Coelenterata, Brachiopoda, Cephalopoda, Echinoids, Trilobita, Graptolites and Foraminifera - Stratigraphic utility of Ammonoidea, Trilobita and Graptoloidea - Evloutionary trends in Hominidae, Equidae and Proboscidae - Siwalik fauna - Gondwana flora and its geological and paleoclimatic importance.

UNIT V – CRYSTALLOGRAPHY

Definition of Crystals – Classification - Inter facial angles – Goniometer - Symmetry - Symmetry Elements - Study of Symmetry Elements, forms and representative minerals of Normal Classes of Isometric, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic systems - Twin crystals – Definition – Classification Types – Schemes.

UNIT VI - MINERALOGY

Definition of Minerals – Classification – Physical and Chemical properties of minerals - Petrological Microscope and its parts, accessory plates and uses – optical properties of minerals - Isotropic and Anisotropic Minerals - Descriptive study of Quartz and its varieties - Feldspar Group - Pyroxene Group - Amphibole Group - Mica Group - Garnet Group - Descriptive study of Calcite, Dolomite, Tourmaline, Topaz, Staurolite, Chlorite and Zircon.

UNIT VII - IGNEOUS PETROLOGY AND METAMORPHIC PETROLOGY

Definition of magma - Composition and constitution of magma - Forms and structures of Igneous Rocks, Textures and Micro structures – Tyrrell's and Tabular classification of Igneous rocks - Bowen's Reaction principle and series - Descriptive Study of Granites - Syenites - Diorites - Gabbro – Dolerites - Ultramafics - Dunites, Peridotites, Pyroxenites and Anorthosites - Differentiation - Assimilation.

Metamorphism – Agents and kinds of metamorphism – Classification of metamorphic Rocks – Textures and structures – Different Facies and Zones – Descriptive study of Marble – Schist and Gneiss – Amphibolites – Pyroxenites – Granulites – Charnockites.

UNIT VIII - SEDIMENTARY PETROLOGY

Sedimentary Rocks - Classification - Texture and structures - Processes of formation, Diagenesis and Lithification – Properties of sediments - Descriptive study of Residual, Clastic, Chemical and Organic deposits – Sedimentary basins of India – Significance of Heavy minerals.

UNIT IX - ECONOMIC GEOLOGY

Definition of Ore - Tenor - Grade – Gangue - Lindgren and Bateman's classification of ore deposits - Ore forming processes - Magmatic concentration – Hydrothermal Process - Oxidation and Supergene Enrichment – Evaporation - Sedimentation – Placer deposits - Metallogenic epochs and provinces – Marine mineral resources and laws of sea beds - Important Ores, their composition, physical properties, mode of

occurrences, distribution in India and uses of Gold, Iron, Aluminium, Manganese, Copper, Magnesium, Lead and Zinc, Lignite, Coal and Petroleum - Dimensional stones, their characteristics, distribution and mode of occurrences in India - Mineral Wealth of Tamil Nadu.

UNIT X - APPLIED GEOLOGY

Principles of Geological mapping and field Techniques – Rock Drilling methods - Borehole problems from borehole data – Geological investigations necessary for Dams, Tunnels and Road Construction - Landslides – Surface Mining methods - Role of geologist in Mining Industries – Environmental problems in Mining Industries – Urbanization and Groundwater problems – Applications of Remote Sensing and GIS in Geological Studies -Occurrence of groundwater – Aquifers – Types of Aquifers – Porosity – Specific yield and retention – Hydrogeological properties of Rocks – Groundwater flow – Darcy's Law – Pumping tests parameters – Groundwater Drilling methods – Aquifer recharge – Electrical methods of groundwater exploration – seawater intrusion.