



অসম লোকসেৱা আয়োগ
ASSAM PUBLIC SERVICE COMMISSION
Jawaharnagar, Khanapara, Guwahati-781 022

Name of Exam: Recruitment to the Posts of Asstt. Geologist in the Directorate of Geology & Mining, Assam.

SYLLABUS

PAPER-I

GENERAL STUDIES

(Multiple Choice Objective Type)

Full Marks : 100

Time : 2 Hours

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1. Constitution and Political System of India.
 2. Current events of National & International Importance.
 3. Indian Economy and Planning Process of India
 4. Geography of India, Assam & World.
 5. Role of Science & Technology in India.
 6. Culture & History of Assam, India & World.
 7. Indian National Movement with special reference to Assam.
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Name of Exam: Recruitment to the Posts of Asstt. Geologist in the Directorate of Geology & Mining, Assam.

SYLLABUS

PAPER-II

GEOLOGY

(Multiple Choice Objective Type)

Full Marks : 100

Time : 2 Hours

GROUP-A

Structural Geology and Seismology

Structural Geology

Stress and Strain Definition of stress: Types of stress (hydrostatic, uniaxial, compressional, tensional, triaxial, deviatoric, differential and effective stress). Sign convention of shear stress; Mohr stress circle; Determination of direction of shearing stress.

Definition of strain: Types of strain; Principal axes of strain, measurement of strain, Flinn's diagram and Fry's methods of strain measurement and other strain markers.

Ductile deformation : Morphological classifications of fold following Ramsay (1964) and Fleuty (1964). Kinematics of folding. Buckle folds and shear folds. Determination of sense of shear from fold geometry. Superposition of folds. Boudinage: origin and its relationship to fold.

Brittle deformation: Faults, Classification of faults, mechanism of faulting. Normal faulting: extensional, synthetic, antithetic, horst and graben, half graben, relay fault, duplex, detachment fault, ramp and flat geometry. Fault nucleation and propagation; geometry of fault propagation.

Thrust: allochthonous, autochthonous, klippe, windows, overthrust, under thrust, nappe, decollement, blind thrust, splay, ramp and flat geometry; thrust related folds; listric thrust, duplex, schuppen structure, imbricate structure, thrust duplex, en echelon thrust; foreland, hinterland; sinistral- dextral geometry - palm tree, tulip, negative flower and positive flower structures.

Strike slip fault: tear fault, transcurrent fault, transfer fault and their characteristic features. Mechanism of faulting with reference to stress and strain.

Foliation and lineation in deformed rocks : Morphological classification. Geometric relationship of foliation and lineation with folds. Interference patterns of lineations. Relation of foliations and lineations to strain directions.

Shear zone Ductile: brittle and brittle-ductile shear zone. Characteristic features of sheared rocks. Strain variation within the shear zone. Mylonite. Determination of shear sense.

Rheology : Rheological equations and importance of temperature in rheology. Geomagnetism. Thermal history of the Earth.

Graphical interpretation of structures :Symmetry of structures; Graphic representation of spherical, stereographical plots, rose diagram and histogram. Introductory ideas on softwares used in structural geology.

Seismology

Seismology: Introductory terminology and basic principles, crustal phases, travel time and magnitude of earthquake. Earthquake as natural hazard- prediction and seismic hazard management, seismic gap, Seismic waves, Snell's law, travel time curve, velocity model, b-value.

Focal depth, earthquake-fault relation in tectonic domain. M, Mb, Ms, Mw, MM scale. Peaked ground acceleration (PGA) and peaked ground velocity (PGV), focal plane solution, Benioff zone.

Palaeoseismology: concept of paleoseismology and its importance, active faults, identification of seismogenic active faults, paleoseismological structures, identification of paleoseismic deformational features and structures from syn-sedimentary and other deformational structures, use of dating techniques for paleoseismic features and their reliability, materials suitable for dating, interpretation of dates, use of historical and archaeological data in paleoseismic data interpretation.

GROUP-B

Mineralogy , Crystal Chemistry & Thermodynamics in Geology

Mineralogy

Chemical composition and compositional variation of minerals, solid solution, compositional classification of minerals; detail classification and structural features of silicate minerals.

Principles of X-ray crystallography, mineral identification by X- ray diffractometry. Impact of X-ray crystallography. Crystal structure: CCP and HCP packing. Defect in minerals: Point Defects, Line defects and Planar defects.

Ionic crystal, ionic radii, coordination number, Pauling rule. Bonding in crystals: Ionic -, covalent- and metallic bonding.

Transformation process in minerals: Exsolution, example of transition phase in mineral exsolution. Structural transformation: Polymorphism. Classification, structural inversion, solid solution behavior and exsolution in rock forming silicate minerals with the examples of feldspar, olivine, pyroxene, amphibole, garnet and mica; their optical behaviour and importance as rock forming minerals.

Thermodynamics

Forms of energy, transformation and conservation of energy, global energy budget. Geologic process and energy flow; state properties; direction of changes in state.

Fundamental thermodynamic equation, First Law of Thermodynamics; work done in volume expansion, Second and Third Law of Thermodynamics.

Chemical potential, Gibbs Free Energy function; Enthalpy, entropy and activity, Free Energy change as a function of activity; variation of enthalpy, entropy and Gibbs Free Energy with temperature and pressure, Clausius-Clapeyron equation.

Compositional dependence of Gibbs Free Energy and Gibbs-Duhem equation.

Mixing components, Raoult's Law and Henry's Law, standard state and activity, ideal and non ideal solution behaviour and equilibrium constant.

GROUP-C

Geoinformatics , Geomorphology & Quaternary Geology

Geoinformatics

Spectral response curve. Sensors. Resolution properties of sensors. Resolution properties of Indian remote sensing satellites and sensors. Elements of photo and image interpretation. Remote sensing and geology.

Stereoscopy and vertical exaggeration. Basic elements of photogrammetric measurements of aerial photographs / digital stereo image. Digital photogrammetry: Concept of digital elevation model (DEM) and digital terrain model (DTM) and their uses. Advantages of digital photogrammetry over traditional optical photogrammetry. Orthophoto.

Thermal remote sensing; Thermal properties of materials; Characteristics of thermal images; thermal image processing and interpretation. Concept of LiDER remote sensing.

Microwave remote sensing; SLAR system; Spatial resolution of SLAR systems; Synthetic Aperture Radar (SAR); microwave remote sensing satellites; microwave image characteristics; Processing of microwave digital data; Geologic interpretation of radar image.

Image processing methods: Image restoration, image enhancement, False colour composite (FCC). ratio images, multispectral classification - supervised and unsupervised, change detection images, accuracy assessment. Concept of hyperspectral data and their importance.

Introduction to GIS and its components, vector and raster data, georeferencing, planning needed to develop a GIS based project in earth science, analysis of spatial and attribute data in GIS platform.

Geomorphology & Quaternary Geology

The Quaternary Period and its divisions, Neogene-Quaternary and Pleistocene-Holocene boundary, the Anthropocene, Quaternary dating dating methods-cosmogenic radionuclides- C14, Be10, Al26, luminescence chronology, dendrochronology (principles, applications and limitations), low temperature thermochronology and exhumation/denudation history

Quaternary climate and tectonics- the ice age, Milankovitch theory, glacial-interglacial cycles, LGM, Little Ice Age, Quaternary sea level changes, uplift-climate connection, climate proxies and Quaternary paleoclimate, $^{87}\text{Sr}/^{86}\text{Sr}$ as proxy for silicate weathering, duricrusts-calcrete, fercrete, alcrete and spleothems, application of stable isotopes in Quaternary climate,

Quaternary geomorphology- the earth as a system, energy flow in the geomorphic system, spatial and temporal scales of landscape analysis, role of structure, tectonics and climate in landform development, neotectonics and active tectonics and landscape response

Quaternary stratigraphy- oxygen isotope stratigraphy, magnetic stratigraphy –principles and application in Quaternary sequences-Indian examples, pedostratigraphy, soil profile and paleosol, Quaternary records from marine and continental settings, event stratigraphy

Quaternary sedimentary records from India- Himalayan foreland, Son-Narmada valley, Gangetic plains, coastal plains, Brahmaputra plains and other parts of NE India

GROUP-D

Hydrogeology Climatology & Oceanography

Hydrogeology

Definition of hydrology and hydrogeology: Hydrologic cycle - precipitation and run-off
Analysis of hydrograph, base flow separation, factors governing shape of hydrograph.

Occurrence of ground water: Openings in rocks, types of openings. Porosity and void ratio. Definition of aquifers, aquiclude, aquitard and aquifuge. Subsurface distribution of water, vadose water and ground water. Specific yield and retention. Estimation of specific yield. Aquifers and their classification. Ground water recharging.

Ground water movement: Darcy's law - its range of validity and limitation, Hydraulic conductivity, permeability, effective stress, specific storage, transmissivity and storativity. Physical and chemical characteristics of ground water. Chemical classification of ground water. Quality criteria for drinking, irrigation, and industrial uses.

Occurrence of ground water in different rock types: igneous, metamorphic, sedimentary and nonindurated sediments. Ground water provinces of India.

Ground water levels and fluctuations - secular, seasonal and diurnal variation. Factors governing ground water level fluctuation. Fresh and salt water relationship in coastal area. Ghyben-Herzberg principle. Prevention and control of sea water intrusion.

Basic principles of well hydraulics- drawdown and cone of depression. Steady state and none steady state flow. Equation for pumping tests. Step drawdown test and aquifer performance test. Analysis of pumping test data.

Surface and subsurface investigation of ground water: Hydrogeological mapping. Systematic and reappraisal survey by well inventory method. Geophysical methods of exploration - gravity, magnetic, electrical and seismic methods. S.P., resistivity, gamma and neutron gamma logging. Ground water exploration by test drilling.

Methods of construction of shallow wells: Methods of drilling, design criteria and development of deep tube wells.

Ground water assessment, development and management: Concept of ground water reserve - static and dynamic reserve. Safe yield and overdraft. Factors governing safe yield. Equation of hydrologic equilibrium. Ground water budgeting.

Climatology & Oceanography

Definition of climate, composition of atmosphere, vertical and horizontal distribution of temperature, insolation, Clouds: their formation and classification. Precipitation: Causes, forms, processes and types. Atmospheric pressure and air circulation, factors affecting wind direction and speed, upper-level waves and jet streams, the Monsoons.

Weather disturbances: Properties of air masses, extratropical cyclone, fronts, anticyclones, tropical weather, thunderstorms, tornadoes and waterspouts. Climates dominated by equatorial and tropical air masses.

Classification of oceans and seas, general features of ocean floor, sea waves, tides, ocean currents, giant deep ocean circulations, physical properties of sea water.

GROUP-E

Igneous Petrology Metamorphic Petrology

Igneous Petrology

Magma, their generation in the crust and mantle: Present day magmatism and global tectonic processes. Magmatic process- concept and models (batch melting and Rayleigh fractionation). Quantitative approach to partial melting, fractional crystallization and source characterization.

Geochemical characteristics of igneous rocks: chemical analyses, major, trace and isotopic composition of igneous rocks in the context of petrogenesis. Compatible and incompatible elements. Geochemical criteria for the identification of palaeo-tectonic settings of igneous rocks.

Phase equilibria study in igneous system: binary, ternary and quaternary silicate system with reference to petrogenesis. Role of volatile H₂O and CO₂ in petrogenesis.

IUGS Classification schemes of Igneous rocks: Plume magmatism and hot spots. Concepts of mantle metasomatism.

Petrology and petrogenesis of major igneous rock types: Ultramafic rocks (Komatiite, Kimberlite, Alkaline rocks, Ophiolites, Carbonatites, Flood basalts (Deccan Trap, Sylhet Trap), Anorthosites, Granitoids and Layered igneous rocks.

Metamorphic Petrology

Regional orogenic metamorphic textures: Tectonites, foliation, lineation; mechanism of tectonic development; Analyses of poly-deformed and poly-metamorphic rocks; other regional metamorphic textures; replacement textures and reaction rim and their role in reconstructing P-T-t history of metamorphism.

Sources of plate tectonic metamorphic heat for crustal metamorphism, geothermal gradient, crustal thickening processes and P-T-t path of metamorphism.

Mineral assemblages and their graphical representation: ACF, AKF and AFM and compositional phase diagrams. Chemical equilibrium in metamorphism, solid-solid reaction, continuous and discontinuous metamorphic reaction.

Cation exchange partitioning relationship among coexisting phases, application of geothermometry and geobarometry, and petrogenetic grid

Regional metamorphism of pelitic and basic metamorphic assemblages: metamorphic reaction involved during regional metamorphosis

GROUP-F

Geochemistry and Isotope Geology & Engineering Geology

Geochemistry and Isotope Geology

Origin, abundance, classification and distribution of elements: Chemical differentiation of earth. Crust and mantle as a geochemical system (composition of the crust, composition of mantle,

interaction between crust and mantle), Ocean and atmosphere as a geochemical system (composition of ocean, composition of atmosphere, evolution of sea water and air, the rise of oxygen), Geochemical cycle.

Principles and application of analytical instruments in geochemistry and isotope studies: Meteorites- classification, composition and origin. Type and composition of Martian and Lunar meteorites.

Stability and abundance of radionuclides, decay mechanism, decay and growth rate of radiogenic decay, decay series.

Radiogenic isotopes: Radiogenic isotopes in geochronology (Rb-Sr, Sm-Nd, K-Ar, U-Th-Pb method of age dating). Extinct radionuclides in geochronological studies. Promordial $^{87}\text{Sr} - ^{86}\text{Sr}$ ratios. Isotopic evolution of Sr and Nd in the Earth.

Stable isotopes: Stable isotopes of O, C and S. Control, application and fractionation of stable isotopes. Oxygen isotope thermometry. Distribution of sulphur isotopes in nature.

Application of Statistics in Geology Binomial and Normal Distributions: Standardization of normal distribution, Joint distribution.

Correlation and regression, variance and covariance, standard and probable error of correlation coefficient.

Sampling distributions : Estimators, sampling distribution of mean, confidence limits, Student t distribution. Test of significance, setting up a hypothesis, null and alternative hypothesis, z-test, t-test, F-test, Chi-square test.

Factor and principal component analysis: Gumbel and Log-Pearson distributions - their applications in flood frequency analysis.

Engineering Geology

Soil: Engineering properties of soil, definition of unit weight, specific gravity, porosity and void ratio, water content, degree of saturation, elementary knowledge of compressibility, consolidation, compaction and shear strength. Importance of clay mineralogy, Atterberg units and soil classification, soil and engineering structures.

Rocks: Strength of rocks, hardness, elasticity, porosity, specific gravity. Rock masses: discontinuity in rock masses, weathering of rock masses, rock mass deformation. Engineering classification of rocks, classification of rock masses in the field according to R.Q.D. (rock quality designation), Bieniswaki and Q-system. Quarrying with special reference to rock blasting. Rock as construction materials. Improvement of rock mass properties - grouting, bolting and anchoring.

Dams and Reservoirs: Classification and parts of dams; geological and geophysical investigation of dam sites, foundation and abutment problems, forces acting on them; Seepage, bearing strength

and rebound problem; Treatment of weak zones – grouting, Investigation of reservoir area, control of leakage and silting.

Geotechnical investigation for tunnel construction: General geotechnical consideration for site locations, geology of the area, importance of structural discontinuities on tunnel and bridge alignment, groundwater conditions, rock stress condition, Methods of tunnel excavation.

GROUP-G

Economic Geology

Genesis and Indian deposits, Exploration and mining

Economic Geology

Genesis: Morphology of ore bodies, textural and structural features of ores, chemical composition of ore, classification of ore deposits, Metallogeny and its relation to crustal evolution.

Genesis of ore deposits: Magmatic, Hydrothermal, Metasomatic, pegmatitic, submarine exhalation and volcanogenic.

Sedimentary type ore deposits: chemical sedimentary and detrital sedimentary ore deposits: stratabound and stratiform deposits; evaporates, metamorphic type ore deposits.

Organic matter in ore, fluid inclusion in ore; Geothermometry, Geobarometry and dating of ore deposits. Metallogeny of Archaean greenstone belts and Proterozoic mobile belts

Structural and chemical control of ore deposits. Plate tectonic and global ore localization. Ore mineralization through geological time.

Economic Geology – Indian deposits

Metallic mineral deposits of India, their distribution, mode of occurrence, mineralogy and genesis: iron, manganese, chromium, copper, lead and zinc, gold, silver, aluminium, nickel and molybdenum.

Non-metallic mineral deposits: Diamond, limestone and dolomite, magnesite, phosphates, asbestos, gemstone, refractory minerals. Clay mineral deposits of Northeast India. Critical and essential minerals.

Radioactive minerals: uranium, thorium: their distribution, mode of occurrence, mineralogy and genesis. Uranium mineralization in north eastern part of India. Rare Earth minerals.

Exploration and mining Methods of mineral prospecting and exploration. Classification of mineral reserve, different methods of surface and subsurface mining for metallic and non-metallic minerals; mining of coal; alluvial mining.

GROUP-H

Sedimentology, and Surveying & Mapping

Sedimentology Texture of sedimentary rocks

Textural elements - size, roundness, sphericity, fabric, form and surface textures, their measurement. Statistical treatment and interpretation of grain-size analysis data.

Structures of sedimentary rock - genesis and significance of sedimentary structures, paleo current analysis.

Sedimentary environments - classification of sedimentary environments, physical and chemical parameters of depositional environments, lithofacies assemblages from fluvial, deltaic, lacustrine, marine, glacial and arid environment.

Genetic classification of sedimentary rocks

Clastics (sandstone and shale), mineralogy of the clastic sediments Diagenesis and lithification. Sedimentology of clay. Provenance determination using heavy minerals, quartz, feldspars and rock fragments.

Origin, mineralogy, classification (Dunham and Folk) of limestone; Diagenesis and neomorphism of carbonate rocks. Sedimentary basins: classification of sedimentary basins, Sedimentation and tectonics (tectonic control of sedimentation, plate tectonics and sediment accumulations).

Sedimentation as a geochemical process; Physico-chemical factors in sedimentation, Eh-pH diagrams, Geochemistry of natural water, geochemical analysis of sediments and their graphical plots to decipher their chemical maturity, weathering index of the source rocks, determination of provenance and tectonic settings, classification of sediments.

Surveying and Mapping Maps

Types and basic elements, projection system, datum and datum transformation, digital mapping techniques, GPS/GNSS and mapping. Surveying: Basic principles, types and procedures of field survey. Closed loop and open traverse, principles of theodolite, dumpy level and total station survey, RL transfer.

Geologic surveying: Definition and scope, study of outcrops, use of compass and clinometers. Base maps: Locating field data on base map, geologic traverses, detail and reconnaissance mapping; Geological field mapping in sedimentary and hard rock terrain.

GROUP-I

Stratigraphy & Geodynamics

Principles of Stratigraphy

Stratigraphy and its relation with sedimentation. Components of stratigraphy, Geological disposition of the Indian stratigraphic sequences; geological history of India. Geological time scale. Stratigraphic units –International and Indian stratigraphic codes.

Principles and methods of correlation of stratigraphic units, stratigraphic relationships - vertical and lateral. Concepts of sequence stratigraphy, magnetostratigraphy and seismo-stratigraphy.

Sedimentary facies - facies concept, lateral and vertical facies variation, facies modeling, palaeogeographic reconstruction.

Indian Stratigraphy

Precambrian formations of India : Dharwar Province, Eastern Ghats Province, Central Indian Province, Singhbhum-Orissa Province and Aravalli-Bundelkhand Province. Archaean-Proterozoic boundary.

Proterozoic formations of Indian Peninsula : Cuddapah Supergroup, Vindhyan Supergroup, Kurnool Group.

Palaeozoic formations of India, Himalayan Palaeozoics, marine Palaeozoics in Peninsular India, Precambrian-Cambrian boundary.

Mesozoic formations of India, Triassic of Spiti and Himalayan range; Jurassic of Kutch region, Cretaceous of Peninsular India. Deccan Traps and associated infra, inter and intra-trappean beds.

Gondwana Sequence of India: Basin configuration, sedimentation and palaeoclimates, Gondwana deposits of Peninsular India, marine intercalations.

Stratigraphy of North-East India

Precambrians and all igneous activities of Shillong Plateau and Arunachal Himalayas.

Gondwana and Paleozoic stratigraphy in the Northeastern region of India. Cretaceous deposits of the Northeast India, Cretaceous-Tertiary boundary, Sylhet traps and other Mesozoic intrusives of the Northeast India. Cenozoic stratigraphy of Assam-Arakan region.

Geodynamics

Continents, Oceans and Mountains, Development of theories from geosynclines to plate tectonics.

Sea-floor spreading, island arc, mid-oceanic ridge, emplacement of ophiolites. Earthquake and seismic belts of the world. Measurements of plate dynamics.

Broad overview of tectonic settings of India. Evolution of the Himalayas and Himalayan tectonics, Indo-Myanmar mobile belt.

Introduction and history of planetary geology: Universe; introduction to solar system: origin and age of the solar system, formation of the Sun and the planets.

Cosmic dust. Asteroidal parent body. Morphology and classification of meteorites.

Primitive meteorites: Ordinary Chondrites and Carbonaceous Chondrites.

Differentiated meteorites: Achondrites, Lunar meteorites and Martian meteorites, iron and stony-iron meteorites.

Planetary remote sensing: Planetary topography and surface study. Surface, atmospheric, mineral and chemical composition study. Thermal remote sensing for planets. Gravity, Gamma and X-ray spectroscopy.

GROUP-J

Palaeontology & Fuel Geology

Palaeontology

Micropalaeontology - definition, types of microfossils and their importance. Nannofossils and their importance in geology; Trace fossils and their classification,

Foraminifers - their morphology and evolution, geological distribution and their applications in palaeoecology, correlation, biostratigraphy and hydrocarbon exploration. Conodonts, ostracods and radiolaria - morphology, stratigraphic distribution and application.

Vertebrate palaeontology - Evolution of man, equidae and proboscidae in the context of palaeoclimate and palaeoecology. Changing pattern of dentition during evolution of the above vertebrates.

Palynology and its stratigraphic and palaeoclimatic significance. Study of pollens and spores, diatoms, dinoflagellate. Palynological organic matters.

Detail account of Gondwana flora in the World and in the Indian context in the context of palaeoclimate and palaeoecology.

Fuel Geology

Coal

Origin of coal: Evolutionary development of flora; climatic, paleogeographic and tectonic requirements for origin of peat swamps; sedimentation of coal and coal bearing sequence, geological features of coal seams; age and geographical distribution of coal; diagenesis of peat and coalification, physical and chemical changes of coal associated with progressing coalification; Causes of coalification.

Coal sampling and analysis: Coal sampling; coal analysis, chemical properties of coal, proximate analysis and ultimate analysis; physical properties of coal; trace elements in coal; coal classification.

Petrography of coal: Macroscopic description of coal; microscopic description of coal, macerals- classification, properties, origin and application, microlithotypes.

Coal utilization and coal as alternative energy source: Combustion, gasification, carbonization and coke; gas in coal, underground coal gasification, coal as liquid fuel, coal as an oil prone source rock; coal and environment

Geology of Indian coal deposits: Geological and geographical distribution of Indian coal deposits; geology of coal deposits of Northeast India.

Petroleum

Nature and origin of petroleum: Basic components of petroleum, Physical properties of oil, Origin of petroleum, theories of organic and inorganic origin. Migration of hydrocarbon – primary and secondary. Trapping mechanisms for oil and gas. Reservoir properties: Porosity, permeability (absolute, effective and relative), Fluid saturation, relative permeability and fluid saturation.

Reservoir rocks : Sandstone reservoir, carbonate reservoir, fractured reservoirs, Petrophysical studies of reservoir rocks, Pressure condition in reservoirs – reservoir pressures, normal and abnormal formation pressure.

Oil well drilling and drilling fluids : Parameters, usefulness types, vertical, deviated and horizontal drilling, Duties of well site geologists; Well logging : Basic of well logging, Different well logging – SP, GR, Resistivity log, neutron log, Density logs, sonic log, conventional electric log. Resistivity and water saturation.

Exploration of hydrocarbon : Geological, geochemical and geophysical exploration. Geophysical exploration of hydrocarbon – seismic survey, gravimetric survey, geological interpretation of seismic data. Petroliferous basins of India. Oil and gas fields of Assam, Arunachal Pradesh, Nagaland, Tripura, Mizoram, Cambay basins, Bombay Off-shore and Krishna-Godaverri basins.

GROUP-K

Fluvial System & Environmental Geology

Fluvial System

Fluvial processes: Evolution of drainage basin, drainage patterns and their significance, hydraulic geometry, classification of fluvial systems, the processes of erosion, transportation and deposition. Stream power, competence and capacity, base level control, structural and active tectonic control on rivers.

Fluvial landforms: The form - process relationship, erosional and depositional landforms, evolution of floodplains and their types, alluvial terraces, alluvial fan and delta, concept of peneplain and fluvial cycle of erosion.

Fluvial depositional environments and sedimentation, depositional models, lithofacies and lithofacies assemblages, genesis of facies, architectural element analysis in facies.

Fluvial landforms in NE India, records of Phanerozoic fluvial sequences, economic potential of fluvial depositional systems System

Environmental Geology

Definition: Fundamental concepts and scope of environmental geology, pollution and hazards due to mining activities, pollution due to radioactive mineral mining.

Landslides: Causal factors, impact of landslides on environment, landslide hazard zonation, preventive measures, Soil erosion.

Flood :Definition, causes, flood in fluvial systems, flood management, structural and non-structural methods of flood management, dams and flood, method of flood frequency analysis, flood in Assam

Water pollution : Sources of pollution of surface and ground water, water pollution parameters, types of water pollution, causal factors, case studies. Parameters of potable water as per Indian and WHO's standards.

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