

**SYLLABUS FOR RECRUITMENT TO THE POST OF**  
**LECTURER (GEOLOGY) UNDER HIGHER SECONDARY SCHOOL, 2015**

**SUBJECTS**

1. General English Paper- I..... 100 Marks
  2. General English Paper- II ..... 100 Marks
  3. Technical Paper- I (*Objective Type*) ..... 200 Marks
  4. Technical Paper- II (*Objective Type*)..... 200 Marks
  5. Technical Paper - III (*Objective Type*) ..... 200 Marks
- (A) *Technical* ..... 150 Marks
- (B) *Aptitude Test* .. 50 Marks

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**GENERAL ENGLISH PAPER – I** (3 hours duration)

ESSAY TYPE

**(Full Marks : 100)**

- (a) Essay Writing ..... 25 Marks
- (b) Précis Writing..... 15 Marks
- (c) Letter Writing..... 15 Marks
- (d) Idioms & Phrases ..... 14 Marks
- (e) Expansion of passages..... 15 Marks
- (f) Comprehension of given passages ..... 16 Marks

**GENERAL ENGLISH PAPER – II** (2 hours duration)

OBJECTIVE TYPE (MCQ)

**(Full Marks : 100)**

- (a) Grammar : ..... 40 Marks  
*Parts of Speech, Nouns, Adjective, Verb, Adverb, Preposition, etc.*
- (b) Composition ..... 30 Marks
  - i) *Analysis of complex and compound sentences*
  - ii) *Transformation of sentences*
  - iii) *Synthesis of sentences*
- (c) Correct usage and vocabularies ..... 30 Marks

## **PAPER –I** (2 hours duration) (200 marks)

### **UNIT-1 : PHYSICAL GEOLOGY (50 marks)**

Origin of the Solar System and the Earth; The composition of the Earth and its interior structure; important physical parameters and properties of the planet earth; abundance of elements in the earth; primary differentiation of the earth and composition of its various zones; Shape and size of the earth. Plate Tectonic theory and evidence; Plate Tectonic boundaries; Volcanism and volcanic landforms.

### **UNIT-2 : GEOMORPHOLOGY (50 marks)**

Landforms-their types and development; weathering, transport and erosion; landforms in relation to rock type, structure and tectonics. Soils-their development and types. Geomorphic processes and their impact on various landforms and associated dynamics-slope, channel, coastline, glacial and aeolian; evolution of major geomorphological features of the Indian sub-continent; geomorphometric analysis and modelling.

### **UNIT-3 : STRUCTURAL GEOLOGY (50 marks)**

Concepts of stress and strain; strain analysis using deformed objects; geometric classification of folds and fault; ; Brittle deformation processes, Joints and Veins, Fault and Faulting, Fault and faulting and their characteristic features. Mechanics of folding and buckling, Ductile Structures; Ductile deformation processes; foliation and lineation; geometry and mechanics of shear zones. Classification of unconformities; map patterns and their uses in the determination of large-scale structures.

### **UNIT-4 : APPLIED GEOLOGY (50 marks)**

(a) GIS and Remote Sensing : Principles and application of GIS; GIS- data structure, attribute data, thematic layers and query analysis. Principle and elements of remote sensing; elements of photo interpretation; electromagnetic spectrum emission range, film and imagery; geological interpretation of air-photos and imagery.

(b) Mineral Exploration : Geological and geophysical methods of surface and subsurface exploration on different scales, sampling, assaying and evaluation of mineral deposits; geochemical and geobotanical surveys in exploration.

## **PAPER –II** (2 hours duration) (200 marks)

### **UNIT-1 : MINERALOGY AND CRYSTALLOGRAPHY (50 marks)**

Crystalline and non crystalline substance. Concept of symmetry, point group lattice and space group; classification of crystal into 32 classes of symmetry; principles of crystal chemistry; principles of optical and X-ray mineralogy. Structural classification of minerals; structure and its interrelation with physical and chemical properties of minerals important phase diagrams of major rock forming minerals and ore minerals.

### **UNIT-2 : STRATIGRAPHY (50 marks)**

Principles of stratigraphy. Different types of stratigraphy; Litho, Bio, Chemo, magneto and sequence stratigraphy. Unconformity and types. Stratigraphic correlation. Boundary problems. Geological time scale and standard stratigraphic scale. Major Indian Pre Cambrian stratigraphic column; Dharwar, Singbhum, Vindhyan and Cuddapah. Paleozoic of Spiti valley, Triassic of Kutch, Jurassic of Kutch, Lameta and Siwaliks. Stratigraphic succession of Mizoram.

### **UNIT-3 : PALAEOONTOLOGY (50 marks)**

Origin and evolution of life; fossils and their uses; species concept; functional morphology, Palaeoecology/functional morphology and geological history of Brachiopoda, Mollusca, Trilobite and Echinoidea and plant fossils. Dinosaurs-their evolution and extinction. Trace fossils: kinds and classification, their significance in palaeoenvironmental analysis.

### **UNIT-4 : ECONOMIC GEOLOGY (50 marks)**

Concept of ore, ore mineral and gangue. Modern concept of ore formations. Physico-chemical control of ore localization. Classification of ore deposits by Lingren and Batemen. Metallogenesis in space and time. Metallogenic epochs and provinces. Textures of ore minerals and applications. Origin of Coal, and Origin of Petroleum. Migration of oil and different traps. Productive basin in India, prospects of hydrocarbon in Mizoram.

## **PAPER –III** (2 hours duration) (200 marks)

### **UNIT-1 : IGNEOUS & METAMORPHIC PETROLOGY (36 marks)**

Magma, its generation, nature and composition. Bowen's reaction principle; Magmatic differentiation and assimilation; Texture, structure and classification of igneous rocks: IUGS and CIPW; Types of Metamorphism. Metamorphic grades, zones and facies. Texture, structure and nomenclature of metamorphic rocks.

### **UNIT-2 : SEDIMENTOLOGY (34 marks)**

Classification of sedimentary rocks; petrography of rocks of clastic, chemical and biochemical origin. Sedimentary textures and structures. Diagenesis; marine, non-marine and mixed depositional environments. Facies association, sedimentation and tectonics; basin analysis.

### **UNIT-3 : GEOCHEMISTRY (40 marks)**

Abundances of elements; structure and atomic properties of elements; the Periodic Table; geochemical classification and distribution of elements in the earth; principles of geochemical cycling; principles of ionic substitution in minerals; laws of thermodynamics; concepts of free energy, activity, fugacity and equilibrium constant; element partitioning in mineral/ rocks formation and concept of distribution coefficients; concept of P-T-X. Eh-pH diagrams and mineral stabilities; radioactive decay schemes, growth of daughter isotopes and radiometric dating; stable isotopes and their fractionation.

### **UNIT-4 : ENGINEERING GEOLOGY & HYDROGEOLOGY (40 marks)**

(a) Engineering Geology : Mechanical properties of rocks; geological investigations for the construction of dams, bridges, highways and tunnels. Mass movement with special emphasis on landslides and causes of hill slope instability. Earthquake and seismicity, seismic zones of India. Aseismic design of buildings.

(b) Hydrogeology : Groundwater, Darcy's law, hydrological characteristics of aquifers, hydrological cycle. Precipitation, evapotranspiration and infiltration processes. Water bearing properties of rocks. Hydrological classification of water-bearing formations. Fresh and salt-water relationships in coastal and inland areas. Groundwater exploration and water pollution.

**Unit – 5 : APTITUDE TEST (50 marks)**

**(a) Numerical And Figurework Tests: (15 marks)**

These tests are reflections of fluency with numbers and calculations. It shows how easily a person can think with numbers. The subject will be given a series of numbers. His/Her task is to see how the numbers go together to form a relationship with each other. He/She has to choose a number which would go next in the series.

**(b) Verbal Analysis And Vocabulary Tests: (15 marks)**

These tests measure the degree of comfort and fluency with the English language. These tests will measure how a person will reason with words. The subject will be given questions with alternative answers, that will reflect his/her command of the rule and use of English language.

**(c) Visual And Spatial/3-D Ability Tests: (10 marks)**

These tests are used to measure perceptual speed and acuity. The subject will be shown pictures where he/she is asked to identify the odd one out; or which comes next in the sequence or explores how easily he/she can see and turn around objects in space.

**(d) Abstract Reasoning Tests: (10 marks)**

This test measures the ability to analyse information and solve problems on a complex, thought based level. It measures a person's ability to quickly identify patterns, logical rules and trends in new data, integrate this information, and apply it to solve problems.

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