

Serial No.

4099

D-FDN-K-HC

## GEOLOGY

### Paper—III

Time Allowed : Three Hours

Maximum Marks : 200

#### INSTRUCTIONS

Candidates should attempt **SIX** questions in all including Question No. 1, which is compulsory, from Part—I and attempt **ONE** question each from Sections A, B, C, D and E from Part—II.

The number of marks carried by each question is indicated at the end of the question.

Answers must be written only in **ENGLISH**.

Symbols and abbreviations are as usual.

Neat sketches may be drawn to illustrate answers, wherever required.

#### PART—I

1. Write notes on any **TEN** of the following :—

5×10=50

(i) Skarns and ore deposits

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(Contd.)

- (ii) Minerals used in ceramic industries
- (iii) Rare earth mineral occurrences of India
- (iv) Mineralisations associated with acidic igneous rocks
- (v) Assaying and Assay width
- (vi) Macro- and Micro-textures of metamorphosed ores
- (vii) Marine and Palaeo Placers
- (viii) Geochemical Sampling
- (ix) Coal measures and Cyclothems
- (x) Petroleum oil logging
- (xi) Failures of Reservoirs
- (xii) Magnetic anomaly and its interpretation.

## PART—II

### SECTION—A

2. Describe the mode of occurrence, structural control if any and genesis of lead-zinc deposits of Zawar group of mines of Rajasthan. 30
3. Write notes on the following :— 6×5=30
- (i) Khetri Copper belt, Rajasthan
  - (ii) Iron and Manganese ores of Bihar and Orissa
  - (iii) Gems and Gemstones of India
  - (iv) Miner Price Index and its Calculation
  - (v) Minerals and Sustainable Development.

### SECTION—B

4. What are the different classes of Volcanogenic Sulphide-deposits found in nature ? How these deposits are distributed in space and time ? Describe the tectonic setting and genesis of such deposits. 7+8+15=30
5. Write notes on the following :— 6×5=30
- (i) Regional metamorphism of manganese ores
  - (ii) Submarine volcanism and ore deposition
  - (iii) Sources of hydrothermal ore mineralisation
  - (iv) Podiform and stratiform chromite ores
  - (v) Kimberlites and diamond genesis.

### SECTION—C

6. Describe different methods of underground mine mapping and sampling. How are you going to determine the 'Assay width' of (a) vein type and (b) stratiform ore bodies ? How are you going to calculate the average width and grade of such ore bodies ? 16+7+7=30
7. Write notes on the following :— 6×5=30
- (i) Diamond drill
  - (ii) Pedgeochemical and Atmogegeochemical methods of Prospecting methods.
  - (iii) Application of Remote Sensing for mapping altered rocks and mineralogical composition around a mineral deposit.
  - (iv) Principles of Gravity method of exploration.
  - (v) Local Prospecting of economic mineral deposits.

### SECTION—D

8. Attempt a critical review of in situ and drifted theories of accumulation of coal deposits. Describe the Coalification Processes. Write briefly on regional and contact metamorphism of coal deposits.  $10+10+10=30$
9. Write notes on the following :—  $6 \times 5 = 30$
- (i) Organic origin of Petroleum
  - (ii) Petroleum Exploration
  - (iii) Coal Seam Correlation
  - (iv) Gas Hydrate and Natural Gas Deposits
  - (v) Radioactive Placer Minerals of India.

### SECTION—E

10. Give a general account of stability of a slope. In what condition a particular part of a slope is likely to suffer failure ? What are different types of 'Mass Failures' ? Explain salient features in each case.  $5+5+10+10=30$
11. Write notes on the following :—  $6 \times 5 = 30$
- (i) Geological investigations necessary for Reservoir Construction
  - (ii) Methods of Tunnelling
  - (iii) Monitoring and Controlling of Mass Movements
  - (iv) Engineering Protection of erosion of Shores
  - (v) Problems of Groundwater in Engineering Projects.