

**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 short notes on any *ten* of the following :  
5×10=50

(a) International Seabed Authority

(b) Channel sampling for vein-type deposits

- (c) Paragenetic sequence in ore formation and its geological significance
- (d) Utility of travel-time curves in geophysical exploration
- (e) Macerals
- (f) Gamma-ray logging
- (g) Difference between an arch dam and a gravity dam
- (h) Deviation of boreholes
- (i) Unconfirmed compressive strength of foundation rocks
- (j) Important controls of ore localisation
- (k) Nuclear wastes' disposal
- (l) Specification and distribution of metallurgical grade chromite ores in India

## **PART—II**

### **Section—A**

2. Describe the distribution of subsea mineral resources at different depth realms on the ocean floor. Add a note on India's strategy and future perspectives for the exploration and exploitation of subsea mineral resources.

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3. Write short notes on the following : 6×5=30

- (a) Banded iron ore formations of Karnataka
- (b) Concept and scope of Mineral Economics with a brief note on the changing pattern of mineral consumption
- (c) Asbestos deposits and their industrial utility
- (d) MM (R & D) Act
- (e) Difference between closed-door policy and open-door policy in relation to mineral development

**Section—B**

4. Write short notes on the following : 6×5=30

- (a) Remobilised ore bodies
- (b) Mineralisations associated with greenstone belts
- (c) Economic ore mineralisation in anorthosite, citing Indian example(s)
- (d) Difference between hydrothermal replacement and cavity filling processes with regard to deposits
- (e) White smokers associated with submarine volcanism

5. Write short notes on the following :  $6 \times 5 = 30$

- (a) Mineralisation in zoned pegmatites of Koderma mica belt
- (b) Fluid inclusion studies in ores and their geological significance
- (c) Genetic types of manganese ore deposits (add suitable example)
- (d) Difference between contact metasomatism and metasomatic replacement with regard to deposits
- (e) Distinction between banded magnetite quartzite and banded haematite quartzite

#### Section—C

6. Define sampling of minerals and ores. Describe the sampling procedures employed for the following deposits :  $3 + 27 = 30$

- (a) Bedded limestone
- (b) Porphyry copper ores
- (c) Alluvial placers

7. Write short notes on the following :  $6 \times 5 = 30$

- (a) Use of drill mud and its significance
- (b) Geologist's report in exploration
- (c) Distinction between Wenner and Schlumberger electrode spacing configurations in resistivity surveys

- (d) Airborne magnetic survey for placer minerals
- (e) Lithogeochemical and atmogeochemical prospecting methods and their application in ore exploration

#### **Section—D**

8. Describe various instrumental techniques for prospecting and assaying of radioactive minerals. 30
9. Write short notes on the following : 6×5=30
- (a) Uranium mineralisation in India
  - (b) Source rocks and reservoir rocks, citing Indian examples
  - (c) Industrial applications of coal petrography
  - (d) Occurrence and distribution of coal measures of Jharia coalfields
  - (e) Difference between geology and structure of Ankaleswar and Assam oil fields

#### **Section—E**

10. (a) With reference to the geological considerations in site selection, bring out the differences between a gravity dam and an earth dam. 10

- (b) Explain the foundation geology of Mullaperiyar dam. 10
- (c) Differentiate landslides from other types of mass movement. Explain the slope failure mechanism in landslides. 10

11. Write short notes on the following : 6×5=30

- (a) Impact of water table levels at a reservoir site
- (b) Landslide hazard zonation atlas
- (c) Seismic zone map of India
- (d) Tunnel supports
- (e) Shoreline engineering and its associated problems

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