

Sl. No.

3540

A-HFP-J-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 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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