

Serial No.

C-HFP-L-HMC

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

- (i) Tenor and Grade of an ore
- (ii) Aluminous refractories
- (iii) Stratiform and Stratabound ores

- (iv) Bore hole logging
- (v) Coal bed methane
- (vi) Oil shale and its utility
- (vii) Mine subsidence
- (viii) Plant indicators
- (ix) Building stones and factors on which their selection depend
- (x) War minerals and War supporting minerals
- (xi) Marine phosphates
- (xii) Geobotanical prospecting.

PART—II

SECTION—A

2. (a) Name the important sulphide ore deposits located in the Delhi Supergroup of rocks of Rajasthan and describe the important ore minerals found in these deposits.
- (b) Discuss the genesis of any one of the important sulphide ore deposits located in the Delhi Supergroup of rocks. 15+15=30
3. Write notes on the following :— 6×5=30
 - (i) Chromite ore mineralisation of South India
 - (ii) Rampura-Agucha Lead-Zinc deposits of Rajasthan
 - (iii) Mode of occurrence and genesis of mica in Kodarma Mica belt, Jharkhand
 - (iv) Strategic, critical and essential minerals
 - (v) Conservation and substitution of minerals.

SECTION—B

4. (a) Describe the General characteristics of Porphyry copper deposits with reference to (i) distribution in space and time, (ii) tectonic setting and (iii) mineralization and zoning.
- (b) Attempt a brief review of genesis of porphyry copper deposits. $15+15=30$
5. Write notes on the following :— $6 \times 5 = 30$
- (i) Mineralization in Archaean Greenstone belts
 - (ii) Importance of Fluid Inclusion Studies of ores
 - (iii) Pegmatites and associated mineral deposits
 - (iv) Mineralization associated with sub-marine volcanism
 - (v) Ore mineralization associated with gabbro-anorthositic rocks.

SECTION—C

6. (a) Describe the different geological guides for prospecting of mineral deposits.
- (b) What are the principles of seismic methods of exploration and its application ? $15+15=30$
7. Write notes on the following :— $6 \times 5 = 30$
- (i) Airborne magnetometers and their uses
 - (ii) Biogeochemical prospecting
 - (iii) Rotary and Percussion drills.
 - (iv) "Cut-off Grade", "Average Grade" and "Mill Grade" ores
 - (v) Use of remote sensing for groundwater management.

SECTION—D

8. (a) Name the different microscopic constituents of coal and describe their characteristic features.
- (b) How does oil accumulate in nature ? What are the future oil and gas prospects of India ? 15+15
9. Write notes on the following :— 6×5=30
- (i) Radioactive method of prospecting
 - (ii) Neyveli peat deposits
 - (iii) Characters of reservoir rocks of Oil and Gas
 - (iv) Important Gondwana Coal deposits of India
 - (v) Geological constraints for Nuclear waste disposal.

SECTION—E .

10. (a) State conditions necessary for successful construction and stability of a bridge. Explain the forces which commonly act on the piers of different types of bridges.
- (b) Describe the Geological examinations necessary for the foundations and abutments of dams. Add a note on groundwater conditions at dam sites. 15+15=30
11. Write notes on the following :— 6×5=30
- (i) Influent and effluent streams
 - (ii) Conditions necessary for an artesian well
 - (iii) Grouting
 - (iv) Spillway apron
 - (v) Landslide.