

A-HFP-M-FDNC

GEOLOGY 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 of Part II.

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

All parts and sub-parts of a question are to be attempted together in the answer book.

Attempts of a part/question shall be counted in chronological order. Unless struck off, attempt of a part/question shall be counted even if attempted partly. Any page or portion of the page left blank in the answer book must be clearly struck off.

Answers must be written only in ENGLISH.

Symbols and abbreviations are as usual.

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

PART I

1. Write short notes on each of the following with sketches wherever appropriate : 5×10=50
- (a) Occurrence of gold in submarine hydrothermal sulphides 5
 - (b) Mineral raw materials used in cement industry 5
 - (c) Overbreak in tunneling 5
 - (d) Depreciation allowance during mineral development 5
 - (e) Exclusive Economic Zone of India 5
 - (f) Industrial applications of coal 5
 - (g) Identification and economic significance of gas hydrates 5
 - (h) Distribution of onshore oil in India 5
 - (i) Compositional layering in chromite deposits 5
 - (j) Bog iron ore 5

PART II
SECTION A

2. (a) Comment on the industrial application of graphite and give its distribution in India. 15
- (b) Classify mineral placers. Comment on the sorting mechanism of beach placers. 15
3. Write short notes on each of the following : 5×6=30
- (a) Geological set-up and genesis of Pb - Zn deposits of Zawar. 5
- (b) What are refractory minerals ? Give their distribution in India. 5
- (c) Describe the qualities of building stones. 5
- (d) Describe the genesis of East Coast Bauxite. 5
- (e) Differentiate between the mineralogy of Black Smokers and White Smokers. 5
- (f) Difference between the podiform and stratiform chromite deposits. 5

SECTION B

4. Explain the following : 15×2=30
- (a) Mineral deposits associated with anorthosites and kimberlites. Give suitable Indian examples. 15
 - (b) Mineralisation by supergene sulphide enrichment process. 15
5. Write notes on each of the following : 6×5=30
- (a) Major mica pegmatite deposits of India 5
 - (b) Residual concentration of iron ores from BHQ 5
 - (c) Application of fluid inclusion studies in ore geology 5
 - (d) Salem magnesite deposits 5
 - (e) Cavity filling ore deposits 5

SECTION C

6. Explain the following : 15×2=30
- (a) Rotary drilling and diamond drilling 15
 - (b) Ore reserve estimation 15
7. Write notes on each of the following : 5×6=30
- (a) Effect of mining on environment 5
 - (b) Core logging 5
 - (c) Channel sampling 5
 - (d) Classification of ore reserves 5
 - (e) Electrical resistivity method 5
 - (f) Geochemical prospecting 5

SECTION D

8. Describe the principles, methods and utility of the following in petroleum exploration : 10×3=30
- (a) Gravity and magnetic survey 10
 - (b) Well logging techniques 10
 - (c) Seismic reflection method 10
9. Write short notes on each of the following : 5×6=30
- (a) Autochthonous and allochthonous coal deposits 5
 - (b) Characteristics of coal in different geological periods 5
 - (c) Microlitho types of coal 5
 - (d) Ranks of coal 5
 - (e) Combustion of coal 5
 - (f) Sedimentary uranium deposits 5

SECTION E

10. Explain the following : 15×2=30
- (a) Sea walls and groins — impact of these shoreline structures on the beach stability 15
 - (b) Foundation geology of the Bhakra dam 15
11. Discuss each of the following : 5×6=30
- (a) Causes and effects of Reservoir Induced Seismicity (RIS) 5
 - (b) Rock Quality Designation (RQD) 5
 - (c) Civil engineering constructional precautions in seismic zones 5
 - (d) Causes of dam failures 5
 - (e) Lining of tunnels 5
 - (f) Reservoir silting 5