

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