

GEOLOGY

Paper – II

Time Allowed : **Three Hours**

Maximum Marks : **200**

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

*There are **EIGHT** questions in all, out of which **FIVE** are to be attempted.*

*Questions no. **1** and **5** are **compulsory**. Out of the remaining **SIX** questions, **THREE** are to be attempted selecting at least **ONE** question from each of the two Sections A and B.*

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Neat sketches may be drawn, wherever required.

*Answers must be written in **ENGLISH** only.*

SECTION A

- Q1.**
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|-----|---|---|
| (a) | What are 'Symmetry elements' in crystallography ? Write the symmetry elements of normal class of tetragonal system. | 8 |
| (b) | Describe inosilicate structure with examples. | 8 |
| (c) | Petrographically differentiate between the following rock types : | 8 |
| | (i) Granite and Syenite | |
| | (ii) Basalt and Anorthosite | |
| (d) | Write a note on agents of metamorphism. | 8 |
| (e) | Discuss the depositional environment for carbonate rocks. | 8 |

- Q2.** (a) Discuss the process of extinction in anisotropic minerals. Describe the different types of extinction in minerals with examples. 10
- (b) Give a detailed account of the twinning in minerals. 15
- (c) What is magmatic differentiation ? Discuss various differentiation processes involved in magma modification. 15
- Q3.** (a) Write a brief account of ACF diagram. 10
- (b) Discuss the crystal structure, classification, composition, physical and optical properties of feldspar group of minerals. 15
- (c) What are sedimentary structures ? Describe the sedimentary structures produced on top of the bedding plane. 15
- Q4.** (a) What is metasomatism ? Write a brief account of metasomatic processes. 10
- (b) Differentiate between :
- (i) Matrix and Cement 5
- (ii) Diagenesis and Lithification 5
- (iii) Clastic and Non-clastic sedimentary rocks 5
- (c) Give the classification of sandstone based on its detrital component and matrix. 15

SECTION B

- Q5.** (a) Describe the methods of ore reserve estimation. 8
- (b) Describe the conditions necessary for the formation of hydrothermal ore deposits. 8
- (c) What is Sampling ? Describe briefly the techniques of sampling in mineral exploration. 8
- (d) Discuss the strategy adopted for the storage and disposal of radioactive waste. 8
- (e) Discuss the hazards caused due to industrial waste. 8
- Q6.** (a) Give a brief account of mineralogy, classification and distribution of iron-ores in India. 15
- (b) Define Exclusive Economic Zone (EEZ). Add a note on the Law of the Sea (UNCLOS). 10
- (c) Discuss the structure, composition and elemental distribution of our Solar System. 15
- Q7.** (a) Describe the Petroleum deposits of India. 15
- (b) What are Pathfinder Elements ? Give a detailed account of geobotanical prospecting. 10
- (c) Differentiate between :
- (i) Isomorphism and Polymorphism 5
- (ii) Planar and Rotational Slides 5
- (iii) Magnitude and Intensity of Earthquake 5

- Q8.** (a) What is Ore Beneficiation ? Briefly explain floatation method of separation. 15
- (b) Discuss the environmental hazards caused due to :
- (i) Open cast mining 5
 - (ii) Use of fertilizers 5
 - (iii) Unplanned urbanization 5
- (c) Describe the various environmental protection laws of India. 10