

GEOLOGY
Paper – I

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. Answer the following within 150 words each :

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|-----|---|-----|
| (a) | What are the evidences in favour of the theory of plate tectonics ? | 8 |
| (b) | Which factors control floods in rivers ? | 8 |
| (c) | How would you distinguish between an unconformity and a fault ? | 8 |
| (d) | What are the principles of recognizing lithology from aerial photographs ? | 8 |
| (e) | How do we come to know that the core of the Earth is chiefly made up of iron ? How do we estimate the age of core formation ? | 4+4 |

- Q2.** (a) How would you distinguish between different types of meteorites based on composition, mineralogy and texture ? How do meteorite studies improve our understanding of the evolution of the Earth ? 10+5
- (b) Illustrate the genetic classification of joints with suitable sketches. 10
- (c) How do earthquakes cause damage ? How do we reduce the risk of damage by earthquakes ? 15
- Q3.** (a) What do you understand by Mass Wasting ? Describe different processes of mass wasting. What are the preventive measures to mitigate the risk of hazards due to mass wasting ? 15
- (b) Elucidate with example the principle of determination of absolute age of rocks. 10
- (c) Distinguish between Strike-slip fault and Dip-slip fault. Illustrate with diagram the effect of erosion on rock blocks having apparent movement. 15
- Q4.** (a) Describe different types of planar structures in folded strata. How do you use cleavage to determine structures in three dimensions ? 15
- (b) What is Weathering ? Describe different processes of weathering with suitable examples. 10
- (c) What is a nappe ? Describe the structure of window and klippe. How do they differ from outlier and inlier structures ? Explain with suitable diagrams. 15

SECTION B

Q5. Answer the following within 150 words each :

- (a) Briefly describe the species concept and problems of adopting biological species concept in Palaeontology. 8
- (b) With the help of neat diagram describe evolutionary trends in Equidae. 8
- (c) Describe in brief Cretaceous/Tertiary boundary problem with reference to India. 8
- (d) What is the hardness of a groundwater which contains 20 mg/L of calcium and 5 mg/L of magnesium ? 8
- (e) Describe the different terminologies of a dam and explain various types of dams. Which geologic investigations need to be carried out for construction of a successful dam ? 8

- Q6.**
- (a) Discuss with the help of neat diagram morphology of Brachiopod. Add a note on their development of deltidium. 15
 - (b) What is Darcy's Law ? What are its limitations ? 10
 - (c) Describe the stratigraphy of Mesozoic of Kuchh mentioning characteristic fossils from each unit. 15

- Q7.**
- (a) Discuss in detail the Precambrian stratigraphy of the Singhbhum craton. 15
 - (b) Discuss the palaeoecological significance of Foraminifera and add a note on their uses in oil exploration. 10
 - (c) What is the Ghyben-Herzberg relationship between fresh and saline waters ? 15

- Q8.** (a) Explain in detail morphology of Graptolites. What are the characteristic features that make them index fossils for the Lower Palaeozoic ? 15
- (b) What are chronostratigraphic units ? Illustrate the methods of chronostratigraphic correlation. 10
- (c) Which geologic factors need to be considered for tunnelling in consolidated rocks ? 15