

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.** Write explanatory notes on the following within 150 words each : $8 \times 5 = 40$
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|-----|---|---|
| (a) | Earth's upper mantle | 8 |
| (b) | Earthquake prediction | 8 |
| (c) | Antecedent and Superimposed drainage | 8 |
| (d) | Geosynchronous and Sun-synchronous orbits | 8 |
| (e) | Strain ellipsoid | 8 |
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- Q2.**
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|-----|--|----|
| (a) | Describe the various types of satellite image resolutions, along with examples. | 15 |
| (b) | How are 'carbonaceous chondrites' distinguished from other types of meteorites ? | 10 |
| (c) | Describe with suitable diagrams different mechanisms of folding of rock strata. | 15 |
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- Q3.**
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|-----|---|------------|
| (a) | What are the major causes of earthquake ? How is the magnitude of an earthquake measured ? Add a note on the seismic zones of India. | 15 |
| (b) | Describe with neat sketch the concept of 'net slip' in faults. Illustrate with diagrams the orientation of 'net slip' with the strike and dip of fault planes in different types of faults. Explain with suitable diagrams the relation between 'slip' and 'separation' on a fault plane. | $2+4+4=10$ |
| (c) | Write a brief note on different types of sand dunes and the conditions under which they form and grow with the help of neat sketches. | 15 |

- Q4.** (a) Illustrate with neat sketches, the classification of folds based on (i) interlimb angle, (ii) orientation of axial plane, and (iii) curvature of axial surface. 15
- (b) Discuss any four theories that explain the origin of orogenic movements. What are their merits and limitations? 10
- (c) Describe the different types of erosional and depositional landforms associated with fluvial processes using neat diagrams. 15

SECTION B

Answer the following within 150 words each :

8×5=40

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|------------|-----|---|----|
| Q5. | (a) | Explain the four stages of fossilisation process. | 8 |
| | (b) | Define biostratigraphy and illustrate the biostratigraphic units with neat sketches. | 8 |
| | (c) | Describe the stratigraphy of Cretaceous successions in the Cauvery basin. | 8 |
| | (d) | Describe causes and effects of 'saltwater intrusion' in the groundwater table. | 8 |
| | (e) | Classify irrigation water on the basis of sodium concentration. | 8 |
| | | | |
| Q6. | (a) | Describe the stratigraphy and depositional setting of the Siwalik group of rocks and comment on the palaeoclimatic conditions during their deposition. | 15 |
| | (b) | What is the zone of aeration ? Describe its different horizons with the help of a diagram. | 10 |
| | (c) | Describe the morphology of Anthozoa and illustrate the structures of Rugose coral exoskeleton. | 15 |
| | | | |
| Q7. | (a) | Discuss the role of microfossils in understanding palaeoclimates and palaeo-oceanography. | 15 |
| | (b) | Briefly describe the stratigraphy of the Bababudan Group. | 10 |
| | (c) | What is sub-surface water ? How does it move ? Describe different types of movement of sub-surface water. | 15 |
| | | | |
| Q8. | (a) | List out the desirable properties of rock aggregates in relation to their various uses. Describe the methods to determine the attrition and abrasion resistance of rocks. | 15 |
| | (b) | Illustrate the morphology of Graptoloidea and add a note on its habitat and geological history. | 10 |
| | (c) | Briefly discuss the stratigraphic evolution of the Vindhyan Supergroup. | 15 |