

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.

Question Nos. **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

1. Answer the following within 150 words each : 8×5=40
- (a) What is a meteorite? Describe different types of meteorites.
 - (b) Discuss the spectral and spatial resolution of a satellite image.
 - (c) What is a moraine? Discuss different types of moraines.
 - (d) Discuss five criteria to recognise the top of a bed by primary features.
 - (e) Describe strike, dip direction and dip amount of a bed. Can the strike and dip be measured in all types of orientation of beds? How are strike, dip direction and dip amount of horizontal, tilted and vertical strata represented on a map?
2. (a) What is a volcano? What are the different types of volcano based on the types of eruption and places where the eruption occurred? 15
- (b) Explain in detail about panchromatic, multispectral and hyperspectral remote sensing images with example. 10
- (c) What is a fold? Draw neat sketches and discuss Ramsay's classification of fold based on dip isogon. 15
3. (a) What are the differences between weathering and erosion? Discuss four different types of mechanical weathering. 10
- (b) What is a fault? Draw a neat diagram and discuss different terminologies associated with a fault plane. Discuss four criteria for recognising fault in a field. 15
- (c) What is an earthquake? Discuss the causes and effects of an earthquake. List the major geographic distribution of earthquakes worldwide. 15
4. (a) What is isostasy? Discuss three different theories of isostasy. What are the merits and limitations of these theories? 10
- (b) Discuss four erosional and four depositional landforms associated with a river. 15
- (c) Discuss about stereographic projections for structural analysis with neat diagrams. 15

SECTION—B

5. (a) What is orthogenesis? Comment on the progressive trend of evolution from Hyracotherium to Equus. 8
- (b) How are abiotic conditions reflected in the test ornamentation of microfossils? Enumerate with example. 8
- (c) What is palaeogeography? How does the present petrographic domain reconstruct the past events? 8
- (d) With the help of a neat sketch, draw a labelled diagram of hydrological cycle. 8
- (e) What are creep, solifluction and landslide? Enumerate their significance that leads to mass scale devastation. 8
6. (a) Discuss about the two-fold classification of Gondwana group of rocks, mentioning the stages and their ages. Comment on the important floras of Lower Gondwana and Upper Gondwana basins. 15
- (b) What do you mean by stratigraphic boundary problems? How do you substantiate the observation on Pakhal Controversy? 10
- (c) Define the terms Rock Quality Designation and Rock Mass Rating (RQD & RMR). How are these parameters useful in the analysis of the design of roof support system in tunnel excavations? 15
7. (a) What is 'dimorphism' in foraminiferal reproduction? How is dimorphism established through the features in foraminiferal tests? Discuss the evolutionary changes of foraminifers through geological ages. 15
- (b) In Indian stratigraphy, Cuddapah system plays a dominant role. Attempt the stratigraphic classification of the Cuddapah group of sediments. Add a note on the age of these rocks with special reference to the economic potential associated. 15
- (c) What do you understand by the terms Hydraulic Conductivity and Storage Coefficient? 10

8. (a) Which palaeogeographic condition is generally indicated by the presence of brachiopods? How is 'habitat shifting' represented by brachiopods in rocks throughout time? Discuss about major features of brachiopod shells. 15
- (b) What is Himalayan Orogeny? Briefly describe the structure and tectonic history of Himalayas. 15
- (c) What is rainwater harvesting? Enumerate the different types of structures constructed for rainwater harvesting. 10

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