

**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 **ELEVEN** questions divided in **SIX** sections.*

*Candidate has to attempt **SIX** questions in all.*

*The **ONLY** question in Section A is **compulsory**.*

*Out of the remaining **TEN** questions, the candidate has to attempt **FIVE**, choosing **ONE** from each of the other Sections **B, C, D, E** and **F**.*

*The number of marks carried by a question / part is indicated against it.*

*Unless otherwise mentioned, symbols, abbreviations and notations have their usual standard meanings.*

*Neat sketches are to be drawn to illustrate answers, wherever required. They shall be drawn in the space provided for answering the question itself.*

*Wherever required, graphs/tables are to be drawn on the Question-cum-Answer (QCA) Booklet itself.*

*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 (QCA) Booklet must be clearly struck off.*

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

**SECTION A****(Compulsory Section)**

**Q1. Describe the following in brief with illustrations, wherever necessary :**

- |   |   |
|---|---|
| (a) Pratt's theory of Isostasy                      | 5 |
| (b) Infrared Remote Sensing                         | 5 |
| (c) Saline Series of Salt Range                     | 5 |
| (d) Duplexes  | 5 |
| (e) Limitations of Lithostratigraphic Correlation   | 5 |
| (f) Shear Sense Indicators                          | 5 |
| (g) Hummocky Cross-stratification                   | 5 |
| (h) Unaltered preservation of fossils               | 5 |
| (i) Species concept in Paleontology                 | 5 |
| (j) Stromatolites and their geological significance | 5 |

**SECTION B**

Attempt any **one** question.

- Q2.** (a) Describe the role of groundwater in Limestone topography. Also, discuss the various erosional landforms developed due to the action of groundwater, with a suitable diagram. 15
- (b) Discuss the Digital Image Processing and comment on the image enhancement techniques. 15
- Q3.** (a) With a neat diagram, describe the various compositional and mechanical layerings of the Earth. Also, discuss the role of seismic waves in inferring the interior of the Earth. 10
- (b) Describe the various types of volcanoes. Also discuss the causes of volcanism, with a diagram and comment on the global distribution pattern of volcanoes. 10
- (c) Discuss the spectral reflectance curve of the Earth's surface covered by soil, water bodies, rocks and vegetation, with suitable sketches. 10

## SECTION C

Attempt any **one** question.

- Q4.** (a) What is dip isogon pattern ? How are they helpful in classification of folds ? 15
- (b) Discuss different types of linear structures and discuss their tectonic significance. 15
- Q5.** (a) Discuss the mechanism and significance of Mylonites and Cataclastic deformation. 10
- (b) What is rock cleavage ? Give the significance of cleavage in deciphering the structure of a folded area. 10
- (c) With the help of a block diagram for normal fault, thrust and strike-slip fault, show the orientation of  $\sigma_1$ ,  $\sigma_2$  and  $\sigma_3$  for generation of these faults. 10

**SECTION D**

Attempt any **one** question.

- Q6.** (a) What is a facies model ? Describe the sedimentation pattern and facies in a tidal flat environment. 15
- (b) How is depositional fabric in rudites useful in determining the depositional environment ? 15
- Q7.** (a) Describe the controlling factors of sandstone composition. 10
- (b) Discuss the diagenesis and diagenetic reactions that occur in carbonate sediments. 10
- (c) Giving the genesis, describe any four sedimentary structures which are useful in paleocurrent analysis. 10

**SECTION E**

Attempt any **one** question.

- Q8.** (a) Describe the shell morphology of trilobites with neat and labelled sketches. Add a note on their biostratigraphic significance during Paleozoic. 15
- (b) Comment on the ichnofacies concept and their role in the interpretation of shallow marine environments. Discuss the advantages and limitations of ichnofossils. 15
- Q9.** (a) Describe the various stages in hominids evolution with suitable examples and sketches. 10
- (b) Comment on the Gondwana plant fossils and their paleoclimatic and paleogeographic implications. 10
- (c) Discuss the hypotheses for the cause of Permian-Triassic mass extinction. 10

**SECTION F**

Attempt any **one** question.

- Q10.** (a) Describe the tectonic evolution of Cuddapah Supergroup. Also discuss the lithostratigraphic classification and associated depositional environment. 15
- (b) Discuss the distribution of marine Paleozoic formation of India. Describe the stratigraphic succession of Kashmir Paleozoic formations and also mention the characteristic fossils from different Paleozoic successions. 15
- Q11.** (a) Discuss the nature and tectonic evolution of Central Indian Tectonic Zone (CITZ). 10
- (b) Describe the depositional environment of Paleogene succession of the Himalayas. 10
- (c) Discuss the tectonic evolution of Kutch Basin. Explain the Mesozoic stratigraphy of Kutch Basin and their depositional environment. 10

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