

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) | Distinguish between the Pratt, Airy, and Vening Meinesz isostasy models. How can perfect isostatic equilibrium be attained ? | 8 |
| (b) | Elucidate the erosional features of aeolian landforms. | 8 |
| (c) | Distinguish between the Wulff and Schmidt net used in creating projection diagrams. Add a note on their relative advantages and disadvantages. | 8 |
| (d) | Describe False Colour Composite (FCC) data products and their interpretation basics. | 8 |
| (e) | Mark the different seismic zones on the outline map of India. | 8 |

- Q2.** (a) Discuss the characteristics and location of global volcanic belts. On an outline map of the World, show the volcanic belts by hatch marks over the terrain. 15
- (b) Explain how parasitic folds are used in interpreting large-scale folding. 10
- (c) Critically evaluate the different theories of origin of Earth and explain in detail the most accepted theory. Illustrate your answer with suitable sketches. 15
- Q3.** (a) Critically assess the role of geomorphology in evaluating the ancient and modern hydrological regime of a terrain. Elucidate your answer by taking examples from Indian fluvial systems. 15
- (b) Discuss the spectral range, ground resolution and image swath of IRS series sensors. 10
- (c) Describe the deformation mechanisms of minerals and rocks, and add a note on their characteristic features. 15
- Q4.** (a) Explain with the help of sketches how microstructures in porphyroblasts can be used to determine post-crystallization deformation. List five other features which are also indicative of such deformation. 15
- (b) Describe the Low Earth Orbit (LEO) satellites and their typical applications. 10
- (c) Define tectonites and describe the three types of tectonites with examples. Explain how each type of tectonite can be used to decipher strain. 15

SECTION B

Q5. Answer the following within 150 words each :

- (a) Explain the effects on the dead organism before burial. 8
- (b) Describe the different concepts of zone. 8
- (c) Discuss the lithology of Krol Formation and add notes on age and fossil contents. 8
- (d) Discuss in brief different geological formations as aquifers. 8
- (e) Enumerate the probable causes of landslides and add a note on the preventive measures for landslides. 8

- Q6.**
- (a) Describe the stratigraphy of Dharwar Craton. Explain the tectonic boundary of Dharwar Craton. 15
 - (b) Describe the different types of thermal springs. Add a note on the current utility of these geothermal resources. 10
 - (c) Discuss in brief the evolutionary trends in Hominidae. 15

- Q7.**
- (a) Describe the morphology of trilobites with the help of neatly labelled diagrams. Comment on their geological history and stratigraphic importance. 15
 - (b) Explain the term Gondwana and its classification. Add notes on its sedimentation and palaeoclimate. 10
 - (c) Describe the utility of drainage basin morphometric indices in evaluating the tectonic impact in fluvial geomorphology. 15

- Q8.**
- (a) Elucidate the important physical properties of rocks tested for different civil engineering uses. 15
 - (b) Describe the important groups of microfossils, their composition and applications. 10
 - (c) Discuss the Palaeozoic sequence of Kumaun-Garhwal Himalaya and its fossil contents. 15

