

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 : 8×5=40**
- (a) Discuss the characteristics and properties of the lithosphere and the asthenosphere. 8
 - (b) Describe the origin of Karst topography. 8
 - (c) Write briefly on the Global Positioning System (GPS). 8
 - (d) What is the significance of equal area projection in solving structural geology problems ? 8
 - (e) Enumerate the strain markers in deformed rocks, with the help of neat sketches. 8
- Q2.**
- (a) With the help of neat diagrams, discuss different types of plate boundaries and enumerate their characteristic features. 15
 - (b) Highlight the advantages and limitations of remote sensing studies with respect to conventional geological field work. 10
 - (c) Describe the different types of breaks in stratigraphic records and their identification in the field. 15
- Q3.**
- (a) Briefly enumerate the principles of radiometric dating using U – Pb isotopes. 15
 - (b) Discuss how lithology controls topography. 10
 - (c) What is thrust fault ? Explain the mechanism of development of thrust fault with neat sketches. 15
- Q4.**
- (a) Elucidate the present status of Continental Drift in light of the geological and geophysical evidences. 15
 - (b) Compare the geomorphic features along the Eastern and Western Coasts of India. 15
 - (c) What is recrystallisation of minerals ? How is it related to deformation ? Explain with neat sketches. 10

SECTION B

- Q5. Answer the following within 150 words each :** **8×5=40**
- (a) Explain in brief the manner of preservation of traces of animals. 8
 - (b) In the context of Dollo's Law, discuss the different patterns of evolution observed in fossils. 8
 - (c) Describe the depositional environments prevailing during the deposition of the Paleogene belt of Sirmur Group of Himachal Pradesh. 8
 - (d) Describe the different techniques used to date groundwater. 8
 - (e) Enumerate the methods of groundwater exploration and development. 8
- Q6.**
- (a) Describe the lithostratigraphic succession of the Siwalik Group and comment on the paleoclimatic regime that prevailed during its deposition. 15
 - (b) Draw neat labelled sketches to depict the evolution of toes in Equidae. 10
 - (c) Describe various groundwater recharge structures with the help of neat diagrams. 15
- Q7.**
- (a) With the help of neat diagrams, depict the evolutionary trends in Proboscideans. 15
 - (b) Discuss the tectonic evolution of the Aravalli Craton. 15
 - (c) Describe the various groundwater quality criteria prescribed for drinking, agriculture and industrial use. 10
- Q8.**
- (a) The Permian – Triassic boundary represents a phase of mass extinction in the Earth's history. Discuss the Permian – Triassic boundary problem in stratigraphy. 15
 - (b) Describe the evolutionary trends in the eyes of trilobites. Illustrate your answer with suitable sketches. 15
 - (c) Discuss in detail the geotechnical parameters used for selection of tunnel sites. 10

