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.

Answers must be written in ENGLISH only.

Neat sketches may be drawn, wherever required.
SECTION A

Q1. Write explanatory notes within 150 words each, on the following: 8×5=40

(a) Protoplanetary hypothesis and its relationship to the Solar Nebula 8
(b) Geomorphic features along the eastern coast of India 8
(c) Salient characters of Geostationary and Polar orbiting satellites 8
(d) Classification of folds on the basis of orientation of axial plane 8
(e) Petrofabric analysis 8

Q2. (a) Explain the geological and palaeontological evidences of continental drift and comment on the mechanism of plate separation and collision. 15
(b) Using case studies, explain the application of geomorphology in mineral prospecting. 15
(c) Describe unconformities and their types, and give the various criteria to distinguish them from faults. 10

Q3. (a) Discuss the evidences of seafloor spreading and explain with illustrative diagrams, how earthquakes and subduction processes are related to each other. 15
(b) Describe the components and working principles of (i) Cross-track scanners, and (ii) RISAT. 15
(c) Enumerate the tools and equipment required to undertake geological mapping. Explain the importance of geological mapping. 10

Q4. (a) With the help of a case study, describe the methodology for using satellite imagery and GIS to identify potential zones of groundwater. 15
(b) How are stress and strain related to each other? Explain the stress – strain curves in terms of brittle, ductile and viscous materials. 15
(c) Discuss the internal structure of the Earth and comment on S and P-waves shadow zones with suitable diagrams. 10
SECTION B

Q5. Write explanatory notes within 150 words each, on the following: 8x5=40

(a) Mineral-walled microfossils and their applications in stratigraphic correlation 8
(b) Chronological order of volcanic events of the Indian Plate, and explanation of causes and manner of Deccan volcanism 8
(c) Ghyben-Herzberg relationship 8
(d) Palaeogeographic reconstruction of India during Gondwana times, using suitable diagrams 8
(e) Causes, effects and mitigation measures of concrete cancer 8

Q6. (a) Define Lithostratigraphy and comment on the criteria for lithostratigraphic classification and description of various rank terms. 15
(b) Briefly describe organic-walled microfossils. Discuss their applications in petroleum exploration. 15
(c) Describe the geological considerations for designing and constructing earthquake resistant structures. 10

Q7. (a) Elaborate the procedure for ‘Aquifer Performance Test’ and estimation of hydraulic properties of aquifers. 15
(b) Describe using diagrams, the morphology of Graptolites and comment on the significance of Graptolites in the evolution of vertebrates. 15
(c) Discuss the stratigraphy and distribution of marine depositional episodes in the Gondwana sequence of India. 10

Q8. (a) Discuss the geological history of Trilobites with specific description of the abundance, decline and extinction of the group through the Palaeozoic Era. 15
(b) Give a detailed account of the field and laboratory tests carried out to determine the engineering properties of rocks. 15
(c) Tabulate the Palaeozoic stratigraphic successions and their equivalents in Spiti, Kashmir and Kumaon basins of the Himalayas. 10