

1006527

A-GSE-P-HMA

GEOLOGY Paper I

Time Allowed : Three Hours

Maximum Marks : 200

INSTRUCTIONS

Please read each of the following instructions carefully before attempting the questions :

*There are ELEVEN questions divided under 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 & F.*

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

Symbols, abbreviations and notations have their usual standard meanings. All parts and sub-parts of a question are to be attempted together in the answer book.

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 answer book must be clearly struck off.

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

Neat sketches are to be drawn to illustrate answers, wherever required.

Wherever required, graphs/tables are to be drawn on the answer book itself.

SECTION A

(Compulsory Section)

1. Describe the following in about 100 words each, with brief sketches, wherever necessary : 10×5=50
- | | |
|--|---|
| (a) Levees and their role in flood control | 5 |
| (b) Differences between unsupervised and supervised classification | 5 |
| (c) Mechanism of parasitic folds | 5 |
| (d) Conditions leading to progressive deformation | 5 |
| (e) Concept of geodesy and crustal movement | 5 |
| (f) Gravity anomaly of mid-oceanic ridges | 5 |
| (g) Sargur Schist Belt | 5 |
| (h) Concurrent Range Zone | 5 |
| (i) Rajahmundry Formation | 5 |
| (j) Derived fossils | 5 |

SECTION B

(Attempt any ONE question)

2. (a) Compare the morphology of the landforms produced by glaciers and rivers. 15
- (b) Explain the term "Spectral reflectance" and describe its significance. Also, give a detailed account of the spectra of various rocks, vegetation, soil and water. 15
3. (a) Explain Davis cycle of erosion and landscape development. 10
- (b) Explain the causes and effects of variation of scale in aerial photographs. 10
- (c) Give an account of the types of lineaments and the role of remote sensing in mapping them. 10

SECTION C

(Attempt any ONE question)

4. (a) Discuss the mechanism of stress and strain in elastic and plastic deformation. 15
- (b) Discuss in detail the time relationship between crystallization and deformation of mineral grains. 15
5. (a) What are joints ? Explain the mechanism of joint formation and explain the type of joints with neat sketches and their significance. 10
- (b) Discuss the mechanism and significance of mylonite and cataclastic deformation. 10
- (c) What are the stereographic projections ? Explain the use of cyclographic stereographic projection to analyse stress and strain in rocks. 10

SECTION D

(Attempt any ONE question)

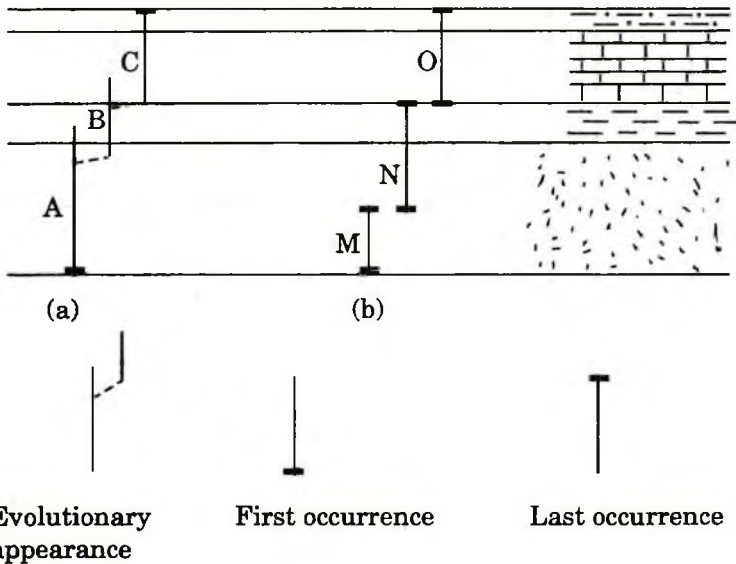
6. (a) Describe in detail the thickness of various layers of the Earth's interior, their composition and physical properties with neat sketches. 15
- (b) Explain the geological features and accretionary wedges of the lithosphere and asthenosphere with a neat sketch. 15
7. (a) Describe the seismic belts and seismic zones of the Indian Subcontinent. 10
- (b) Describe paleomagnetism and its application for determining paleoposition of India. 10
- (c) Discuss the theory and concept of plate tectonics with neat sketches. 10

SECTION E

(Attempt any ONE question)

8. (a) "Late Cretaceous was a period of varied facies in the Indian Subcontinent." Discuss the statement giving examples. 15

- (b) In a stratigraphic sequence, evolutionary lineage of species A, B and C (a) and ranges of M, N and O (b) are shown. Divide the sequence into biostratigraphic zones based on both (a) and (b). Which of the zones should be preferred for correlation and why? 15



9. (a) Give a broad classification of Siwalik Group in tabular form and mention the characteristic fossils in each division. 10
- (b) Briefly describing the lithologic succession of Bagh Beds, link the stratigraphic sequence with the episodes of marine transgression-regression. 10
- (c) Name the areas in Peninsular India affected by Permian marine transgression, briefly describing the lithology and fossil content. 10

SECTION F

(Attempt any ONE question)

10. (a) Discuss, with examples, how microfossils are used as tracers of deep-sea currents. 15
- (b) Discuss the evolutionary changes that took place in facial sutures and glabella of trilobites. 15
11. (a) Describe the method of separation of foraminifera from soft shale or mudstone. 10
- (b) What is pallial sinus in a bivalve ? Discuss the habitat of bivalves having pallial sinus. 10
- (c) What is dimorphism in foraminifera ? Write the morphological difference in the foraminiferal forms which originate due to dimorphism. 10