

Total No. of Printed Pages—8

HS/XII/Sc/G1/24

2 0 2 4

GEOLOGY

(Theory)

Full Marks : 70

Time : 3 hours

The figures in the margin indicate full marks for the questions

General Instructions :

- (i) Write all the answers in the Answer Script.
- (ii) Attempt Part—A (Objective Questions) serially.
- (iii) Attempt all parts of a question together at one place.

(PART : A—OBJECTIVE)

(Marks : 35)

- 1.** Choose and write the correct answer of any six of the following : 1×6=6

(a) Very thin rock layers are called

- (i) bed
- (ii) strata
- (iii) laminae

(2)

- (b) The term 'apical angle' is associated with
- (i) Lamellibranch
 - (ii) Gastropod
 - (iii) Cephalopod
- (c) The correct sequence of the following three formations from older to younger is
- (i) Barail, Surma, Tipam
 - (ii) Surma, Tipam, Barail
 - (iii) Surma, Barail, Tipam
- (d) Diamond, platinum, magnetite and chromite deposits are associated with
- (i) magmatic processes
 - (ii) sedimentary processes
 - (iii) metamorphic processes
- (e) The rocks on the sides of a dam constitute its
- (i) foundation
 - (ii) abutment
 - (iii) reservoir
- (f) Trilobite fossils in India are found in the
- (i) Vindhyan Supergroup
 - (ii) Paleozoic of Spiti
 - (iii) Tertiaries of Assam

(3)

- (g) Lamellibranchs are generally
- (i) free-swimming
 - (ii) bottom dwelling in the shallow seas
 - (iii) bottom dwelling in the deep seas
- (h) An example of an argillaceous rock is
- (i) sandstone
 - (ii) fine sandstone
 - (iii) mudstone

2. State whether the following statements are 'True' or 'False' (any six) : 1×6=6

- (a) Bedding planes must dip upstream under a dam to make it stable.
- (b) The impressions left by adductor muscles on the inner side of lamellibranchs are called ligaments.
- (c) The most common sedimentary structure is bedding.
- (d) The deposits developed as a result of mechanical concentration are called sedimentary economic deposits.
- (e) Cutting off the toe of a hillslope increases the risk of landslides.
- (f) The Khasi Group is of Cretaceous Age.
- (g) Petroleum traps are formed because such rocks are overlain by a porous and permeable rock called cap rocks.
- (h) It is better if seepage from a reservoir happens towards the upstream side.

(4)

3. Fill in the blanks (any six) :

1×6=6

- (a) Beach placers in Kerala contain ____ mineral deposits.
- (b) The Basal conglomerate and the ____ limestones together constitute the Basal formation of the Vindhyan Supergroup.
- (c) Dams are constructed over ____ river valleys.
- (d) The hinge area of a lamellibranch is labelled as lunule and ____.
- (e) The economic mineral deposits associated with the water table are called ____ deposits.
- (f) The chief cause of landslide is ____.
- (g) The equivalency of rocks of two different sections is called ____.
- (h) Coal deposits of North-East India are generally rich in the element ____.

4. Express each of the following lines in 1 (one) word (any five) :

1×5=5

- (a) A group of related formations and/or groups
- (b) Wavy features in rocks
- (c) The study of ancient life-forms, specifically plants
- (d) Mineral deposits formed at the same time as the enclosing rock
- (e) An opening in a dam lets the excess water in the reservoir flow out
- (f) The fossil leaves an imprint on the enclosing rock

(5)

5. Match Column—A with Column—B and write the corresponding numbers : 1×6=6

Column—A

Column—B

- | | |
|------------------|------------------------------|
| (a) Cross-beds | (i) Pore-fluid pressure |
| (b) Kopili shale | (ii) Nummulites |
| (c) Dharwar | (iii) Last and largest |
| (d) Landslides | (iv) Wavy features |
| (e) Body chamber | (v) Trilobites |
| (f) Haimanta | (vi) First and largest |
| | (vii) Good drainage of water |
| | (viii) Iron ore deposits |
| | (ix) Forest |

6. Write on the following within 1 (one) or 2 (two) line(s) (any six) : 1×6=6

- (a) Lithostratigraphy
- (b) Mitigation
- (c) Disintegration
- (d) Umbo
- (e) Primary mineral deposits
- (f) Porosity
- (g) Disaster
- (h) Suture

(6)

(PART : B—DESCRIPTIVE)

(Marks : 35)

Answer **five** questions, selecting **one** from each Group

GROUP—A

(**Sedimentology**)

7. State the four modes of sediment transport. How do non-clastic rocks form? Write an explanatory note on diagenesis. 2+2+3=7
8. Write short notes on any *two* of the following : 3½×2=7
- (a) Load casts
 - (b) Shape of grains
 - (c) Rudaceous rocks
9. Give a classification of sedimentary environments of deposition, including the main sub-environments. Write notes on any two of the sub-environments. 2+5=7

GROUP—B

(**Paleontology**)

10. Outline the morphology of a typical cephalopod shell with a neat labelled sketch. 7
11. Write short notes on any *two* of the following : 3½×2=7
- (a) Dentition in lamellibranchs

(7)

(b) Difference between brachiopod and lamellibranch shell

(c) Types of sutures in cephalopods

12. Write a brief note on the scope and uses of paleontology. 7

GROUP—C

(**Stratigraphy**)

13. Outline the lithostratigraphy of Meghalaya. 7

14. Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$

(a) Haimanta Supergroup

(b) Tipam Group

(c) Paleontologic Correlation

15. Explain the procedures for correlation of rocks in stratigraphy. 7

GROUP—D

(**Energy and Mineral Resources**)

16. Write an account of the origin of coal. 7

17. Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$

(a) Late magmatic deposits

(b) Placer deposits

(c) Importance of mineral resources

18. Write brief notes on the ore minerals, mode of occurrence and distribution of iron ore deposits in India. 7

(8)

GROUP—E

**(Engineering Geology, Groundwater, Environment
and Disaster Studies)**

19. How do bedding planes of stratified rock affect the stability of a dam? Draw neat sketches to supplement your answer. 7

20. Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$

(a) Porosity versus Permeability

(b) Impact of underground mining

(c) Effects of earthquake

21. Write an essay on the hydrologic cycle. 7
