

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

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- (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

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- (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.

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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

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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

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( 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

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(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

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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

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