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HS/XII/Sc/G1/23

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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) The term 'fluvial' is associated with

- (i) sea
- (ii) river
- (iii) glacier

(b) Arenaceous materials range in size from

- (i) 2–1/16 mm
- (ii) 1–1/16 mm
- (iii) 1–2 mm

- (c) The low quality coal is
- (i) peat
 - (ii) bituminous
 - (iii) anthracite
- (d) The upper surface of groundwater is called
- (i) vadose water
 - (ii) water table
 - (iii) capillary water
- (e) The term 'epigenetic' means
- (i) earlier than
 - (ii) at the same time
 - (iii) later than
- (f) Muth quartzites are observed in
- (i) Vindhyan rocks of Sone Valley
 - (ii) Cretaceous rocks of Meghalaya
 - (iii) Paleozoic rocks of Spiti
- (g) Chalcopyrite is an ore of
- (i) Cu
 - (ii) Pb
 - (iii) both Cu and Pb
- (h) Choose the odd one out from the following.
- (i) Dharwars of Karnataka
 - (ii) Vindhyan of Sone Valley
 - (iii) Tertiary of Assam

(3)

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

- (a) Tipams are younger than the Surmas.
- (b) Lithification promotes diagenesis.
- (c) An unconformity separates the Dharwar rocks from overlying igneous intrusives.
- (d) Minerals with valuable metals in them are called tenor.
- (e) Dams must be constructed over rocks that dip upstream.
- (f) Planktonic organisms live on the sea bottom.
- (g) Rains promote landslides.
- (h) The Khasi group is of Tertiary Age.

3. Fill in the blanks (any six) : 1×6=6

- (a) The Tertiaries of North-East are rich in petroleum and ____.
- (b) Closepet granite is observed within the ____ supergroup.

(4)

- (c) Petroleum is of ____ origin.
- (d) Further movement of petroleum movement is stopped by ____ rocks.
- (e) The angle of repose for a stable slope is less than ____°.
- (f) ____ is the ore of aluminium.
- (g) Radiometric dating methods help in ____ of rocks of two different areas.
- (h) The natural movement of water in its various forms around the earth is called the ____.

4. Express each of the following lines in 1 (one) word (any five) : 1×5=5

- (a) Wavy structures on the top of sediments
- (b) Water-bearing formation
- (c) Space where organisms live
- (d) An association of closely related groups in a stratigraphic succession
- (e) Hollows in rocks after the entire fossil is taken away in solution
- (f) Sedimentary rocks of physical/mechanical origin

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

<i>Column—A</i>	<i>Column—B</i>
(a) Suture	(i) Early magmatic deposits
(b) Oxidation and supergene deposits	(ii) Gastropod
(c) Mechanical concentration	(iii) Spiti
(d) Meekoceras zone	(iv) Assam
(e) Uplift pressure	(v) Dam
(f) Thin layers	(vi) Placer deposits
	(vii) Lamination
	(viii) Water table
	(ix) Cephalopod

6. Write on the following 1 (one) or 2 (two) line(s) (any six) : $1 \times 6 = 6$

- (a) Bed
- (b) Petrification
- (c) Transitional environment
- (d) Umbo
- (e) Correlation
- (f) Early magmatic deposits
- (g) Dihing group
- (h) Cap rock

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(PART : B—DESCRIPTIVE)

(Marks : 35)

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

GROUP—A

(**Sedimentology**)

7. Write brief notes on the various processes of disintegration and decomposition of rocks. 7
8. Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$
- (a) Current bedding and graded bedding
 - (b) Marine environment
 - (c) Chemical sedimentary structures
9. Explain elaborately the concept of sediment grain size and grain shape as textural parameters. 7

GROUP—B

(**Paleontology**)

10. Outline the morphology of a typical gastropod shell with a neat labelled sketch. $6+1=7$
11. Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$
- (a) Dentition in Lamellibranchs
 - (b) Gondwana plant fossils
 - (c) Fossils and paleogeography and paleoclimate
12. Define fossils. Briefly explain the different modes of preservation of organisms. $1+6=7$

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GROUP—C

(**Stratigraphy**)

13. Write the lithostratigraphy of the Vindhyan supergroup of Sone valley in tabular form with very brief petrographic notes on each unit. 7
14. Write short notes on any *two* of the following : $3\frac{1}{2}\times 2=7$
- (a) Tipam group
 - (b) Jaintia group
 - (c) Lower Dharwars
15. Write notes on the fossils found in the Triassic rocks of Spiti. 7

GROUP—D

(**Energy and Mineral Resources**)

16. Explain the different processes of formation of economic mineral deposits by sedimentary processes. 7
17. Write short notes on any *two* of the following : $3\frac{1}{2}\times 2=7$
- (a) Types of coal
 - (b) Oilfields of NE India
 - (c) Genetic classification of economic mineral deposits
18. Explain the processes of migration and accumulation of petroleum. 7

(8)

GROUP—E

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

- 19.** Explain the environmental impacts of opencast and underground mining. 7
- 20.** Write short notes on any *two* of the following : $3\frac{1}{2} \times 2 = 7$
- (a) Behaviour of different rocks as dam foundation
 - (b) Porosity and permeability
 - (c) Geological considerations in dam construction
- 21.** List and explain the remedial measures for mitigation of landslides. 7
