Ref. No.: Ex/CE/5/GEO/T/103/2024

B. CIVIL ENGG. (EVENING) 1st YEAR 1st SEM. EXAMINATION 2024

Subject: ENGINEERING GEOLOGY. **Time: 3 Hours.** **Full Marks: 100**

Answer Question No. 1 and any Five (5) from the rest: **{20+ (5 x 16)} = 100**

1. **Write "True" or "False" :** **1 x 20 = 20**

i) Shale is a sedimentary rock.
ii) P-wave can only pass through the solid medium.
iii) Syn-form is the fold which closes downward.
iv) Calcite is harder than Gypsum.
v) 7-Fold axis of symmetry exists in nature.
vi) Net-slip is measured along dip direction in reverse fault.
vii) The core-mantle boundary is demarcated by "Moho-discontinuity".
viii) Petrology deals with study of petroleum.
ix) 1-Fold symmetry is equivalent to none-symmetry.
x) Brass is harder than Glass.
xi) Sill is a discordant structure of intrusive sedimentary rock.
xii) Trigonal System consists of three crystallographic axes.
xiii) Cleavage and fracture planes are equivalent in rock.
xiv) Basalt is a sedimentary rock.
xv) Strike is the angle between inclined and horizontal planes.
xvi) Love waves propagate through the surface of earth.
xvii) Quartz naturally shows at least one set of perfect cleavage.
xviii) Dip is the angle between inclined and horizontal planes.
xix) Effluent rivers recharge the surface water.
xx) Lustre is colour of dust of any mineral.

2. a) Describe with neat sketch the Internal Structure of the Earth using Depth vs. Velocity diagram of seismic waves. 10

b) Discuss about the characters of different earthquake waves. 6

3. a) Discuss the different Optical properties by which you can identify minerals in nature. 8

b) Define mineral and crystal. Describe the Crystal Systems on the basis of their axial ratios and inter-axial angle. 8

4. a) Attempt a Classification of Fold on the Basis of Dip isogons and Orthogonal thickness. Draw neat sketches of these folds. 8

b) Define Normal Fault. How do you identify a faulted structure in vertical rock section? Draw neat sketches of Dip-slip fault. 8

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5. a) What are Dam and Reservoir. What are the Geological factors that should be taken care of during construction of a stable dam? Explain with diagram. 10

   b) Discuss with neat sketches about the orientation of basement rocks of a safe and suitable Dam. 6

6. a) Define rock. What are the different types of rock found in nature? How the metamorphic rocks are formed in nature? 10

   b) What is Dyke? What is the basic difference between Sill and Dyke? Define Sedimentary Rock with example. 6

7. a) Discuss the problem of construction of a Tunnel across any faulted and foliated sub-surface zone. Explain with suitable diagram. 8

   b) What are geological controls that should be taken care of during construction of a Bridge across any natural depression? Explain with suitable diagram. 8

8. a) Discuss the problem of construction of a Road along Hill-slope. How will you protect the Hill-cut Road which is constructed on foliated or sheared zone? 10

   b) Define Ground Water Table. How will you protect the river bank from erosion? 6

9. **Write short notes: (any Four)** 4 x 4 = 16

   a) Crystallographic Axes,,
   b) Axis of Symmetry,
   c) Becke Test,
   d) Saline Water Intrusion,
   e) Moh's Scale of Hardness,
   f) Symmetry Elements.