

Ex/SC/GEOL/UG/CORE/TH/14/2022

**B. Sc. (GEOLOGICAL SCIENCES) EXAMINATION, 2022**

( 3rd Year, 2nd Semester )

**ENGINEERING GEOLOGY & SOLID EARTH GEOPHYSICS**

**PAPER – CORE/TH/14**

Time : Two hours

Full Marks : 40

(Use a separate Answer script for each Part)

**PART I ( 20 Marks)**

**(Solid Earth Geophysics)**

1. Answer *any five (5)* questions : 4×5=20
  - a) Describe the Internal Structure of the Earth on the basics of velocity of seismic waves. 4
  - b) Describe the characters of different earthquake waves. 4
  - c) What is the Benioff zone? Explain the Elastic Rebound Theory of earthquake? 2+2=4
  - d) Describe the Self-exciting magneto-hydrodynamic model with a suitable sketch. 4
  - e) Explain the Geomagnetic Field on the basis of both GAD and Inclined Axial Dipole Models. 4
  - f) How do you determine the different type magnetic minerals by High Field Thermomagnetic Study? 4
  - g) Short notes on (*any Two*) : 2×2=4

[ Turn over

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- i) P-wave Shadow Zone,
- ii) Hysteresis Study,
- iii) Rock magnetism.

**PART II ( 20 Marks)**

**(Engineering Geology)**

2. Answer *any 5* questions : 4×5=20
- a) Derive the expression for normal ( $\sigma$ ) and shear ( $\tau$ ) stress on an inclined plane making angle  $\theta$  with the direction of minimum principal stress in two dimensions.
  - b) Write briefly the purposes of site characterization for an engineering project? Do you think that the frequency of landslide in hilly regions becomes extremely high in monsoon as compare to winter season? Justify your answer.
  - c) What are the major differences in the nature of destructions due to propagation of Love and Rayleigh waves? Explain your answer with suitable sketches. Which is the faster surface-wave generated during earthquake?
  - d) How is the size of an earthquake measured? What is the basis of Richer scale of measuring magnitude of

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- earthquake? Write the relation of magnitude of earthquake with the amount of slip along the fracture.
- e) What major geological factors should a geologist consider in construction of Tunnel? Do you think that the tunnel passing through the core of an antiform is more stable than through the core of a synform? Justify your answer.
  - f) What parameters are considered in Rock Mass Rating (RMR) system in engineering geological project? Write the specific ranges of RMR value for the quality of rock mass.