

Ex/SC/GEOL/UG/DSE/TH/02/A/2025

B.Sc. GEOLOGICAL SCIENCE EXAMINATION, 2025

(3rd Year, 1st Semester)

GEOLOGICAL SCIENCE

PAPER : DSE/TH/2a

(Introduction to Geophysics)

Time : Two Hours

Full Marks : 40

Use separate Answer Scripts for each Part.

PART—I (20 Marks)

Answer ***any four*** questions :

5×4=20

1. With the help of suitable sketches, explain the Geoid, Reference Ellipsoid, Mean Sea level and topographic surface of the Earth. Do you think that gravity along the Geoid is constant? Justify your answer.
2. Derive the mathematical expression of Gravitational potential (U). What type of gravity anomaly is usually associated with convergent plate boundaries? Justify your answer.
3. Derive the potential differences of DC Resistivity survey in terms of current (I), resistivity (ρ) and the distances among the current and potential electrodes. Also derive the apparent resistivity (ρ_a) for Wenner, Schlumberger and Dipole-Dipole methods of resistivity survey.

GEOL-957

[Turn Over]

(2)

4. An assignment is given to study the groundwater condition of an alluvial plane and slip surfaces of a hill slope. What kind of geophysical surveys will you conduct? Justify your answer with sketches.
5. With the help of suitable diagrams, write briefly the reasons of four major types of corrections needed during gravity exploration method. Write the mathematical expression for each correction.
6. Why the 'terrain correction' is always positive regardless of whether the local topography consists of a mountain or a valley? Why is the 'Free-air correction' termed as 'free-air'?

PART—II (20 Marks)

Answer **any four** questions : 5×4=20

1. Describe a Proton Precession Magnetometer with a schematic diagram. 5
(CO3)
2. Discuss briefly the different types of geophysical methods. 5
(CO4)
3. How do you ascertain the presence of a mineral deposit with a considerable magnetic intensity covered by sediments using a magnetic method? 5
(CO4)

GEOL-957

[Continued]

(3)

4. Describe a Saturation Circuit Magnetometer with a schematic diagram. 5
(CO3)
5. Describe the plan of Flight Pattern and Height for Aeromagnetic Survey. 5
(CO3)
6. Write short notes on (**any two**) : 2×5=10
(i) Magnetic Anomaly
(ii) Seismic Methods
(iii) Mechanical Instruments (CO2)

★ ★ ★

GEOL-957

XX24(113)—70