

B. SC. GEOLOGICAL SCIENCE EXAMINATION, 2022

(3rd Year, 1st Semester)

INTRODUCTION TO GEOPHYSICS

PAPER – DSE/TH/2A

Time : Two hours

Full Marks : 40

(Use separate answer script for each group)

PART- 1 (20 Marks)

Attempt all questions.

4 x 5

1. Derive the mathematical expression of Gravitation potential. What do you mean by “Equipotential Surface”?

OR

With the help of suitable sketches explain the Equipotential surface, Reference Ellipsoid, Mean Sea Level and topographic surface of the Earth. Also write their relationship.

2. Do you think that the gravity along Geoid is constant? Justify your answer.

OR

Why is the ‘Geoid’ not uniform on the earth’s surface? What is the reason of negative geoid anomaly in subducted lithosphere.

3. With the help of diagrams show the dispositions of electrodes and apparent resistivities for Schlumberger, Wenner, and Dipole-Dipole spreading of resistivity survey.

OR

An assignment is given to study the ground water condition and slip surface of a hill slope. What kind of geophysical surveys will you conduct? Justify your answer.

4. With the help of suitable sketches describe briefly the four major types of corrections needed during gravity exploration method. Also write the mathematical expression for each correction.

OR

Why is the ‘terrain correction’ 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’?

5. What are the major advantages of active geophysical method? Name three most common active geophysical methods.

OR

Derive the Gravitation field due to a buried spherical body of radius ‘ a ’ and at depth ‘ z ’ from the earth surface.

[Turn over

[2]

PART – II (20 Marks)

2. Answer any four (4) questions: 4 X 5 = 20
- a) Discuss briefly about the different branches of geophysics by which we can explore natural resources. 5
 - b) Briefly describe the mechanisms for induced magnetization of rocks. 5
 - c) Describe a Fluxgate Magnetometer with a schematic diagram. 5
 - d) Write Short Notes (any two): 2.5x2 = 5
 - i) Inclined Axial Dipole,
 - ii) Ferromagnetism,
 - iii) Magnetic Field Force.
 - e) How will you determine a buried dyke with a considerable magnetic intensity covered by sedimentary rocks using magnetic method? 5
 - f) Describe the function of a Proton Precession Magnetometer with a schematic diagram. 5
 - g) What is stacked profile? Briefly discuss about the representation of geophysical data. 5
 - h) Discuss about the qualitative and quantitative interpretations of geophysical data. 5