B. Sc. GEOLOGICAL SCIENCE EXAMINATION, 2024

(3rd Year, 1st Semester)

INTRODUCTION TO GEOPHYSICS

PAPER : DSE 2A

Time : *Two Hours* *Full Marks* : 40

(*Use a separate Answer script for each Part*)

PART—I (20 Marks)

Answer *any four* questions from the following : 5×4=20

1. What are the major advantages of passive geophysical method? Name three most common passive methods of geophysical survey. Write the intensive properties of these methods. 2+2+1=5

2. With the help of suitable sketches, explain the geoid, mean sea level and topographic surface of the Earth. What do you mean by ellipsoid and reference ellipsoid in gravity survey? Writ the relation between geoid height, ellipsoidal height and orthometric height. 1+2+2=5

3. State the mathematical relation between gravitation potential (U) and acceleration due to gravity (g). What is Bouger gravity anomaly? Do you think the 'terrain correction' is always required for gravity survey? 1+2+2=5

4. What type of gravity anomaly is usually associated with hot mantle plume? Explain your answer. Why is the 'Free-air correction' termed as 'free-air'? 3+2=5

5. Derive separately the mathematical expressions of apparent resistivity for the Wenner, Schlumberger and Dipole-Dipole electrode spreading. Also, write the most suitable use of the above three resistivity surveys. 3½+1½=5

6. Derive the gravitation field due to a buried spherical body of radius '*a*' and at depth '*z*' from the Earth's surface. 5

PART—II (20 Marks)

Answer *any four* questions from the following : 5×4=20

1. How to collect the oriented block samples from *in-situ* exposures for different magnetic experiments? 5

2. Describe a fluxgate magnetometer with a schematic diagram. 5

3. Write short notes on any **two** : 2½×2=5

(a) Sun Compass

(b) Mechanical Instruments

(c) Magnetic Susceptibility

4. How will you determine a buried dyke with a considerable magnetic intensity covered by sediments using magnetic method? 5

5. Describe Proton Precession Magnetometer with a schematic diagram. 5

6. Discuss briefly about the different types of geophysical processes. 5

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