B. Sc. (Geological Sciences) Examination, 2022

(3rd Year, 2nd Semester)

Exploration Geology

Paper – DSE 4(a)

Time : Two hours   Full Marks : 40

(Use a separate Answer script for each Part)

PART I (20 Marks)

(Answer any four questions)

1. a) Shear zones are often found to be potential zones of ore mineralization. With the help of a suitable sketch explain how they facilitate the ore mineralization process.

    b) State the principal types of deformation bands and their effects on rock permeability.   3+2=5

2. a) Using examples show the relevance of geo-botanical survey in mineral exploration.

    b) What are the different scales of geological mapping used in exploration work?   3+2=5

3. a) Explain the occurrence of structural traps in a thurst system. Use a sketch to form you answer.

    b) With the help of a diagram show the potential location of hydrocarbon accumulation around a salt dome.

          3+2=5

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4. a) Explain the term: Geodetic Reference System (GRS) (80).

   b) Derive the equation to show the maximum gravity anomaly due to a spherical ore body as a function of its size and depth of occurrence.   2+3=5

5. Find out the gravity due to an infinitely extended horizontal cylindrical body at a depth of z, assuming m as its mass per unit length. Use other standard physical variables required for this theoretical derivation.   5

6. a) Derive the relation between Poisson's ratio (v) V_p and V_s stand for compressional and shear wave speeds.

   b) With the help of graphical plots show the possible variations of v with porosity of rocks.   3+2=5

PART II (20 Marks)

Answer any 5 questions   *(5 × 4 = 20)*

7. Write briefly about the significant mineralogical and geochemical characteristics of kimberlite-group of rocks. Write a short-note on origin of kiberlite.

8. Explain the origin of diamond. Some kimberlites contain diamond whereas others do not - Explain with apprpirate P-T diagrams.

9. Write the equilibrium expression of Zn^{2+} partitioning into pyroxene and silicate melt. How does value of the

distribution coefficient of this expression help to understand the mobility of Zn?

10. Write short notes on (a) geochemical dispersion and geochemical mobility of elements. What is a 'pathfinder element' of a particular ore type? What are the most widely used pathfinders in geochemical exploration?

11. 'Recognition of geochemical patterns related to ore is the aim and function of geochemical exploration' - Explain with examples. What is 'normal background' value in a geochemical pattern?

12. What is 'significant anomalies' in geochemical patterns? An ore deposit itself is a geochemical anomaly' - Explain. What are regional threshold and local threshold in a geochemical pattern?