

B. SC. GEOLOGICAL SCIENCES EXAMINATION, 2023

(3rd Year, 2nd Semester)

EXPLORATION GEOLOGY

PAPER – CORE/TH/04A

Time : Two hours

Full Marks : 40

(Use a separate Answer script for each Part)

PART – I (Marks: 20)

Answer *any four* questions.

1. a) With examples explain important criteria adopted to initiate an exploration activity.
b) State the fundamental working principles that are systematically exercised in an exploration study.
3+2=5
2. a) Describe the characteristic features of a gossan and their importance in mineral exploration.
b) Mineral deposits are often found to localize preferentially along shear zones. Explain this statement.
3+2=5
3. a) What are the scales of mapping in regional, district and deposit scale surveys?
b) List systematically the major deposit scale activities undertaken while exploring an economic resource.
2+3=5

[Turn over

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4. a) Derive an equation to show the maximum gravity anomaly due to a spherical ore body as a function of its size and depth of occurrence.
- b) Show that the gravity anomaly for a sheet-like cylindrical body is independent to the vertical depth of its occurrence. $2+3=5$
5. a) Explain the theoretical principles of Free-air and Bouguer corrections.
- b) With the help of sketches show the basic difference between the Wenner and Schlumberger configurations of electrodes employed in resistivity surveys. $3+2=5$
6. a) Using a schematic diagram show the formation of a roll-over anticlinal structure and its role in hydrocarbon accumulation.
- b) Draw a salt dome structure indicating the probable locations of petroleum reservoirs in its neighbourhood. $3+2=5$

PART – II (Marks: 20)

Answer *all* questions. $2 \times 10 = 20$

1. a) What is secondary dispersion? What is a pathfinder element? Give examples. What is a geochemical anomaly? “An ore deposit itself is a geochemical

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anomaly” – Explain. Why are normal background values more important than the average values of the elements in geochemical distribution plots?

$2+2+2+2+2=10$

2. a) Write briefly about the petrology and geochemistry of common host rocks for diamonds.
- b) Describe a kimberlite pipe considering both old and new terminology.
- c) What are the major types of crystals commonly found in kimberlite? $5+3+2=10$

OR

3. a) Write in detail about the origin of diamonds.
- b) Why does Sub-Continental Lithospheric Mantle (SCLM) important for the diamond endowment?
- c) “Some kimberlite contains diamond whereas others do not” – Explain. $4+3+3=10$