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3 (Sem-5/CBCS) GLG HE 1

2023

GEOLOGY

(Honours Elective)

Paper : GLG-HE- 5016

(Exploration Geology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer all the questions.

1. Answer the following questions as directed :

I. Choose the correct answer for the following : $1 \times 5 = 5$

(a) The Bouguer anomaly obtained after applying all necessary corrections is due to-

(A) Topographic undulations above the datum

Contd.

(B) Increase in densities of crustal rocks with depth.

(C) Lateral density variations

(D) Vertical density contrast across Moho

(b) The leaching of silica and alkalis from a nepheline-syenite may leave behind a surface capping of

(A) Copper deposit

(B) Molybdenum deposit

(C) Hydrous aluminium oxide (bauxite)

(D) Lead zinc deposit

(c) Which of the following mineral deposit is generated usually in contact metamorphic aureoles?

(A) Chromite

(B) Banded iron formation

(C) Wollastonite

(D) Bauxite

(d) Hydrophone is used in

(A) Gravity survey

(B) Magnetic survey

(C) Seismic survey

(D) Resistivity survey

(e) In electromagnetic (EM) sounding, the depth of investigation _____ with increasing frequency

(A) increases

(B) decreases

(C) remains unchanged

(D) varies randomly

II. Fill in the blanks : $1 \times 2 = 2$

(A) More exact ground surveys use a _____ as a substitute for a compass.

(B) The physical property used in magnetic prospecting is _____.

2. Answer the following in brief : $2 \times 4 = 8$

(a) What is grab sampling?

(b) What are sample variance and standard deviation?

(c) What are the factors that control the size of the error in estimating the properties of a deposit from sample data?

(d) The Bauxite is of great industrial value. Why? What is the difference between bauxite and laterite?

3. Write short note on **any three** of the following : $3 \times 5 = 15$

(a) Stages of mineral exploration

(b) Types of data

(c) Structural control of ore localization

(d) Sillimanite is industrial mineral

(e) Use of median, mode and standard deviation in the analysis of geological samples

4. What are the operative physical property and measured parameters in gravity and seismic methods of geophysical exploration? Describe the gravity method of exploration with neat sketches. $3 + 7 = 10$

Or

What are path finders and indicator elements? What is the path finder in the uranium deposits of sandstone type? Describe the geochemical method of prospecting. $2 + 1 + 7 = 10$

Or

Write short notes on :

- (a) Principles of operation of diamond drilling
- (b) Litholog preparation from exploration borewell

5. What are nugget value and cutting factors in ore reserve estimation? What are the factors on which the selection of conventional estimation method depends? Describe the polygonal model of reserve estimation with suitable sketch.

2+2+6=10

Or

Give an account on : 5+5=10

- (a) Factors affecting reliability of reserve estimation
- (b) Application of statistics in error estimation

6. What are the *three* motions the drilling techniques essentially based on? What are the various types of drilling? Describe the percussion drilling in detail. 1+2+7=10