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**3 (Sem-5/CBCS) GLG HE 1**

**2024**

**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. Choose the correct answer for the following :

1×7=7

(i) The statistical method used in mineral resource estimation where extremely high assay grades are reduced to a predetermined maximum value to prevent overestimation of the average ore grade is called

- (a) Cutting factor
- (b) Tenor
- (c) Cut-off-grade
- (d) Mineable grade

*Contd.*



(ii) Which one is a pathfinder element of gold in geochemical prospecting ?

(a) Ba

(b) Be

(c) Sc

(d) As

(iii) The prime advantage of aeromagnetic survey of a geological terrain is

(a) High-resolution detection of magnetic field variations at great depths

(b) Rapid coverage of large and inaccessible areas at relatively low cost

(c) Direct measurement of magnetic mineral percentages in rocks

(d) Perfect elimination of diurnal magnetic variations

(iv) The amount of a particular element present in the parent rock which is not affected by dispersion or migration is known as

(a) Background value

(b) Threshold value

(c) Anomaly value

(d) Baseline value

(v) Gash veins are generally found in

(a) Parallel to bedding planes

(b) Compressional zones in shear belts

(c) Cross-cutting igneous intrusions

(d) Tensional zones in folded rocks



(vi) In ore reserve estimation, the process of extending known grade and thickness values to unknown points within the area bounded by sample points is called

- (a) Interpolation
- (b) Extrapolation
- (c) Grade capping
- (d) Resource blocking

(vii) The most reliable method for obtaining undisturbed samples and detailed geological information of an ore deposit at depth is

- (a) Reserve circulation drilling
- (b) Percussion drilling
- (c) Diamond core drilling
- (d) Rotary air blast drilling

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

- (a) Define muck sampling.

(b) Define standard deviation with reference to its importance in statistical analysis.

(c) What is the main advantage of Schlumberger array over Wenner configuration in electrical resistivity surveys ?

(d) Why is core drilling employed in mineral exploration ?

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

- (a) Geochemical dispersion
- (b) Pitting and trenching in geological exploration
- (c) Bulk density of ore and its determination
- (d) Pathfinder elements in geochemical prospecting

4. Answer the following question :  $10 \times 3 = 30$

- (a) What is the difference between mineral resource and mineral reserve ? Discuss the scheme of mineral resource classification recommended by the Geological Survey of India.  $2 + 8 = 10$



**Or**

(b) Describe the principle of self-potential (SP) method in electrical prospecting. For what kind of deposits this method is most effective ?  $8+2=10$

5. (a) Describe the various methods of ore reserve estimation. Discuss how errors are assessed and minimized in reserve calculations.  $7+3=10$

**Or**

(b) Write answer of the following questions briefly :  $5 \times 2 = 10$

(i) "Gossan is a significant surface signature in exploration of sulphide mineral deposits." Explain this with suitable examples.

(ii) Write briefly on the geometrical methods of ore reserve estimation and their limitations.

6. (a) Explain rotary drilling as a mineral exploration technique. Discuss its advantages and limitations in comparison to core drilling methods.

10

**Or**

(b) Write short notes on :  $5 \times 2 = 10$

(i) Principles of sampling and its methods

(ii) Bouguer gravity anomaly