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3 (Sem-5/CBCS) GLG HE 1

2022

## **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 from the following questions : **(any seven)**  $1 \times 7 = 7$

(a) The choice of technique to locate a certain mineral deposit depends upon

- (i) nature of the mineral
- (ii) nature of the surrounding rocks
- (iii) depth of the mineral deposit
- (iv) All of the above

Contd.

(b) The horizontal openings which are dug in mountainous terrain to explore ore bodies are called

- (i) pits
- (ii) trenches
- (iii) adits
- (iv) Shaft

(c) Gossan or cap rocks are good indicators of which type of the following deposits ?

- (i) Magmatic deposits
- (ii) Placer deposits
- (iii) Residual deposits
- (iv) Secondary sulphide deposits

(d) Which one of the following is the best host rock in contact metamorphic deposit ?

- (i) Feldspathic rocks
- (ii) Greywacke rocks
- (iii) Carbonate rocks
- (iv) Granite

(e) In channel sampling methods samples are cut

- (i) along the strike of mineralization
- (ii) across the strike of mineralization
- (iii) in selective parts of mineralization
- (iv) randomly along the strike

(f) Which type of clay is commonly used as a drilling mud ?

- (i) China clay
- (ii) Fuller's earth
- (iii) Bentonite clay
- (iv) Fire clay

(g) The common indicator elements of skarn deposit are

- (i) Cr-Fe
- (ii) Pt-Cr-Ni
- (iii) Mo-Zn-Cu
- (iv) Au-Ag



(h) Cable tool drill is a version of the

(i) hand drill

(ii) churn drill

(iii) empire drill

(iv) diamond drill

(i) Seismic methods are useful in determining

(i) subsurface rock disposition

(ii) subsurface structures

(iii) sedimentary basin geometry

(iv) All of the above

(j) Which one is the significant factor in gravity exploration ?

(i) Latitude

(ii) Elevation

(iii) Variation of density in the subsurface rocks

(iv) Earth tides

(k) Self potential method is most suitable for prospecting of

(i) carbonates

(ii) sulphide ores

(iii) ferruginous ore

(iv) None of the above

(l) Elements which are found in dispersion state generally have

(i) very large ionic radii

(ii) very small ionic radii

(iii) intermediate ionic radii

(iv) No such relation exists

2. Answer the following briefly : **(any four)**  
2×4=8

(a) How do trenching methods help in mineral exploration ?

(b) Explain the process of formation of ladder veins.

(c) Explain in which type of mineral deposits pitting sampling method is useful.



- (d) What is meant by porphyry type of ore deposit ?
- (e) What is metal zoning in skarn deposits ?
- (f) What is standard deviation and its uses in reserve evaluation ?
- (g) Explain the terms indicated and inferred mineral reserves.
- (h) What is the difference between cut-off grade and minable grade of ore.
3. Write short notes on **any three** of the following :  $5 \times 3 = 15$
- (a) Stages of mineral exploration
- (b) Seismic reflection principles
- (c) Application of self potential method in mineral exploration
- (d) Use of median and mode in the analysis of geological samples
- (e) Application of path finder elements in geochemical prospecting
- (f) Application of elemental dispersion in geochemical prospecting

- (g) Regular and irregular grid pattern in geological sampling
- (h) Litholog preparation from exploration bore well
4. Answer **any three** of the following questions :  $10 \times 3 = 30$
- (a) What is drilling ? What is the difference between core and noncore drilling ? Describe the drilling methods which are applied in petroleum exploration.  $1+2+7=10$
- (b) What is meant by sampling of ore deposit ? What are the factors on which correctness of samples depend ? Give an account on different methods of sampling with suitable sketches.  $1+2+7=10$
- (c) What is meant by geochemical anomaly ? What are background and threshold values ? What are the natural factors that influence the intensity, spread and size of a geochemical anomaly.  $2+3+5=10$
- (d) What is the difference between an ore and a proto ore ? Give an account on classification of mineral deposit with respect to process of formation.  $1+9=10$



(e) Write briefly on :  $5+5=10$

(i) Evaluation of sampling data

(ii) Methods of reserve estimation in tabular ore body

(f) What are the common causes of magnetic anomalies ? Why are the mafic and ultramafic rocks usually more magnetic than acid igneous rocks ? Describe the magnetic method of geophysical exploration with neat sketches.  $2+1+7=10$

(g) Write briefly on :  $5+5=10$

(i) Gravity prospecting

(ii) Factors affecting reliability of reserve estimation

(h) What is the principle of reserve estimation ? Describe the triangular geometric model of reserve estimation with suitable sketch.  $2+2+6=10$