

(4)

Ex./M.Sc.II/G-2/XII/6/2019

MASTER OF SCIENCE EXAMINATION, 2019

(2nd Year, 1st Semester)

APPLIED GEOLOGY

Geochemical Exploration, Drilling Methods,

Min. Benefic. & Mining

Paper : - XII

Time : Two hours

Full Marks : 50

Use a separate answer script for each group.

GROUP - A (10 marks)

(Geochemical Exploration)

- (b) What is disseminated ore ? Discuss the steps and types of mining processes to be applied in sequence for a deposit, where a gossan is successively underlain by supergene enrichment and deep seated vein. 1+4
- (c) What is 'box cut operation' ? How does 'stripping ratio' affect the life span of an open cast mine ? – Discuss in brief. 2+3
- (d) What is 'sublevel caving' ? Discuss the geological criteria for the 'caving mining method' used for an ore body. 2+3
- (e) What is overburden ratio ? How are the 'total production cost (C_p)' per unit volume of the pit limit and 'total operation cost (C_o)' of the pit limit related to one another ? 1+4
- (f) Explain the importance of 'isocpach map' in underground mining ? Discuss the significance of geohydrological information for underground and open pit mining ? 2+3

1. Answer any *two* questions : 2x5=10
- (a) What do you understand by dispersion halo ? Using necessary sketches briefly discuss the common mechanism of formation of primary dispersion halo in deep-seated environment. What is the significance of dispersion halo in geochemica exploration ? 1+3+1
- (b) Briefly discuss the sampling method and sample treatment in stream sediment survey. What are the advantages and disadvantages of stream sediment survey ?

— X —

(Turn over)

(2)

- (c) What is the fundamental difference between biogeochemical and geobotanical exploration ? Discuss the sampling methods for biogeochemical exploration. 2+3

GROUP - B (10 marks)

(Drilling Methods)

2. Answer any *two* questions : 2x5
- (a) Discuss the working principle of 'pneumatic hammer' ? What are the prime uses of the major types of percussion drills ?
- (b) What are the prime advantages of the wire-line drilling method ? Discuss how a deep fault zone may be treated during wire-line rotary drill. 2+3
- (c) Discuss the geological condition, where 'reich drilling' is generally used for tunnelling. Distinguish between 'ratchet-pawl motion' and 'reciprocating motion'. 2+3
- (d) What is core loss ? Explain how injected bentonite clay circulates through single and double tube core barrel. 2+3

(3)

GROUP - C (10 marks)

(Mineral Beneficiation)

3. Answer any *two* questions : 2x5=10
- (a) What is comminution ? What are the objectives of comminution ? Briefly describe autogenous mill and pebble mill. 1+1+3
- (b) What is the working principle of drum magnetic separator and cross-belt magnetic separator ? Using necessary sketch explain how ferromagnetic and diamagnetic materials are separated by front feed, top feed and under feed process in drum magnetic separator. 2+3
- (c) Describe the mechanism of separating heavier minerals from lighter minerals by 'Chance cone' separator and Jigging. Use necessary sketch. What do you understand by - 200 #(mesh) and +200# grain size ? 4+1

GROUP - D (20 marks)

(Mining)

4. Answer any *four* questions : 4x5=20
- (a) What are the major disadvantages of open cast mining ? Discuss the different major stages of operations for the complete cycle of open cast mining. 2+3

(Turn over)