**Mineral Processing, 2017 (End Semester)**
**B.Tech, 4th Semester, M & M Engg.**

Total Pages—4

(Set-$V_1$)

# B.Tech-4th (M & M)
# Mineral Processing

*Full Marks* : 70

*Time* : 3 hours

**Answer six questions including Q. No. 1 which is compulsory**

*The figures in the right-hand margin indicate marks*

Symbols carry usual meaning

1. Answer *all* questions : 2 × 10

   (*a*) 1 ton of chalcopyrite containing 2% copper is floated to obtain a concentrate containing 25% copper. If the mass of the concentrate is 60 kg, find the per cent of copper in tailing.

   (*b*) Define Concentration criterion.

   (*c*) Explain the mechanisms of sintering process.

   (*d*) For the recovery data obtained in a laboratory flotation test, the lead recovery is

*( Turn Over )*

| | Mass | Assay |
|---|---|---|
| Head | 2000 g | 2·1% Pb |
| Tailing | — | 0·1% Pb |
| Concentrate | 70 g | 55·1% Pb |

(*e*) Define Filtration. What are the factors affecting rate of filtration ?

(*f*) With the help of suitable diagram explain the difference between open and closed circuit grinding.

(*g*) Draw the flow sheet for a basic crushing plant.

(*h*) Define Pelletizing.

(*i*) What is the volume % solid in a pulp containing 65 wt% solids ? Average specific gravity of solids is 2·70.

(*j*) Explain the term 'Liberation'.

2. (*a*) Write down the characteristics of industrial screens. Explain how the capacity and efficiency of industrial screens are interrelated. 5

(*b*) Define collector. Explain briefly, the function of a collector and name the different types of collectors used in froth floatation ? 5

3. (*a*) Explain the term recovery, ratio of concentration, enrichment ratio. How they are calculated ? Derive relevant formula. 5

(*b*) Explain the operation of a jigging machine with the help of a suitable diagram. 5

4. (*a*) Define the process of agglomeration. Explain the various techniques of agglomeration and their applications in ferrous and non-ferrous metal industries. 5

(*b*) What is thickening process ? Draw a simplified diagram showing common features of a conventional thickener. 5

5. (*a*) Explain the construction and operational features of a roll crusher with the help of a suitable diagram. Derive the relation between friction coefficient and angle of nip. 5

(*b*) Explain the construction and operational features of a gyratory crusher with the help of a suitable diagram. 5

6. (*a*) Explain Kick's law and Rittinger's law of Grinding. What is grindability ? 5

(*b*) What is classification ? Give different types of classifier and explain air classifier. 5

7. (*a*) What is High-tension separation ? Explain briefly. 5

(*b*) Explain the theory of ball mill operation along with its different zones. Draw required figure. Mention process affecting factors. 5

8. Write short notes on any *two* : $5 \times 2$

(*i*) Free Settling and Hindered Settling

(*ii*) Effect of particle size in magnetic separation

(*iii*) Enrichment ratio

(*iv*) Differential floatation.

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