USN | | | | | | | | | | |

10MN62

Sixth Semester B.E. Degree Examination, June/July 2019
Mineral Processing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Define Mineral Processing. Explain objectives and scopes of Mineral Processing. **(10 Marks)**

b. Explain in brief, types of pretreatment involved in different stages of ore processing. **(06 Marks)**

c. The weight of the grab sample collected from the mine cars weights 650 gm. What will be the weight of the sample after drying if the percentage of moisture lost was 5%? **(04 Marks)**

2 a. Explain in detail how does vezin sampler from main stream with a neat sketch. **(08 Marks)**

b. Write a brief note on two product formula of mass balancing method. **(05 Marks)**

c. The feed to a flotation plant assays 0.75% copper. The concentrate produced assays 25% Cu and the tailings 0.2% Cu. Calculate the recovery of copper to the concentrate , the ratio of concentration and the enrichment ratio. **(07 Marks)**

3 a. Explain in brief the different theories of Comminution. **(08 Marks)**

b. What are the stages involved in comminution process? **(04 Marks)**

c. Work index of hematite ore is 7.0 K W hr/ short ton. Determine the power required to crush 150 t/hr of hematite if

i) 80% of the feed passes a 50mm screen and

ii) 80% of the product passes a 5mm screen. **(08 Marks)**

4 a. Draw a neat sketch of roller crusher and derive formula to determine angle of nip for the same. **(10 Marks)**

b. Calculate the operating speed of a ball mill of 2 meters diameter containing steel balls (specific gravity of 7.6) of 0.12 metre diameter. The mill operates at 70% of the critical speed. **(05 Marks)**

c. What will be the actual speed in rpm of a ball mill having 900mm internal diameter charged with 25mm balls? **(05 Marks)**

PART - B

5 a. From the sieve analysis data of a sample in the table given below, calculate

i) Average size of the sample and ii) 80% passing size **(10 Marks)**

Mesh number	Mesh size microns	Direct wt % retained
- 18	853	7.0
- 18 + 25	599	10.4
- 25 + 36	422	14.2
- 36 + 52	295	13.6
- 52 + 72	211	9.2
- 72 + 100	152	8.1
- 100 + 150	104	8.2
- 150 + 200	74	5.1
- 200		24.2

b. Derive equation showing 'terminal velocity' dependence on small spherical particle size and densities of particles and fluid under free settling conditions. **(10 Marks)**

6 a. What is Jigging? Explain the principle and applications of jigging. **(10 Marks)**
b. An Iron ore of 56% Fe contains only one Iron Mineral Hematite. What is the percent gangue in Iron ore? **(04 Marks)**
c. Define Ferromagnetic, Paramagnetic and Diamagnetic material. **(06 Marks)**

7 a. Explain why flotation is used for fine particles only. **(04 Marks)**
b. What are the purpose of collector , frothar , activator and depressant in flotation process? **(16 Marks)**

8 a. Draw a neat flow sheet for typical copper are processing. **(10 Marks)**
b. Draw a neat flow sheet for typical iron ore processing. **(10 Marks)**

*****