CBCS SCHEME

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18MN63

Sixth Semester B.E. Degree Examination, July/August 2022
Mineral Processing and Fuel Technology

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define the following : mineral, ore, concentrate, grade and ROM. **(05 Marks)**

b. Explain in detail how does Vezin sampler collects samples from main stream with neat sketch. **(15 Marks)**

OR

2 a. Define the following :
Mineral processing, communication, liberation, sample and sampling. **(05 Marks)**

b. A material is crushed in a primary crusher such that the average size of particle is reduced from 40mm to 10mm with the consumption of energy of 10kWs/kg. What would be the consumption of energy needed to crush the same material of average size 60mm to an average size of 20mm.
i) Assuming Rittinger's law applies
ii) Assuming Kick's law applies. **(10 Marks)**

c. Describe the principle of movement of charges in tumbling mill. **(05 Marks)**

Module-2

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

b. What is screening? Which factors affect the screening efficiency? And classify different types of industrial screening. **(10 Marks)**

OR

4 a. Sphalerite and magnanite particles at size range of 5.2 to 30 microns are present in mixture. Determine the size ranges of pure sphalerite, pure manganite, and the third product of mixture which can be obtained if separated in a free settling classifier. The specific gravities of sphalerite and manganite are 3.9 and 5.0 respectively. **(14 Marks)**

b. Describe the construction and working of trammel screen with a neat sketch. **(06 Marks)**

Module-3

5 a. Describe the working principle of Wilfley table and draw a suitable sketch for the same. **(10 Marks)**

b. What is jigging? Explain the principle and applications of jigging. **(10 Marks)**

OR

6 a. Explain with a suitable sketch, the working of high intensity magnetic separator. **(10 Marks)**

b. Explain with a neat sketch, the forth flotation process of oxide ore. **(10 Marks)**

Module-4

7 The following is the data obtained from float and Sink test of coal of –2 + 0.5mm size :

Sp. Gravity of liquid used	Wt.% of floated coal	Ash% of floated coal
1.30	10.0	4.0
1.35	15.0	6.0
1.40	20.0	8.0
1.45	25.0	14.0
1.50	10.0	24.0
1.55	5.0	32.0
1.60	5.0	44.0
1.75	5.0	56.0
2.00	2.5	60.0
2.00(sink)	2.5	61.0
		100.0

Determine the washability characteristics. **(20 Marks)**

OR

8 a. Draw and explain the flow sheet of zinc ore. **(10 Marks)**

b. Describe any one method of filtration used during iron are processing. **(10 Marks)**

Module-5

9 a. Explain in brief, why and how proximate analysis of coal is carried out. **(12 Marks)**

b. The weight of the coal sample collected from the mine cars weights 650gms. What will be the weight of the sample after drying if the percentage of moisture test was 8%. If the percentage of ash and volatile matter before drying was 15% and 35% respectively, then determine weight of fixed carbon in the dried sample (in grams). **(08 Marks)**

OR

10 a. Explain with a neat sketch, the low temperature carbonization of coal. **(10 Marks)**

b. Describe briefly the mechanism of coal combustion. **(10 Marks)**

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