

11026 : Mechanical Operations : 5 CT 02

P. Pages : 2

Time : Three Hours

**AW - 3156**

Max. Marks : 80

- Notes :
1. All question carry marks. as indicated.
 2. Answer **three** question from Section A and **three** question from Section B.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Illustrate your answer necessary with the help of neat sketches.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Define the following terms. 9
a) Sphericity b) Specific surface area of mixture
c) Average particle size
- b) What are the factors to be considered while selecting a screening equipment's? 5

OR

2. A quartz mixture having analysis shown in table is screened through a standard 10 mesh screen. Calculate mass ratios of overflow and underflow of feed and overall effectiveness of screen. 14

Mesh Number	D _p mm	Mass retained in gms		
		Feed	Overflow	Underflow
4	4.699	0	0	-
6	3.327	25	49.7	-
8	2.362	125	251.3	0
10	1.651	320	294	58.5
14	1.168	260	84	115.5
20	0.833	155	15.4	75
28	0.589	55	7	24
35	0.417	20	-	9
65	0.208	20	-	6
Pan	---	20	-	12

3. a) Calculate the settling velocity for hindered settling of glass spheres in water at 68°F. When the suspension contains 1206 gm of glass spheres in 1140 cm³ of total Vol^m. The average diameter of the sphere was 0.0061 inch and the true density of the sphere is 154 lb/ft³. 9
- b) Explain the following terms. 4
1) Drag force 2) Terminal settling velocity

OR

4. a) Explain the construction and working of hydraulic Jig with Diagram. 7
- b) Explain any one mechanical classifier with Diagram. 6

5. a) Explain Axial flow impellers and radial flow impellers with suitable examples. 8
b) Give the advantages and disadvantages of screw conveyor. 5

OR

6. a) Explain the following terms. 4
1) Angle of Repose 2) Bulk density
b) Give the properties of paddles. 5
c) Draw the sketch of any four propellers used in mixing operations. 4

SECTION - B

7. a) Explain Electroflotation with the help of Diagram. 7
b) Explain the working of rotary Drum filter with neat Diagram. 7

OR

8. a) Explain any one flotation machine with the help of Diagram. 7
b) A plate and frame press, filtering a slurry, gave a total of 8m^3 of filtrate in 1800 seconds and 11m^3 in 3600 seconds, when filtration was stopped. Estimate the washing time in seconds if 3m^3 of wash water was used. The resistance of the cloth can be neglected and a constant pressure is used throughout. 7
9. a) Explain the methods to charge a solid particles with the help of suitable diagram. 9
b) Give the comparison between sedimentation & centrifuge. 4

OR

10. a) Explain the principle of electrostatic separator. 4
b) Explain the following 9
1) Cyclone design 2) Particle size separation
3) Efficiency of cyclone.
11. a) Give the industrial application of adsorption. 6
b) Explain Langmuir isotherm. 7

OR

12. a) Explain pressure swing adsorption. 6
b) Describe the significance of break through curve with neat sketch. 7
