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Third Semester B.E. Degree Examination, June/July 2023
Mechanical Operations

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. What is screen effectiveness? Derive an equation for effectiveness of a screen. **(10 Marks)**
   b. With a neat sketch, explain working and various arrangements of Trammels. **(10 Marks)**

OR

2 a. Define-particle shape, sphericity, shape factor, ideal screens, actual screens. **(10 Marks)**
   b. With a neat sketch, explain the working of vibrating screen. **(10 Marks)**

Module-2

3 a. State and explain the different laws to calculate power requirement for size reduction equipments. **(10 Marks)**
   b. With a neat diagram, explain the principle, construction and working of a Smooth roll crushers. **(10 Marks)**

OR

4 a. With a neat diagram, explain the principle, construction and working of a ball mill and derive an equation for critical speed. **(12 Marks)**
   b. Find the operating speed of the ball mill with diameter of ball mill 450 mm and diameter of ball 25 mm and operating speed is 50% of critical speed. **(08 Marks)**

Module-3

5 a. Derive Kozeny-Carman equation. **(12 Marks)**
   b. What is minimum fluidization? What are the conditions for fluidization? **(08 Marks)**

OR

6 a. Derive equations for one dimensional motion of particles through a fluid in gravitational and centrifugal field. **(12 Marks)**
   b. With a neat sketch, explain the working of cyclones. **(08 Marks)**

Module-4

7 a. With a neat sketch, explain different zones in batch settling. **(08 Marks)**
   b. With neat sketch, explain the working of Rotary drum filter. List also advantages and disadvantages. **(12 Marks)**

OR

8 a. Derive equations for constant rate filtration and constant pressure filtration. **(10 Marks)**

   b. With a neat sketch, explain the construction, working of plate and frame filter. Mention advantages and disadvantages. **(10 Marks)**

Module-5

9 a. Explain types of impellers with neat sketch. **(10 Marks)**

   b. Write short notes on Magnetic separation and Ribbon blender. **(10 Marks)**

OR

10   Write short notes on :

   a. Storage of solids.

   b. Muller mixer.

   c. Belt conveyor.

   d. Froth floatation process. **(20 Marks)**

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