

3 Hours

Marks: 80

Question No. 1 is compulsory.

Attempt any three questions from the remaining.

Assume suitable data if required and clearly mention it.

Figures to the right indicates full marks.

1. Write short notes on the following:

- a) Particle size measurement techniques
- b) Ball mill
- c) Belt conveyor
- d) Fludization

[20]

2. a) Describe laws of crushing.

[10]

b) Define screen effectiveness and derive the formula for the calculation of effectiveness of screen.

[10]

3. a) Derive an expression to estimate the size of smallest particle that can be separated in Cyclone Seperator

[10]

b) Explain constant rate filtration and constant pressure filtration

[10]

4. a) Explain the degree of mixing and rate of mixing of Dry solids

[10]

b) A slurry containing 5 kg of water/kg of solid is to be thickened to a sludge

[10]

containing 1.5 kg of water/kg of solids in a continuous operation. A laboratory

test of six different concentrations of slurry yielded following results:

Concentration (Kg water/ kg of solid)	5.0	4.2	3.7	3.1	2.5	2
Rate of Sedimentation	0.2	0.12	.094	0.07	0.052	0.03

Calculate the minimum area of the thickener to effect the separation of 1.33 kg/s of solids

5. a) Discuss various conditions of fluidization [10]

b) A crushing roll 1 m in diameter are set so that crushing surface area [10]

12.5 mm apart and the angle of nip is 31° . What is the maximum size of particle which should be fed to the rolls.

If the actual capacity is 12 % of the theoretical, calculate the throughput in kg/s when running at 2.0 Hz if the working face of the rolls is 0.4m long and feed weighs 2500kg/m^3 .

6. Write brief notes on: [20]

- a) Hammer Mill
- b) Ribbon blender
- c) Pneumatic conveying system
- d) Plate and Frame filter press
