

10 DEC. 2025 SE CHEMICAL (SEM-IV) C SCHEME SFMO QP CODE: 10093206

Time : 3 Hrs

Marks:80

Question No 1 is compulsory.

Solve any three questions from remaining five questions.

Assume suitable data if necessary.

Q.1 Answer the following questions (Each question carries the 5 marks)

- a) Write short note on particle size measurement techniques. 5
- b) Write short note on sedimentation. 5
- c) Write short note on belt conveyor. 5
- d) Write short note on Ribben blender. 5

Q.2

- a) A sample of Pyrite was screened. The screen analysis is given below 10

Mesh	8/10	10/14	14/20	20/28	28/35	38/48	48/65
Mesh fraction retained	0	21.2	19.6	17.4	14	15.8	12
Aperture, mm	1.651	1.168	0.833	0.589	0.417	0.295	0.208

- i) Calculate the mean surface diameter. Specific gravity of Pyrite is 5.0
- ii) Find the specific surface
- b) State and Explain in details Energy laws for crushing. 10

Q.3

- a) Calculate the operating speed of ball mill from the following data: 10
 - i) Diameter of ball mill = 800 mm
 - ii) Diameter of ball = 60 mm
 - if:
 - i) Operating speed is 55% less than critical speed
 - ii) Critical speed is 40% more than operating speed
- b) Discuss constant pressure filtration and constant rate filtration. 10

Q.4

- a) Discuss conditions for Fluidization in details. 10
- b) Derive an expression for determination of thickener area. 10

Q.5

- a) Derive the expression for minimum fluidization velocity **10**
 b) A slurry containing 5 kg of water/kg of solid is to be thickened to a sludge containing 1.5 kg of water/kg of solid in a continuous operation. A laboratory test using five different concentrations of slurry yielded the following results:

Concentration (Kg of water/kg of solid)	5.0	4.2	3.7	3.1	2.5
Rate of sedimentation (mm/sec)	0.20	0.12	0.094	0.070	0.052

Calculate the minimum area of thickener to effect the separation of 1.33 kg/s of solids. **10**

Q.6 write short note on **20**

- a) Muller Mixer
- b) Degree of mixing
- c) screw conveyors
- d) Explain Negative pressure pneumatic conveying system
