11/12/2024 CHEMICAL SEM-IV C SCHEME SFMO QP CODE: 10067248

Time: 3 Hours **Marks: 80**

NB: 1) Question no.1 is compulsory
2) Attempt any three from remaining five questions.
3) Assume suitable data if required.
4) Figure to the right indicates full marks.

Q.1

a) Explain in brief different particle size measurement techniques. 4
b) Why and how filter aids are used 4
c) Write short note on froth flotation 4
d) Describe the methods adopted in industry for conveying of solids. 4
e) Explain industrial mixers used for mixing of cohesive solids. 4

Q.2

a) Derive an expression for the effectiveness of a screen. Explain stage wise procedure of finding the effectiveness of a screen in the laboratory. 10
b) Discuss Ball Mill based on following points: 10
i) Working Principle
ii) Brief construction
iii) Factors influencing the size of product.
iv) Critical speed and operating speed

Q.3

a) Derive the expression for minimum fluidization velocity. 10
b) Derive expression for constant rate filtration. 10

Q.4

a) 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 solids in a continuous operation. 10
A laboratory test using five different concentrations of slurry yielded the following results:

Con. Y (Kg water/ kg of solid)	5.0	4.2	3.7	3.1	2.5
Rate of Sedimentation, u_c (mm/sec)	0.17	0.10	0.08	0.06	0.042

Calculate the minimum area of the thickener to effect the separation of 0.6 kg/s of solids.

b) Derive the expression to estimate the size of smallest particle that can be separated in cyclone separator. 10

Q.5

a) Explain procedure used to determine mixing index for mixing of solids. 10
b) In Context with solids handling and transportation derive Jansen equation. 10

Q.6 Write short note on 20
i) Vibrating screen
ii) Rotary drum vacuum filter
iii) Sigma mixer
iv) Electrostatic precipitator (ESP)

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