21/05/2025 SE CHEMICAL SEM-IV C-SCHEME SFMO QP CODE: 10083221

Time: 3 Hours **Total Marks: 80**

N.B. (i) Question number 1 is compulsory.
(ii) Answer any three questions from rest.
(iii) Assume suitable data wherever necessary.

Q. 1	(A)	Explain Sphericity with its significance	[05]
	(B)	Write assumptions for Kynch theory of sedimentation.	[05]
	(C)	Explain Negative pressure pneumatic conveying system.	[05]
	(D)	A soil containing 14% moisture was mixed in large muller mixer with 10 weight percent of a tracer considering of dextrose and pictric acid. After 3 min. of mixing, 12 random samples were collected in weight percent of tracer,10.24, 9.3, 7.94, 10.24, 11.08, 10.03, 11.91, 9.72, 10.76, 10.97, 10.55.calculate the mixing index.	[05]
Q. 2	(A)	Derive the expression for screen effectiveness	[10]
	(B)	State and Explain in details Energy laws for crushing.	[10]
Q. 3	(A)	A crusher is reducing limestone of crushing strength 70 MN/m^2 from 6 mm diameter size to product size of 0.1 mm diameter requires 9 KW . The same machine is used to crush dolomite at the same rate of output from 6 mm diameter size to product which contains of 20% with an average diameter of 0.25 mm, 60% with an average diameter of 0.125 mm and the balance having an average diameter of 0.085 mm. Estimate the power required to drive the crusher, assuming that the crushing strength of dolomite is 100 MN/m^2 and that crushing follows Rittinger's law.	[10]
	(B)	Derive the expression for constant pressure filtration	[10]
Q. 4	(A)	A Plate and frame press, filtering a slurry, gave a total of 8 m^3 of filtrate in 1800 seconds and 11m^3 in 3600 seconds, when filtration was stopped. Estimate the washing time in seconds if 3 m^3 of wash water was used. The resistance of the cloth can be neglected and a constant pressure is used throughout	[10]
	(B)	Derive the expression to calculate the area of thickener by any one method	[10]
Q. 5	(A)	Derive the expression for minimum fluidization velocity.	[10]
	(B)	Derive the expression to estimate the size of smallest particle that can be separated in cyclone separator.	[10]
Q. 6		Write short note on	[10]
	(A)	Ribbon Blender	[05]
	(B)	Degree of mixing	[05]
	(C)	Screw conveyors	[05]
	(D)	Pressures in bins and silos	[05]

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