

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2180508****Date: 25/11/2019****Subject Name: Solid-Fluid Operations****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Define: (1) filtration (2) clarification (3) cyclone efficiency	03
	(b) Differentiate between constant pressure and constant rate filtration.	04
	(c) Explain float and sink method and differential method with suitable Diagram ?	07
Q.2	(a) Define (1) Minimum fluidization velocity (2) filtration (3) Sedimentation	03
	(b) Differentiate between particulate and bubbling fluidization.	04
	(c) Explain the working, construction and application of plate and frame filter press.	07
	OR	
	(c) Explain the working, construction and application of Rotary drum filter.	07
Q.3	(a) Define (1) Froude no (2) swirling (3) Power no	03
	(b) Differentiate between paddle and propeller	04
	(c) Define fluidization. Explain the condition of or fluidization with suitable diagram.	07
	OR	
Q.3	(a) Define (1) seeding (2) nucleation (3) super saturation in term of crystallization.	03
	(b) Differentiate between static mixture and intensive mixture.	04
	(c) What is the precaution required for the selection of agitation? How to scale-up the agitation vessel?	07
Q.4	(a) Explain the factor affecting crystallization.	03
	(b) Differentiate between cyclone and hydro cyclone .	04
	(c) Explain the drying curve with suitable sketch?	07
	OR	
Q.4	(a) Define (1) leaching (2) drying (3) fluidization.	03
	(b) Differentiate between packed bed and fluidized bed reactor	04
	(c) Classify the equipments for solid conveying and explain chain conveyer in details.	07

- Q.5** (a) Define and enlist different conveyers. **03**
(b) A rotary filter, operating at 0.03 Hz, filters at the rate of $0.0075 \text{ m}^3/\text{s}$. Operating under the same vacuum and neglecting the resistance of the filter cloth, at what speed must the filter be operated to give a filtration rate of $0.0160 \text{ m}^3/\text{s}$? **04**
(c) Explain the mechanism and working of moving bed reactor. **07**

OR

- Q.5** (a) Write in brief the use of conveyer in chemical industries. **03**
(b) Solid spherical particles of coffee extract from a dryer having a diameter of $400 \mu\text{m}$ are falling through air at a temperature of 422 K . The density of the particles is 1030 kg/m^3 . Calculate the terminal settling velocity and the distance of fall in 5 s . The pressure is 101.32 kPa . **04**
Data: $\rho_{\text{air}} = 0.838 \text{ kg/m}^3$, $\mu_{\text{air}} = 2.37 \times 10^{-5} \text{ kgm}^{-1} \text{ s}^{-1}$
(c) Write the application of fluidization in chemical industry. **07**

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