Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code: 2180508 **Date:13/05/2019**

Subject Name:SoliD-Fluid Operations

Time:10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Define agitation and mixing. State various purposes of agitation.	**03**
	(b)	What are conveyors? Describe the transportation of material through belt conveyor.	**04**
	(c)	Classify solid fluid operations. Explain various solid fluid operations with suitable example.	**07**
Q.2	**(a)**	Define fluidization and explain minimum fluidization velocity.	**03**
	(b)	Describe the term crystallization. State various applications of Crystallization.	**04**
	(c)	Explain construction and working of plate and frame filter press with its advantages and limitations.	**07**
		OR	
	(c)	Explain in detail: Slurry bed reactor	**07**
Q.3	**(a)**	Write in brief about types of nucleation in crystallization.	**03**
	(b)	Enlist various types of conveyors. Explain screw conveyor for transportation of pasty materials.	**04**
	(c)	Describe flow of fluid through porous solid beds and derive Ergun equation.	**07**
		OR	
Q.3	**(a)**	Explain the phenomenon of crystals growth in brief.	**03**
	(b)	A disc turbine with six flat blades is installed centrally in a vertical baffled tank 2.0 m in diameter. The turbine is 0.67 m in diameter and is positioned 0.67 m above the bottom of the tank. The turbine blades are 134 mm wide. The tank is filled to a depth of 2.0 m with an aqueous solution of 50 percent NaOH at 65°C, which has a viscosity of 12 cP and a density of 1500 kg/m^3. The turbine impeller turns at 90 r/min. What power will be required? If $N_{Re} < 10,000$ take $N_p=65$ and If $N_{Re} > 10,000$ take $N_p= 5.8$	**04**
	(c)	Explain in detail about conditions for fluidization.	**07**
Q.4	**(a)**	Explain in brief: Static Mixers	**03**
	(b)	Write short note on ‘Slurry transport’.	**04**
	(c)	Explain in detail: Moving bed reactor	**07**
		OR	
Q.4	**(a)**	Explain in brief: Heating and cooling mixers	**03**
	(b)	Write short note on pneumatic conveying system.	**04**
	(c)	Explain in detail: Fixed bed reactor	**07**
Q.5	**(a)**	List out various industrial applications of Fluidization.	**03**
	(b)	Define Drying. Classify various dryers used in drying process.	**04**
	(c)	Enlist various types of centrifuge. Explain in detail suspended batch centrifuge with neat sketch.	**07**
		OR	
Q.5	**(a)**	Describe particulate fluidization in brief.	**03**
	(b)	Explain the term Leaching. State various applications of Leaching.	**04**
	(c)	Define sorting classifiers. Explain ‘sink and float’ method for sorting classifiers.	**07**

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