Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2143608 Date:22/05/2018

Subject Name:Mechanical Operations in Chemical Process Industries

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Define: Sedimentation.	
	2	Define: Ideal Screen.	
	3	Define: Angle of Nip.	
	4	Write the working principle of jaw crusher.	
	5	Define: Size reduction.	
	6	Define: Agitation	
	7	List out the various mechanism for size reduction.	
	8	Define: Fluidization	
	9	Define: Critical Speed.	
	10	Define: Filter Aids.	
	11	Write the equation for the screen effectiveness.	
	12	List out different types of impellers.	
	13	Enlist various types of conveyors.	
	14	Define: Mixing	
Q.2	**(a)**	Explain the comparison between ideal screen and actual screen.	**03**
	(b)	Calculate the sphericity of cylinder of diameter 1cm and height 3cm.	**04**
	(c)	Write a short note on roll crusher with neat diagram.	**07**
		OR	
	(c)	A material is crushed in a jaw crusher and the average size of particle reduced from 5cm to 1cm, with the consumption of energy 1.32×10^4 J/kg. What will be the consumption of energy to crush the same material of an average size of 7.5cm to 2.5cm, assuming (a) Rittinger's law, and (b) Kick's law?	**07**
Q.3	**(a)**	Define screen effectiveness and also derive its equation	**03**
	(b)	Write a short note on fluid energy mill with neat diagram.	**04**
	(c)	What is swirling and what is its effect on liquid mixing. what are the various method to prevent swirling?	**07**
		OR	
Q.3	**(a)**	Discuss roll of filter aid in filtration.	**03**
	(b)	List out different properties if filter media.	**04**
	(c)	Write a short note on rotary drum filter with neat diagram	**07**

Q.4	**(a)**	Explain sink and float method.	**03**
	(b)	Write a short note on cyclone separator.	**04**
	(c)	Explain the cake, clarifying and cross flow flirtation with neat diagram.	**07**

OR

Q.4	**(a)**	Write equation for Power number, Reynolds number, and Froude number for power consumption in impellers in agitation.	**03**
	(b)	Define Constant rate filtration and constant pressure filtration.	**04**
	(c)	Write a short note on batch sedimentation.	**07**
Q.5	**(a)**	Write difference between agitation and mixing.	**03**
	(b)	Write a short note on pneumatic conveyors.	**04**
	(c)	Define minimum fluidization velocity and explain different types of fluidization.	**07**

OR

Q.5	**(a)**	Draw a neat sketch of agitated vessel and label its important parts.	**03**
	(b)	Discuss advantages and disadvantages of fluidization.	**04**
	(c)	Explain fluidization process and its application in chemical industry.	**07**

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