Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) • EXAMINATION – WINTER 2016

Subject Code:2143608 Date:21/11/2016

Subject Name:Mechanical Operations in Chemical Process Industries

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		**Short Questions**	**14**
	1	Define: mesh number	
	2	Define: Critical Speed	
	3	Define: Agitation	
	4	Define: fluidization	
	5	Define: Constant pressure filtration	
	6	In constant rate filtration the pressure is constant. (True/false)	
	7	Define: angle of nip	
	8	Define: Sphericity	
	9	Define: filtration	
	10	Define: screen capacity	
	11	List out different types of impeller for agitation.	
	12	Define: Crushing efficiency	
	13	Define: Mixing	
	14	Enlist different types of conveyers.	
Q.2	**(a)**	Classify size reduction equipments.	**03**
	(b)	State Rittinger's law and kick's law with their respective equations.	**04**
	(c)	Write a short note on fluid energy mill with neat figure.	**07**
		OR	
	(c)	Calculate the operating speed of the ball mill from the data given below: Diameter of ball mill = 800 mm, diameter of ball = 60 mm If (i) operating speed is 55 % less than the critical speed. (ii) Critical speed is 40 % more than the operating speed.	**07**
Q.3	**(a)**	Define screen effectiveness and derive the equation for the same.	**03**
	(b)	Write a short note on thickener with a neat diagram.	**04**
	(c)	Define sedimentation and write a short note on batch sedimentation with neat diagram.	**07**
		OR	
Q.3	**(a)**	Write different parameters affecting screening operation.	**03**
	(b)	List out different characteristics of filter medium.	**04**
	(c)	Write a short note on plate and frame filter press with neat sketch.	**07**
Q.4	**(a)**	What is power number and its significance?	**03**
	(b)	Explain cyclone separator with neat sketch.	**04**
	(c)	Write short notes on (1) Muller mixer and (2) Pug mill	**07**
		OR	

Q.4	**(a)**	Write a short note on batch centrifuge.	**03**
	(b)	Explain sink and float method.	**04**
	(c)	Write a short note on (1) Ribbon blenders and (2) Banbury mixer.	**07**
Q.5	**(a)**	Write equation for Power number, Reynolds number, and Froude number for power consumption in impellers in agitation.	**03**
	(b)	Explain different methods to prevent swirling and vortex formation.	**04**
	(c)	Define minimum fluidization velocity and explain different types of fluidization.	**07**

OR

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

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