Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2143608 **Date:01/06/2016**

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: Angle of nip	
	2	Define: Critical Speed	
	3	Define: Agitation	
	4	Crushing efficiencies are high. (True/False)	
	5	Define: Constant rate filtration	
	6	In constant pressure filtration the pressure is constant. (True/false)	
	7	Define: Mesh Number	
	8	Define: Sedimentation	
	9	Define: Size reduction	
	10	Write the equation of screen effectiveness	
	11	List out different types of agitators.	
	12	Define: Centrifuging	
	13	Define: Mixing	
	14	Write different driving forces used in size reduction.	
Q.2	**(a)**	Explain advantages of size reduction	**03**
	(b)	What will be the power required to crush 150 tonnes per hour of limestone if 80 percent of the feed passes 50 mm screen and 80 percent of the product a 3.125 mm screen? Work index of lime stone = 12.74	**04**
	(c)	Write a short note on Jaw crusher with neat figure.	**07**
		OR	
	(c)	Calculate the operating speed of the ball mill from the following data: (i) Diameter of ball mill = 500 mm (ii) Diameter of ball = 40 mm (iii) Operating speed is 50% of the critical speed of the mill	**07**
Q.3	**(a)**	Explain comparison of ideal screen and actual screen.	**03**
	(b)	Write a short note on cyclone separator.	**04**
	(c)	List out different types of screening equipments and explain any one in detail.	**07**
		OR	
Q.3	**(a)**	Explain comparison of crushing and grinding.	**03**
	(b)	List out different characteristics of filter medium.	**04**
	(c)	Write a short note on rotary drum filter with neat sketch.	**07**
Q.4	**(a)**	Open circuit and closed circuit grinding.	**03**
	(b)	Explain different methods to prevent swirling and vortex	**04**

formation.

	(c)	List out different types of mixing equipment and explain any two in detail.	**07**

OR

Q.4	**(a)**	Draw a neat sketch of fluid energy mill.	**03**
	(b)	Explain sink and float method.	**04**
	(c)	Write a short note on batch sedimentation.	**07**
Q.5	**(a)**	Write equation for Power number, Reynolds number, and Froude number for power consumption in impellers in agitation.	**03**
	(b)	Explain thickener.	**04**
	(c)	Explain types of fluidization.	**07**

OR

Q.5	**(a)**	Justify: Crushing efficiencies are low.	**03**
	(b)	Derive equation of angle of nip.	**04**
	(c)	Write a short note on conveyers.	**07**

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