Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2015

Subject Code: 2143608 **Date:30/05/2015**

Subject Name: Mechanical Operation In Chemical Process Industries

Time: 10:30am-1.00pm **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)**	Write a brief note on importance of Mechanical Operations in Chemical process Industry.	**07**
	(b)	Explain the construction and working of the jaw crusher.	**07**
Q.2	**(a)**	Write statement and equation of Rittinger's law. A set of crushing rolls of 1400 mm diameter by 400 mm width of face. Minimum spacing between two rolls is 10 mm and the angle of nip is 30°. What is the maximum permissible size of feed?	**07**
	(b)	Calculate the power required for crushing 150 ton/hr of limestone if 80% of the feed passes through 2 inch screen and 80% of the product passes through 1/8 inch screen. Work index of limestone = 12.74	**07**
		OR	
	(b)	Discuss different types of conveyers and their application.	**07**
Q.3	**(a)**	Write all assumptions and derive equation for screen efficiency.	**07**
	(b)	**(i)** Calculate the spherecity of a cylinder of 1cm diameter and 1cm height.	**04**
		(ii) Differentiate between ideal screen and actual screen.	**03**
		OR	
Q.3	**(a)**	Derive the expression for critical speed of a ball mill.	**07**
	(b)	Show the difference between open circuit and closed circuit grinding with neat sketch.	**07**
Q.4	**(a)**	Define agitation and mixing. Enlist different types of flow pattern induced in an agitated vessel.	**07**
	(b)	What is differential settling method? Explain in detail the working of batch sedimentation.	**07**
		OR	
Q.4	**(a)**	Write a short note on 'hydro cyclones'.	**07**
	(b)	Describe a continuous gravity thickener.	**07**
Q.5	**(a)**	Discuss principles of cake filtration and derive equation for specific cake resistance and filter medium resistance for an incompressible cake.	**10**
	(b)	Write a short note on rotary filters.	**04**
		OR	
Q.5	**(a)**	Explain the fluidization regimes with neat sketch.	**07**
	(b)	Differentiate between constant pressure and constant rate filtration.	**07**

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