Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V- EXAMINATION – SUMMER 2016

Subject Code: 150502 **Date: 21/05/2016**

Subject Name: Mechanical Operation

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.**

Q.1	**(a)**	Write short note on differential and cumulative analysis.	**07**
	(b)	Define sphericity. Calculate the sphericity of a cylinder of 1 cm diameter & 1 cm height. Also calculate sphericity of sphere.	**07**
Q.2	**(a)**	Write short note on muller mixer and pug mill with sketch.	**07**
	(b)	List out different solid mixing equipment & with neat diagram explain principle, construction, working and application of any one of them.	**07**
		OR	
	(b)	What is minimum fluidization velocity? Describe particulate and aggregative fluidization in detail.	**07**
Q.3	**(a)**	Define various laws of size reduction. What is the power required to crush 1000 ton/h of lime stone if 80 % of the feed passes a 2 inch screen and 80 % of the product passes a 1/8 inch screen. Work index of lime stone is 12.74.	**07**
	(b)	Describe open circuit & closed circuit operation with neat sketch.	**07**
		OR	
Q.3	**(a)**	Explain the construction and working of bucket elevator & belt conveyor with neat sketch.	**07**
	(b)	With neat sketch, explain pneumatic conveying system with advantages and disadvantages.	**07**
Q.4	**(a)**	A pair of rolls is to take a feed equivalent to spheres of 3 cm in diameter and crush them to spheres having 1 cm diameter. If the coefficient of friction is 0.29, what would be the diameter of rolls?	**07**
	(b)	In a ball mill of diameter 2000 mm, 100 mm diameter steel balls are being used for grinding. Presently, for the material being ground, the mill is run at 15 rpm. At what speed will the mill have to be run if the 100 mm balls are replaced by 50 mm balls, all the other conditions remaining the same?	**07**
		OR	
Q.4	**(a)**	Describe working principles of cyclone separator with neat sketch and also discuss about hydro cyclone.	**07**
	(b)	What is filter aid? Give example of it. What are the selection criteria for filter media? Name various types of filter media.	**07**
Q.5	**(a)**	Discuss swirling and vortex formation in agitation. Classify various types of agitator in detail.	**07**
	(b)	Derive expression for flow number for agitation with sketch.	**07**
		OR	
Q.5	**(a)**	Discuss batch sedimentation with sketch.	**07**
	(b)	Discuss sink and float method and also gravity classifier in detail.	**07**

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