Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2018

Subject Code:2150502 **Date:11/12/2018**

Subject Name:Mechanical Operation

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.**

Q.1	**(a)**	Classify comminuting equipment.	**03**
	(b)	Differentiate between open circuit and closed circuit operations.	**04**
	(c)	Explain working of a smooth roll crusher. Define angle of nip.	**07**
Q.2	**(a)**	Discuss various mechanism of filtration in brief.	**03**
	(b)	Explain "Screen effectiveness and capacity are opposing factors."	**04**
	(c)	Define agitation and mixing. Enlist different types of flow pattern induced in an Agitated vessel (liquid).	**07**
		OR	
	(c)	Discuss various laws for crushing .	**07**
Q.3	**(a)**	Discuss applications of fluidization in chemical industry.	**03**
	(b)	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?	**04**
	(c)	Discuss mixers for pastes and plastic masses.	**07**
		OR	
Q.3	**(a)**	Differentiate clarifier and classifier.	**03**
	(b)	Classify the Filtration equipments with examples in each category.	**04**
	(c)	Write a short note on rotary filters with neat diagram.	**07**
Q.4	**(a)**	Define: (i) angle of nip and (ii) mixing index.(iii) angle of repose	**03**
	(b)	In a ball mill of diameter 2000 mm, 100 mm dia. 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?	**04**
	(c)	Explain in detail: Types of fluidization.	**07**

OR

Q.4	**(a)**	Discuss the different criteria's for selection of conveyers.	**03**
	(b)	Draw neat sketch of an agitated vessel and label the important parts.	**04**
	(c)	An agitated baffle vessel is being used to prepare a uniform solution of viscosity 2 cP, running the agitator at 100 rpm, so as to obtain a Reynolds number of 50,000. If the contents of the vessel are replaced by a solution of viscosity 4 cP, and the agitator rpm is increased to 200, by how much will the power requirement change?	**07**
Q.5	**(a)**	Write short notes on slurry transport.	**03**
	(b)	What is the use of filter aid and filter media?	**04**
	(c)	What are the various methods for prevention of swirling in an agitated vessel?	**07**

OR

Q.5	**(a)**	What is power number and its significance?	**03**
	(b)	Explain : "For efficient grinding, ball mills must be operated at a speed less than the critical speed."	**04**
	(c)	With the help of neat sketch explain different types of impellers for agitation of liquids along with application.	**07**

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