

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3133507****Date: 28/11/2019****Subject Name: Basics of Unit Operations (BUO)****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.

		<b>Mark</b>
<b>Q.1</b>	(a) Define specific surface area, surface mean diameter and volume mean diameter for particles.	<b>03</b>
	(b) Differentiate Jaw crusher and Gyratory crusher.	<b>04</b>
	(c) Explain the working and construction of a rotary drum filter with diagram.	<b>07</b>
<b>Q.2</b>	(a) Define various purposes of agitation.	<b>03</b>
	(b) Derive method for calculation of power consumption for agitator	<b>04</b>
	(c) What will be the power required to crush 500 tons per hour of limestone if 80% of the feed passes 150 mm screen and 80% of the product a 2.125 mm screen? Work index of limestone is 12.74.	<b>07</b>
	<b>OR</b>	
	(c) Define agitation and mixing. Enlist different types of flow pattern induced in an Agitated vessel (liquid).	<b>07</b>
<b>Q.3</b>	(a) Explain the power requirement for a crushing mill by Rittinger's power laws with expressions.	<b>03</b>
	(b) Explain the working and construction of a ball mill with a neat sketch.	<b>04</b>
	(c) Explain about Hydro cyclone	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Discuss about sink and float method.	<b>03</b>
	(b) What are the uses of filter aid and filter media?	<b>04</b>
	(c) Explain the principle, construction and working of a roll crusher with a neat sketch.	<b>07</b>
<b>Q.4</b>	(a) Differentiate clarifier and classifier.	<b>03</b>
	(b) Discuss pros and cons of filter press.	<b>04</b>
	(c) With the help of neat sketch explain different types of impellers for agitation of liquids along with application.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) What rotational speed in RPM would you recommend for a ball mill of 1200 mm in diameter charged with 75mm balls?	<b>03</b>
	(b) Explain about critical speed of ball mill	<b>04</b>
	(c) Write short notes on "Scale up in agitator design"	<b>07</b>
<b>Q.5</b>	(a) Classify comminuting equipment.	<b>03</b>
	(b) Discuss different laws used for size reduction.	<b>04</b>
	(c) Explain construction, working and applications of cyclone separator with diagram.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Write short note on static mixers.	<b>03</b>
	(b) Describe various methods for swirling prevention	<b>04</b>
	(c) Explain the working and construction of a jaw crusher with sketch	<b>07</b>

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