

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV(New) • EXAMINATION – WINTER 2016****Subject Code:2143506****Date:21/11/2016****Subject Name: Unit Operations-I****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.

		MARKS
Q.1	Short Questions	14
	1 Define critical speed of ball mill.	
	2 Define screen capacity.	
	3 Define terminal settling velocity.	
	4 Why are the crushing efficiencies low?	
	5 Name various laws for crushing.	
	6 What is the need of size reduction in process industries?	
	7 Classify different equipments for filtration.	
	8 Write characteristics of ideal screen.	
	9 Define sedimentation.	
	10 Define constant rate filtration.	
	11 Explain principle of cake filtration.	
	12 Write applications of sedimentation.	
	13 Define mesh number.	
	14 Write the formula to find angle of nip?	
Q.2	(a) Discuss the different arrangements of trammel.	03
	(b) Explain screen analysis in detail with reference to Tyler standard screen series.	04
	(c) Name different screening equipments. Explain any one in detail.	07
	(c) Derive the expression for screen effectiveness by doing material balance over a screen.	07
Q.3	(a) Write the formula for specific surface area, surface mean diameter and volume mean diameter for particles.	03
	(b) With the help of flow diagram explain open-circuit and closed-circuit grinding operation.	04
	(c) A sample of material is crushed in a jaw crusher such that the average size of the particles is reduced from 50mm to 10mm with the energy consumption of 13 kw/(kg/s). Determine the consumption of energy to crush the same material of 75mm average size to 25 mm average size using Rittinger's law.	07
OR		
Q.3	(a) Discuss advantage and disadvantage of filter press.	03
	(b) Write differences between Jaw crusher and gyratory crusher.	04
	(c) What rotational speed in RPM would you recommend for a ball mill 1100mm in diameter charged with 70mm balls?	07
Q.4	(a) Write the criteria for selection of filtration equipments.	03
	(b) Discuss the factors affecting screening operation.	04
	(c) Write a short note on rotary drum filters.	07

OR
OR

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| Q.4 | (a) | Differentiate between ideal screen and actual screen. | 03 |
| | (b) | Discuss briefly about filter media and filter aids. | 04 |
| | (c) | Discuss construction and working of a batch centrifuge with a neat sketch. | 07 |
| Q.5 | (a) | Describe a continuous gravity thickener. | 03 |
| | (b) | Explain in brief Froth Flootation with diagram. | 04 |
| | (c) | Explain working and construction of bag filters. | 07 |
| OR | | | |
| Q.5 | (a) | Write short note on magnetic separator. | 03 |
| | (b) | With the help of a neat sketch explain the construction and working of a cyclone separator. | 04 |
| | (c) | Describe batch sedimentation process with a graph. | 07 |
