Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2143506 **Date: 30/05/2015**

Subject Name: Unit Operations-I

Time: 10:30 am-1:00 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 a short note on differential analysis. **07**

(b) With neat diagram explain construction, working and applications of cyclone separator. **07**

Q.2 **(a)** Define ultrafine grinder, list out name of equipments in this class of grinder and describe any one in detail. **07**

(b) Define: critical speed of a ball mill and state its significance. Determine critical speed and operating speed of a ball mill of a ball mill which contains 80 mm size balls and it has feed size of 1000 mm. **07**

OR

(b) Write a short note on electrostatic precipitator. Discuss its applications in environmental pollution control. **07**

Q.3 **(a)** Explain various factors affecting size reduction. **07**

(b) Explain ideal and actual screens. Discuss various parameters affecting screening efficiency. **07**

OR

Q.3 **(a)** Write a short note on basket centrifuge. **07**

(b) Explain bag filters and their applications in environmental pollution problems. **07**

Q.4 **(a)** Expalin magnetic separation in detail. **07**

(b) With neat diagram explain batch sedimentation test. **07**

OR

Q.4 **(a)** For sample of solid mixture following results are reported. Perform a weight analysis and determine (i) surface mean diameter and (ii) mass mean diameter. **07**

Diameter (mm)	4.8	3.6	1.20	0.80	0.45	0.20	0.10	0.05
Weight of Particles (gm)	20	180	200	80	90	70	100	60

(b) What are the key components used in froth floatation. With suitable examples explain their applicability and action. **07**

Q.5 **(a)** List out different types of thickener and explain any one in detail. **07**

(b) Write a short note on trickling filter. **07**

OR

Q.5 **(a)** Write a short note on 'Trommel'. **07**

(b) Define: terminal settling velocity. Determine terminal settling velocity of a spherical particle has diameter of 50 µm and specific gravity of 2.6 settled in water at 25 ^{0}C. Assume stoke's law is applicable. Density of water at 25 ^{0}C is 1000 Kg/m^3. Viscosity of water at 25 Celsius degree = 10 $^{(-3)}$ Kg/m sec. **07**

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