

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – WINTER • 2014****Subject Code: 150502****Date: 28-11-2014****Subject Name: Mechanical Operation****Time: 10.30 am - 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) Explain the need of size reduction in process industries? **07**
 (b) Explain construction and working of Jaw crusher with a neat sketch? **07**

- Q.2** (a) What will be the power required to crush 150 tonnes per hour of limestone if 80% of the feed passes 50mm screen and 80% of the product passes a 3.125mm screen? Work index of limestone = 12.74. **05**
 (b) Define (i) Sphericity and (ii) mass mean diameter **02**
 (c) Explain construction and working of Filter press with a neat sketch **07**

OR

- (c) Explain working of cyclone separator with a neat sketch. **07**
Q.3 (a) What is fluidization? Discuss the conditions for fluidization. **07**
 (b) Explain different types of agitators and their selection criteria. **07**

OR

- Q.3** (a) With the help of flow diagram explain open-circuit and closed-circuit grinding operation. **07**
 (b) One tonne per hour of dolomite is produced by a ball mill operating in a closed circuit with a 100 mesh screen. The screen analysis (wt%) is given below. Calculate the screen efficiency. **07**

Mesh	Feed	Oversize	Undersize
35	8.2	13.9	0
48	15.1	32.2	0
65	13.9	27.4	0
100	11.4	20.3	2.4
150	9.2	4.5	14.4
200	7.9	1.7	13.4
-200	34.3	0	69.8
Sum	100	100	100

- Q.4** (a) Explain working of any one ultrafine grinding equipment with a neat sketch. **07**
 (b) Write statement and equation of Kicks law. A set of crushing rolls of 1400 mm diameter by 400 mm width of face. Minimum spacing between two rolls is 10 mm and the angle of nip is 30°. What is the maximum permissible size of feed? **07**

OR

- Q.4** (a) List different types of industrial conveyers and explain any one in detail. **08**
 (b) Describe a continuous gravity thickener with a neat sketch. **06**
Q.5 (a) Describe different types of solid mixers in brief and their applications. **06**
 (b) Discuss particle shape and size. Explain the principle of ribbon blender with its different industrial application. **08**

OR

- Q.5** (a) Differentiate between clarifier and classifier along with their working principle. **07**
 (b) What is swirling and what is its effect on liquid mixing. What are the various ways of prevention of swirling? **04**
 (c) Define power number and give its significance? **03**
