

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering - SEMESTER-II • EXAMINATION – SUMMER 2013

Subject Code: 320013

Date: 21-06-2013

Subject Name: Mechanical Operation (CEO – I)

Time: 2:30 pm - 05:00 pm

Total Marks: 70

Instructions:

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is considered to be Authentic.

- Q:1 (a) Differentiate unit operation and unit process. 07
(b) Classify size reduction equipments. 07
- Q:2 (a) Define: sphericity, specific surface area, volume surface mean diameter, mass Mean diameter. 07
(b) Write a note on types of screen analysis. 07
- OR
- (b) Calculate the power required to crush 100 tons of lime stone (work index 12.7) If 80% feed passes through a screen opening 50 mm and 80% of product passes through screen opening 3 mm. 07
- Q:3 (a) Describe the crushing laws and explain all in detail. 07
(b) Explain plate and frame filter press with sketch. 07
- OR
- Q:3 (a) Explain theory of batch sedimentation. 07
(b) Discuss principle, construction and working of cyclone separator. 07
- Q:4 (a) What are the advantages and disadvantages of centrifuge over filter press. 07
(b) Explain constant rate filtration and constant pressure filtration. 07
- OR
- Q:4 (a) Explain methods of vortex prevention. 07
(b) Explain agitation vessel with principle, working and construction. 07
- Q:5 (a) Write a note on electrostatic precipitator. 07
(b) Explain banbury mixture. 07
- OR
- Q:5 (a) Derive an expression for power calculation in agitation. 07
(b) While analyzing 100 gms. Sand sample by testing sieves, the following Observation were recorded.
- | Clear opening(cms) | Material retained(gms) |
|--------------------|------------------------|
| 0.4690 | 0.0 |
| 0.3327 | 18.00 |
| 0.2362 | 29.00 |
| 0.1651 | 36.00 |
| 0.1168 | 17.00 |
- Calculate the specific surface area and volume surface mean diameter for this Sample. Specific gravity of particles=2.65, Sphericity $Q_s=0.571$. 07
