Seat No.: _____  Enrolment No. 

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020**

**Subject Code:3150502** **Date:01/02/2021**

**Subject Name:Mechanical Operations**

**Time:10:30 AM TO 12:30 PM** **Total Marks: 56**

**Instructions:**

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | Marks |
|---|---|---|---|
| **Q.1** | **(a)** | Define (1) Mesh number (2) Angle of nip (3) Work index | **03** |
| | **(b)** | Write a short note on Screen analysis. | **04** |
| | **(c)** | Describe various laws for size reduction and write principle of comminution. | **07** |
| **Q.2** | **(a)** | What is power number and its significance? | **03** |
| | **(b)** | What the use is of filter aid and filter media? | **04** |
| | **(c)** | Give classification of various size reduction equipments. | **07** |
| **Q.3** | **(a)** | Define sphericity. Prove that sphericity of sphere is unity. | **03** |
| | **(b)** | What rotational speed in RPM would you recommend for a ball mill of 1200 mm in diameter charged with 75mm balls? | **04** |
| | **(c)** | Describe open circuit & closed circuit operation with neat sketch. | **07** |
| **Q.4** | **(a)** | Calculate 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. | **03** |
| | **(b)** | Explain sink and float method. | **04** |
| | **(c)** | With the help of a neat sketch explain the construction and working of a toothed roller crusher and write the important equations for roll crusher. | **07** |
| **Q.5** | **(a)** | What are the various equipments used for storage of solids? Discuss any one. | **03** |
| | **(b)** | With neat diagram explain about grizzlies. | **04** |
| | **(c)** | With the help of neat sketch explain different types of impellers for agitation of liquids along with application. | **07** |
| **Q.6** | **(a)** | Discuss the different criteria's for selection of conveyers. | **03** |
| | **(b)** | Explain: "For efficient grinding, ball mills must be operated at a speed less than the critical speed." | **04** |
| | **(c)** | With neat sketch, explain pneumatic conveying system with advantages and disadvantages. | **07** |
| **Q.7** | **(a)** | Explain minimum fluidization velocity. | **03** |
| | **(b)** | Describe batch sedimentation process with a neat sketch in details. | **04** |
| | **(c)** | Explain construction and working of continuous rotary vacuum filter. | **07** |
| **Q.8** | **(a)** | Discuss applications of fluidization in chemical industry. | **03** |
| | **(b)** | Write short note on batch centrifuge. | **04** |

(c) With neat diagram explain construction and working of plate and frame filter press also state its advantages and limitations. **07**