

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2022****Subject Code:3150502****Date:11-01-2023****Subject Name:Mechanical Operations****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

	MARKS
Q.1 (a) Define (1) Screen efficiency (2) Ideal screen (3) Specific surface area of mixture	03
(b) Define sphericity. Find the sphericity cylinder having $D=H$.	04
(c) Explain the construction and working of a trommels with the help of a neat sketch and enlist various trommels arrangement.	07
Q.2 (a) A feed consists of 60% coarse particles, which are to be recovered. The oversize and undersize contain 20% and 90%, respectively, fine particles. What is the values of Y_A , Y_B and Y_C .	03
(b) What rotational speed in RPM would you recommend for a ball mill 1100mm in diameter charged with 70 mm balls?	04
(c) Classify comminuting equipment and give suitable industrial application of it.	07
OR	
(c) A material is crushed in a jaw crusher and the average size of the particle is reduced from 5 cm to 1.3 cm with consumption of energy at the rate of 37 Watt.hr/ton. What will be the consumption of energy necessary to crush the same material of average size 8 cm to an average size 3 cm? The mechanical efficiency remains same. (a) Using Rittinger's law; (b) using Kick's law	07
Q.3 (a) Explain use of Filter aid with a suitable example.	03
(b) Classify the Filtration equipments with examples in each category.	04
(c) What is the differential settling method? Explain in detail the working of batch sedimentation with application.	07
OR	
Q.3 (a) Discuss Sink and float method	03
(b) Explain construction and working of the Hydrocyclones separator.	04
(c) Explain construction and working of continuous rotary vacuum filter.	07
Q.4 (a) Write down purpose of mixing	03
(b) Differentiate agitation and mixing.	04
(c) Discuss selection criteria of agitator.	07
OR	
Q.4 (a) What is mixing index and its significance.	03
(b) Discuss different method for prevention of swirling and vortex formation in agitated tank.	04
(c) Describe the different mixing equipments used for solid mixing in brief.	07

- Q.5** (a) List different types of industrial conveyers **03**
(b) Explain in detail the bucket conveyer. **04**
(c) Explain in detail: Types of fluidization. **07**
- OR**
- Q.5** (a) Enlist the industrial application fluidization. **03**
(b) Discuss minimum fluidization velocity and pressure drop in fluidized bed with neat sketch. **04**
(c) List different types of industrial conveyers and explain any one in detail. **07**
