

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020****Subject Code:2150502****Date:01/02/2021****Subject Name:Mechanical Operation****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.

- Q.1** (a) Differentiate between constant rate filtration and constant pressure filtration **03**
(b) Discuss mechanisms of filtration with schematic. **04**
(c) A plate and frame press gave a total of 8 m³ of filtrate in 1800 s and 11.3 m³ in 3600 s when filtration was stopped. Estimate the washing time if 3 m³ of wash water is used. The resistance of the cloth may be neglected and a constant pressure is used throughout. **07**
- Q.2** (a) Define (i) Sphercity (ii) Crushing efficiency (iii) screen capacity **03**
(b) Explain principle of comminution. **04**
(c) Draw various screen motions and give comparison of ideal and actual screen. **07**
- Q.3** (a) Differentiate between clarifier and classifiers **03**
(b) Discuss factors affecting performance of cyclone. **04**
(c) Define fluidization. Explain the condition for fluidization with pressure drop and bed height vs. superficial velocity for bed of solids. **07**
- Q.4** (a) Define: (i) angle of nip and (ii) mixing index (iii) and mesh number. **03**
(b) Write a short note on tubular centrifuge. **04**
(c) Discuss Kynch theory for design of continuous thickener. **07**
- Q.5** (a) What is the difference between differential analysis & cumulative analysis? **03**
(b) Write short note on storage of solids. **04**
(c) Explain construction and working of rotary drum filter with its neat diagram. **07**
- Q.6** (a) State and explain various types of impeller used for liquid mixing. **03**
(b) Discuss various methods for prevention of swirling. **04**
(c) Explain principle of ultrafiltration, types of membrane and membrane modules used for it. **07**
- Q.7** (a) List out applications of fluidization in chemical industry. **03**
(b) Discuss principle and application of differential settling method. **04**
(c) Explain basic principle of Ribbon blender and its industrial application. **07**
- Q.8** (a) Give significance of Power no, Reynolds no and Froude no for mixing of liquids. **03**
(b) Write short note on scale up of agitated vessel. **04**
(c) What are the different types of conveyers? Explain the screw conveyer in detail. **07**
