

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3150505****Date:15/09/2021****Subject Name:Particle and Fluid Particle Processing****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.

- Q.1** (a) State the purposes of agitation of liquid in chemical industries. **03**
 (b) Explain conditions for fluidization with neat sketch. **04**
 (c) In a filter press, at a constant pressure difference of 3.0 kg/cm^2 , a 12 cm cake is formed in one hour with a filtrate volume of 5400 liters. Washing proceeds exactly as filtration using 900 liters. All other operation takes 11 minutes time. Assume the filtrate has same properties of wash water. The rate of washing is 0.20 times the final filtration rate. Calculate the volume of filtrate produced in one day of operation. **07**
- Q.2** (a) List out basic requirement for the septum in any industrial filtration. **03**
 (b) Explain Sink and float method for classification of solids. **04**
 (c) With schematic explain various flow pattern of liquids and prevention of vortex formation in agitated vessel. **07**
- OR**
- (c) Discuss Coe-Clevenger theory for thickener area **07**
- Q.3** (a) State various types of impellers used for mixing and agitation of liquid. **03**
 (b) Define screen capacity and briefly discuss about screen effectiveness and capacity. **04**
 (c) With schematic representation discuss working of Rotary drum filtration unit. **07**
- OR**
- Q.3** (a) Explain/define following terms: (i) Froude number (ii) Power number (iii) Critical sedimentation time **03**
 (b) Discuss types of fluidization. **04**
 (c) With neat sketch explain moving bed leaching equipment. **07**
- Q.4** (a) State various application of fluidization in chemical industries. **03**
 (b) Write short note on scale up of agitated vessel. **04**
 (c) Explain construction and working of Fluidized bed reactor. **07**
- OR**
- Q.4** (a) Define following terms: Magma, Invariant crystal, critical moisture content. **03**
 (b) Explain principle of drying and patterns of gas–solid interaction in dryers. **04**
 (c) Discuss working and construction of helical element static mixer. **07**
- Q.5** (a) Explain various mechanism of size reduction. **03**
 (b) Explain concentration profile in continuous thickeners. **04**
 (c) Write short note on Freeze drying **07**

OR

- Q.5** (a) Differentiate between homogeneous and heterogeneous nucleation. **03**
(b) Discuss batch sedimentation test with different concentration zones. **04**
(c) Discuss working of cyclone separator and state factors affecting the performance of the cyclone. **07**
