

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022****Subject Code:3150505****Date:09/06/2022****Subject Name:Particle and Fluid Particle Processing****Time:02:30 PM TO 05:00 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) Write names of different solid-fluid reactors. **03**  
 (b) State classification of solid-fluid operations. **04**  
 (c) Explain various types of fluidization in detail. **07**
- Q.2** (a) List six applications of crystallization operation. **03**  
 (b) What are the various types of mechanical impellers? Write two applications of each. **04**  
 (c) With neat diagram explain mechanism of crystal growth in detail. **07**
- OR**
- (c) With neat diagram explain drying rate curve in detail. **07**
- Q.3** (a) What are kneaders? **03**  
 (b) What is function of filter aids? State four examples of filter aids. **04**  
 (c) With neat diagram explain batch sedimentation test in detail. **07**
- OR**
- Q.3** (a) Enlist six types of conveyers. **03**  
 (b) Draw a labeled diagram of Swenson-walker crystallizer. **04**  
 (c) With neat diagram explain construction and working of Bollman extractor used for leaching operation. **07**
- Q.4** (a) State important parameters affecting leaching. **03**  
 (b) With neat diagram explain construction and working of tray drier. **04**  
 (c) A plate and frame filter press filtering a slurry, gave total of 25 m<sup>3</sup> of filtrate in 30 minutes and 35 m<sup>3</sup> of filtrate in 60 minutes, when filtration was stopped. Estimate the washing time in minutes if 10m<sup>3</sup> of washed water are used. The resistance of filter cloth is neglected and a constant pressure is used throughout. **07**
- OR**
- Q.4** (a) Explain in brief about growth of crystals. **03**  
 (b) Write a short note on hydraulic transport. **04**  
 (c) With neat diagram explain construction and working of rotary drum vacuum filter. **07**
- Q.5** (a) State names of three mechanism of filtration. **03**  
 (b) Write in brief about intensive mixers. **04**  
 (c) Explain in detail about scale up of agitated vessel. **07**
- OR**
- Q.5** (a) List out important applications of fluidization in chemical industries. **03**  
 (b) A 100 Kg batch of granular solids containing 30% moisture is to be dried in a tray dryer is dried to 16% moisture by passing a current of air at 350K across its surface at velocity of 1.8 m/sec. If constant rate of drying under these conditions is 0.7x10<sup>-3</sup> Kg/m<sup>2</sup> Sec. Drying surface is 0.03 m<sup>2</sup>/Kg of dry weight and critical moisture content is 15% Calculate total drying time. **04**  
 (c) Explain in detail about slurry transportation. **07**

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