

**GUJARAT TECHNOLOGICAL UNIVERSITY****B. Pharm.- SEMESTER- I • EXAMINATION – SUMMER-2016****Subject Code:210004****Date: 23/05/2016****Subject Name: Pharmaceutical Engineering****Time: 02:30 pm – 05:30 pm****Total Marks: 80****Instructions:**

- 1. Attempt any five questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1** (a) Define the following terms: (i) Unit operations (ii) Dimensional equation. Give the importance of pharmaceutical engineering in the field of pharmacy. **06**
- (b) List the unit operations & unit processes. Write the SI units for mass, length, time, temperature, heat & force. **05**
- (c) Write a short note on different types of graphical representations. **05**
- Q.2** (a) Define and explain following terms giving appropriate examples. (1) Stoichiometry (2) Unit operation (3) Tie substance **06**
- (b) Discuss Dalton's law, Amagat's law and their corollary. **05**
- (c) Write a brief note on material and energy balance. **05**
- Q.3** (a) Describe total mechanical energy balance. **06**
- (b) Give Reynold's equation. Why it is dimensionless, prove it and mention significance of Reynold's number. **05**
- (c) Differentiate (1) Orifice meter and Venturimeter. (2) Stream line and Turbulent flow. **05**
- Q.4** (a) Classify transport systems for solid. Explain belt conveyor. **06**
- (b) Explain Piston Pump. **05**
- (c) Describe pneumatic conveyors with its diagram. **05**
- Q.5** (a) What is thermal radiation? Explain the concept of Black body and Gray body in thermal radiation. **06**
- (b) What is conduction? Give Fourier's law and derive its equation. **05**
- (c) A glass window with an area of 6 ft<sup>2</sup> is installed in a wooden wall of a room. The dimensions of this wall are 8 by 10 ft. The wood is 1 – in. thick and has a thermal conductivity of 0.087 Btu/(hr)(ft<sup>2</sup>)(°F/ft). The glass is 1/8 – in thick and has a thermal conductivity of 0.40 Btu/(hr)(ft<sup>2</sup>)(°F/ft). Fi inside wall and glass temperature is 90°F and outside wall and glass temperature is 30°F. **05**
- Q.6** (a) Discuss the principle involved in mass transfer. Enumerate unit operations in which mass transfer operation is involved. **06**
- (b) Write a short note : Steam as Heating media **05**
- (c) Classify heat exchange equipment. Discuss construction and working of single pass tubular heatexchanger. **05**
- Q.7** (a) Discuss the theory of corrosion. Describe the importance of corrosion. **06**
- (b) Discuss various factors affecting on selection of materials for plant construction. **05**
- (c) Discuss advantages and limitations of different kind of plastics used in Pharmaceutical industry. **05**