

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VII CHEMICAL : WINTER- 2022
SUBJECT : CHEMICAL PROCESS EQUIPMENT DESIGN-II

Day : Wednesday

Time : 02:30 PM-05:30 PM

Date : 07-12-2022

W-13593-2022

Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if **NECESSARY**.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Use of non-programmable **CALCULATOR** is allowed.

- Q.1 Design a vertical short tube calandria for an evaporator with reference to diameter of tube sheet and calandria sheet thickness. (10)
- a) Heat transfer area = 220 m²
 - b) Steam pressure = 0.15 N/mm²
 - c) Density of liquid = 1000 kg/m³
 - d) MOC (tube) = brass
 - e) Permissible stress for C.S. = 98 N/mm²
 - f) Modulus of elasticity (brass) = 9.5 x 10⁴ N/mm²
 - g) Viscosity = 0.3
 - h) Tube dia. (o.d.) = 100 mm
 - i) Tube thickness = 1.5 mm
 - j) Tube length = 1165 mm
 - k) Triangular pitch = 125 mm
 - l) Proportionality factor $\beta = 0.9$
- OR**
- Q.1 Discuss the salient feature of different types of crystallizers with neat diagram and their working. (10)
- Q.2 Explain the design procedure with various equations for design of rotary drum vacuum filter, including design of drum, shaft, bearing and drive system. (10)
- OR**
- Q.2 Explain various types of continuous dryers with neat sketch and working mechanism. (10)
- Q.3 Define plate efficiency? How would you design a bubble cap tray column for separation of two components? (10)
- OR**
- Q.3 Explain design method for binary system for sieve tray column. (10)
- Q.4 Write a note on: (10)
- i) Cornell's method for packed column design
 - ii) Onda's method for packed column design
- OR**
- Q.4 Explain the design procedure for packed column using HTU, NTU concept. (10)
- Q.5 Explain various types of piping material and their specification used in chemical process industries. (10)
- OR**
- Q.5 Write notes on: (10)
- i) Pipe fittings
 - ii) Types of Flanges
 - iii) Types of Valves
- Q.6 What are the various types of pipe supports? Why it is necessary. (10)
- OR**
- Q.6 What do you understand by expansion joints in piping system. (10)