

Total No. of Questions : 10]

P3403

SEAT No. :

[Total No. of Pages : 2

[5670]-679

B.E. (Chemical)

CHEMICAL ENGINEERING DESIGN - II

(2015 Pattern) (Semester - I) (409343) (End sem.)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, and Q.9 or Q.10
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) Describe in brief design variables in distillation. [4]

b) Calculate the plate pressure drop in a distillation column from the following data: [6]

Maximum Vapour velocity through holes on the plate = 24.4 m/s

Orifice Coefficient = 0.82 Vapour density = 0.72 kg/m³

Liquid density = 1000 kg/m³ Hole diameter = 5 mm

Plate thickness = 5 mm Height of overflow weir = 25 mm

OR

Q2) Explain in brief Onda's method for prediction of HTU. [10]

Q3) a) State the difference between random packing and structured packing in a packed column. [4]

b) Explain the procedure of downcomer design with relevant equations. [6]

OR

Q4) a) Write the two equations with applications of Cornell's method for prediction of HTU. [5]

b) Describe in brief supports used for packings in a packed column and function of hold down plates. [5]

P.T.O.

Q5) a) Water is flowing through a pipeline of 25 mm i.d. for a distance of 3 km. The impressed head of water is 10 m of H₂O. [8]

Density of water = 1000 kg/m³

Viscosity of water = 1×10^{-3} Ns/m²

Determine the flow rate of water through the pipeline.

b) Describe in brief types of gaskets and their selection. [8]

OR

Q6) a) Find the head loss per km of a 20cm diameter asphalted cast iron pipe, when the water is flowing through the pipeline at the rate of 0.05 m³/s. [8]

Density of water = 1000 kg/m³

Viscosity of water = 0.89 CP

Fanning friction factor = 0.019

b) State factors to be considered in design of a pipeline for transportation of crude oil. [8]

Q7) a) Describe in brief different methods used for treatment of waste water [8]

b) Describe in brief properties of steam. [8]

OR

Q8) a) State desirable properties for selection of material for piping. [6]

b) Explain in brief Boiler mountings and Boiler accessories. [10]

Q9) a) Describe in brief Non-Steam heating systems using thermic fluids. [8]

b) Explain in brief preventive and predictive types of plant maintenance. [10]

OR

Q10) a) Write a short note on: Psychrometry. [6]

b) Explain in brief: Lubrication. [6]

c) Describe in brief maintenance of a Centrifugal pump. [6]

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