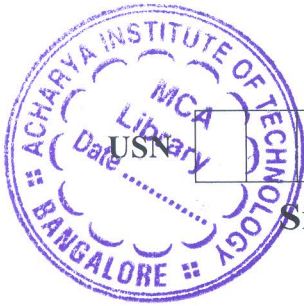


CBCS SCHEME

18BT62



Sixth Semester B.E. Degree Examination, June/July 2024 Bioprocess Equipment Design and CAED

Time: 4 hrs.

Max. Marks: 100

- Note : 1. Answer any ONE full questions.
2. Use of Perry hand book is permitted.

- 1 2900kg/h of Toluene is cooled from 71°C to 37°C by heating amyl acetate from 30°C to 40°C using 4500mm hairpins exchanger is 2 inch by 1¼ inch IPS concentric pipe with detachable flanges, 180 ° return bend. Annulus are also interconnected with flange joints with a combined dirt factor of 0.0082h m² K Cal⁻¹. Calculate number of hairpins, pressure drop on each side.

(50 Marks)

Draw to scale the exchanger with relevant details.

(50 Marks)

- 2 2900kg/h of pure ethanol slightly above atmospheric pressure is to be condensed using water as coolant and is available at 25°C and leaving at 50°C. Calculate the required size of vertical condenser for following data :

Outside diameter of tube = 25.4mm.

Thickness of tube = 2.6mm

Length of tube = 3.3m

Triangular pitch is to be assumed.

Water velocity is 2m/s.

Design the condenser in detail.

(60 Marks)

Draw to scale the sectional elevation of condenser.

(40 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.