

B.Tech. SEM -VI (Chemical 2014 Course (CBCS) : WINTER - 2018

SUBJECT: CHEMICAL PROCESS EQUIPMENT DESIGN – I

Day : Wednesday
Date : 14/11/2018

W-2018-2441

Time : 10.00 AM TO 01.00 PM
Max Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non programmable calculator is **ALLOWED**.
- 4) Assume suitable data, if necessary.

- Q.1** a) Explain various codes and standards in design. (05)
b) Explain the significance of process equipment design in chemical plant. (05)

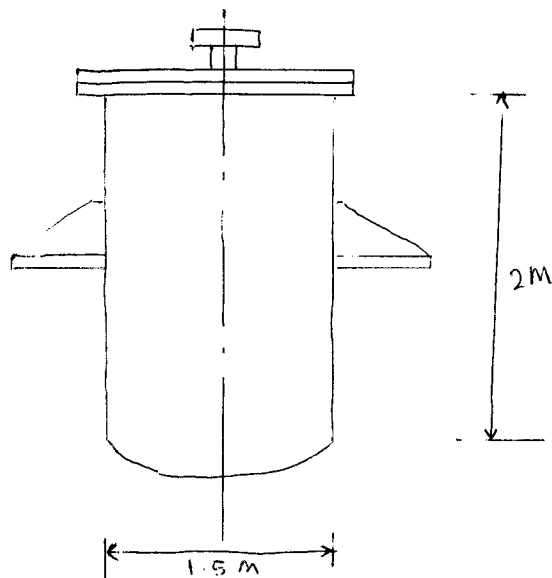
OR

Explain theories of failure in detail. (10)

- Q.2** Derive the equation for designing of thin walled vessel under internal pressure. (10)

OR

Estimate the thickness required for the component part of vessel shown in the diagram. The vessel is to be operated at a pressure of 14 bar (absolute) and temperature of 300°C. The material of construction will be plain carbon steel. Weld will be fully radio graphed. A corrosion allowance of 2mm should be used. Typical design stress = 85 N/mm² (10)



- Q.3** Explain the types of supports in detail. (10)

OR

- a) Explain types of flanges also explain their selection criteria. (05)
- b) Explain various stress induced in supports. (05)

- Q.4** Gas oil at 200°C is to be cooled to 40°C. The oil flow rate is 22500 kg/h. Cooling water is available at 30°C and the temperature rise is to be limited to 20°C. The pressure drop allowance for each stream is 100 KN/m². Design for this duty. (10)

P. T. O.

OR

a) Explain Kern's method for exchanger design. (05)

b) Explain Bell's method. (05)

Q.5 a) Explain various agitators used in chemical process industry. (05)

b) Explain selection criteria of agitator. (05)

OR

Derive the equation for power consumption in agitator. (10)

Q.6 Explain general design procedure for decanter.

OR

a) Explain designing of cyclone separator. (05)

b) Explain Multi effect evaporator in detail. (05)

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