Total No. of Questions : 6]

SEAT No. :

P1536

[Total No. of Pages : 2

TE/Insem/APR-136
T.E. (Chemical Engineering)
CHEMICAL ENGINEERING DESIGN - I
(2015 Pattern)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates :

1) ***Assume suitable data, if necessary.***
2) ***Neat figures to the right indicate full marks.***
3) ***Use of scientific calculator is allowed.***
4) ***Attempt Q.1 or 2, Q.3 or 4 and Q.5 or 6.***

Q1) a) Enlist and Explain various losses during storage of volatile liquids. **[5]**

b) Draw and explain various types of roofs used for storage vessels. **[5]**

OR

Q2) a) Explain Hortonspheres as storage vessels and give its any two applications. **[5]**

b) Give detailed design procedure for design of Cylindrical storage vessels with cone roof. **[5]**

Q3) A tall vertical vessel 1.5 m in diameter and 13 m high is to be provided with the skirt support. Weight of the vessel with all its attachments is 80,000 Kg. Diameter of skirt is equal to the diameter of the vessel. Height of skirt is 2.2 m. wind pressure acting over the vessel is 100 Kg/m^2. Seismic coefficient = 0.08, permissible tensile stress of skirt material = 960 Kg/m^2, permissible compressive stress is 1/3rd yield stress of material. Yield stress is 2400 Kg/cm^2, estimate the thickness of skirt support. **[10]**

OR

Q4) a) Explain saddle support with neat sketch and show various proportions for Saddle support. **[5]**

b) Draw and explain various types of supports used to support vessels. **[5]**

P.T.O.

Q5) a) What is temperature correction factor? How is it calculated? Why is it used in design of heat exchanger. **[5]**

b) Write short note on : **[5]**

i) Plate Heat exchangers.

ii) Tube in tube type heat exchangers.

OR

Q6) A1800 kg/hr of an organic liquid is to be cooled from 100°C to 60°C by water available at 15°C. The maximum temperature to which water can be heated is 42°C. Water is circulated through the annulus of concentric tube heat exchanger. ID of inner tube = 12.5mm. OD of inner tube = 14.5 mm. ID of outer tube = 22mm. Design the heat exchanger. Neglect fouling and tube wall resistance. Properties of organic liquid –Density = 1078 kg/m^3 viscosity = 3.2 m N s/m^3, specific heat = 2650 J/kg. k, Thermal conductivity = 0.26 w/m.k Water – Density = 995 kg/m^3 viscosity = 0.853×10^{-3} N.s/m^2 sp. heat = 4180 J/kg k, Thermal conductivity = 0.61 W/m.k. **[10]**

	Ethylene Glycol	Water
Density kg/m^3	1078	995
Viscosity N.S/m^2	3.2×10^{-3}	0.853×10^{-3}
Specific Heat J/Kg k	2650	4180
Thermal Conductivity W/mk	0.261	0.614