

B.Tech. Sixth Semester (Chemical Tech.(Food, Pulp & Paper, Oil & Paint and Petro Technology)) (CGS)

11043 : Process Equipment - Design & Drawing : 6 CT 01

P. Pages : 2

Time : Three Hours



AU - 2813

Max. Marks : 80

- Notes :
1. Answer **Three** question from Section A and **Three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and chemical equations should be given wherever necessary.
 5. Illustrate your answer necessary with the help of neat sketches.
 6. Cell phone not permitted.
 7. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Discuss theories of failure and their combined stresses. 8
b) Explain protective coatings. 6

OR

2. a) Discuss method of corrosion prevention. 6
b) Discuss the different method used for lining of chemical equipment. 8
3. a) How can we select the most economical head? 6
b) A vessel with inside diameter 40 cm is fabricated from a material having yield strength 4500 kg/cm². What maximum pressure service can be achieved if it is possible to increase the thickness during fabrication. 7
Factor of safety is 4.0.

OR

4. a) A cylindrical shell of a vessel has an inside diameter 4m and is subjected to an internal pressure 5 kg/cm². Calculate the required thickness and corresponding deflection. Allowable tensile stress of material is 1200 kg/cm². 7
b) Discuss comparison between Jacket and Coil and their applications. 6
5. a) Explain vessel closures and their applications. 6
b) A cylindrical vessel is provided with a conical bottom having base diameter 240 cm. Half apex angle of the cone is 45°. Design pressure of the vessel is 1.5 kg/cm². Permissible compressive stress in compression ring is 680 kg/cm². Calculate the area of compression ring required for the conical bottom. 7

OR

6. a) What are types of helical ribbon agitator? Draw their sketch. 8
b) Explain stresses in shell of high pressure vessels. 5

SECTION – B

7. a) How we can calculate gasket width? 6
b) What are different types of nozzles? Discuss fabricated Nozzle and their design. 8

OR

8. a) Estimate period of vibration for a tall vertical vessel 2.5m in diameter and 40m in height. The thickness of vessel is 12mm. The column has no attachments. Weight of the vessel per unit length is 1250 kg/m. 7
b) How to estimate stress due to seismic load and bending moment? 7
9. a) How we can store volatile, non-volatile liquid and gases? 6
b) Explain mechanical design of horizontal storage tank with saddle supports. 7

OR

10. a) A horizontal cylindrical tank with flat ends has a diameter 4m. The liquid height in the tank is 0.8m. It is 20% D. Find volume of liquid in tank. 6
b) Discuss cryogenic liquid storage tanks. 7
11. Water is to flow through a pipeline 25mm in internal diameter for a distance of 2km. The impressed head of water is 10m of H₂O. 13
Density of water = 1000 kg/m³
Viscosity of water = 1 x 10⁻³ N-s/m²
Estimate the flow rate of water through the pipeline.

OR

12. a) Explain in details in importance of piping layout in chemical process plant. 7
b) how to determine thickness of pipe? 6

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