

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA ENGINEERING – SEMESTER –VIII • EXAMINATION – SUMMER-2017

Subject Code: 3385502**Date: 04/05/2017****Subject Name: Process Equipment Design****Time:10:30 AM TO 1:00 PM****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Each question carry equal marks (14 marks)

- Q.1 (a) Write syntax of 14 different AutoCAD commands used to prepare drawing shown in Fig.-1 07
- (b) Calculate minimum thickness required for seamless ellipsoidal head as per UG 32 of ASME Sec VIII Div 1 from following data : 07
1. Internal Diameter = 3500 mm
 2. Height = 850 mm
 3. Design pressure = 1.6 MPa
 4. Strength as per ASME SEC II A = 105 MPa
 5. Weld joints efficiency = Type 1,100% RT
 6. Corrosion allowance = 6 mm

Values for Factor K

| | | | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|-----|
| D/ 2h | 3.0 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.0 |
| K | 1.83 | 1.73 | 1.64 | 1.55 | 1.46 | 1.37 | 1.29 | 1.21 | 1.14 | 1.07 | 1.0 |
| D/ 2h | 1.9 | 1.8 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1.0 | |
| K | 0.93 | 0.87 | 0.81 | 0.76 | 0.71 | 0.66 | 0.61 | 0.57 | 0.53 | 0.5 | |

- Q.2 (a) Explain consideration of thermal stresses and discontinuity stresses in process equipment design 07
- (b) Explain selection criteria of Material for Process Equipment used for food manufacturing equipment and Justify your selection. 07

OR

- (b) Explain Mechanical Properties Of Material used for process equipment. 07
- Q.3 (a) Find the diameter of a solid steel shaft to transmit 25 kW at 150 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 6. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameter is 0.5. 07

OR

- (b) Explain packaging and gasket with neat sketch. 07
- Q.3 (a) Explain different types of agitator used in reaction vessel. 07
- (b) Explain in briefly heating system in reaction vessel. 07

- Q.4 (a) Write brief note on clad material for heat exchanger. 07
- (b) Write brief note on TEMA code. 07

OR

- Q.4 (a) List different application of heat exchangers in process plant and explain application of heat exchangers in: 07
1. Air-separation and LNG(Liquefied natural gas) plant
 2. Lubricating oil coolers
 3. Power plant operations
 4. Food processing industries.
- (b) List different types of evaporators. Explain basket type evaporator with neat sketch. 07
- Q.5 (a) Explain the design consideration of crystallizer with neat sketch. 07
- (b) List different types of internal used in distillation column with neat sketch. 07
- OR
- Q.5 (a) List different types of hazards in process industry. 07
- (b) Classify and explain the pressure relief devices and explain vents and flame arresters. 07

FIG-1 ALL DIMENSIONS ARE IN MM

