Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering - SEMESTER–VIII • EXAMINATION – WINTER • 2016

Subject Code: 3385502 **Date: 24-10-2016**

Subject Name: Process Equipment Design

Time: 10:30 am - 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make Suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of programmable & Communication aids are strictly prohibited.**
5. **Draw a neat sketch whenever necessary**
6. **English version is authentic.**

Q.1 (a) Write syntax of 14 different AutoCAD commands used to prepare drawing shown in Fig.-1 07

(b) Calculate the thickness of a Torispherical head as per UG 32(J) of ASME Sec VIII Div 1for the following conditions : 07

1. Internal diameter = D = 1016 mm
2. Dome radius (outside dia. of skirt of head) = L = 1016 mm
3. Knuckle radius = r = 102 mm
4. Pressure = p = 1.38 MPa
5. Strength as per ASME SEC II A= S = 95 MPa
6. Weld joints efficiency = E = 1.0

Values for Factor M

L/r	1.0	1.25	1.5	1.75	2.0	2.25	2.5	2.75	3.0	3.25	3.5
M	1.00	1.03	1.06	1.08	1.10	1.13	1.15	1.17	1.18	1.2	1.22
L/r	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
M	1.25	1.28	1.31	1.34	1.36	1.39	1.41	1.44	1.46	1.48	1.50
L/r	9.5	10.0	10.5	11.0	11.5	12.0	13.0	14.0	15.0	16.0	16.6
M	1.52	1.54	1.56	1.58	1.60	1.62	1.65	1.69	1.72	1.75	1.77

Q.2 (a) What is loading on process equipment? Explain different categories and types of loading on process equipment. 07

(b) Explain selection criteria of Material for Process Equipment used for Milk silo and Justify your selection. 07

OR

(b) Define Corrosion and explain Types of Corrosion observed in Process Equipment. 07

Q.3 (a) A hollow steel shaft transmits 600 kW at 500 r.p.m. The maximum shear stress is 70 MPa. Find the outside and inside diameter of the shaft, if the outer diameter is twice of inside diameter, assuming that the maximum torque is 20% greater than the mean torque. 07

(b) Explain the function of key. Explain types of key with neat sketch. 07

OR

Q.3 (a) Explain different types of agitator used in reaction vessel. 07

(b) Write classification of heat exchanger explain any one with neat sketch. 07

Q.4	(a)	Write brief note on TEMA.	07
	(b)	Explain design consideration of shell and tube type heat exchanger.	07
		OR	
Q. 4	(a)	List different types of evaporators. Explain any one in brief with neat sketch.	07
	(b)	Explain the design consideration of crystallizer with neat sketch.	07
Q.5	(a)	Explain the design consideration (features) of column internals.	07
	(b)	Explain safety measures in process industry.	07
		OR	
Q.5	(a)	Explain different methods for wind design of vertical tall tower/column	07
	(b)	Explain advantages of Auto CAD drafting software over manual drafting.	07

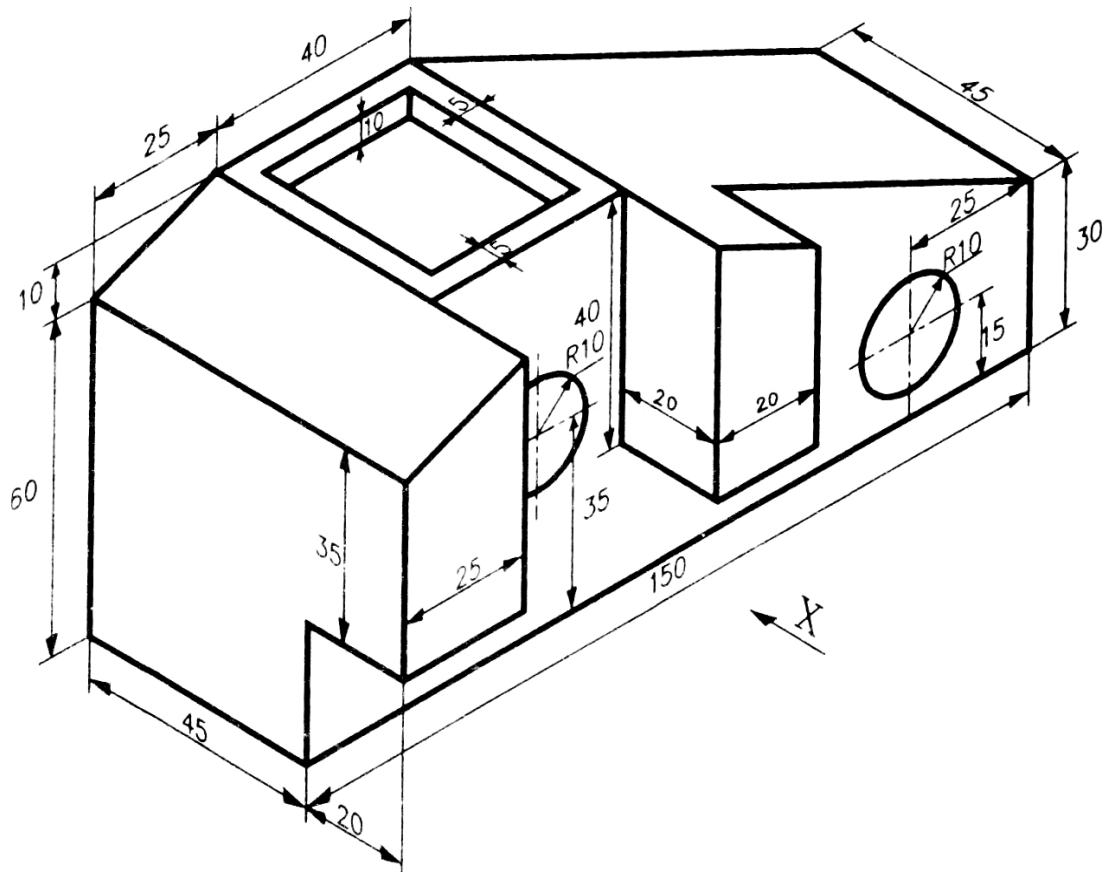

FIG-1 ALL DIMENSIONS ARE IN MM