

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA ENGINEERING SEMESTER –VIII • EXAMINATION SUMMER • 2015**

**Subject Code: 385502****Date: 08-05-2015****Subject Name: Process Equipment Design****Time: 10.30 AM TO 01.00 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) | Explain classification of Process Equipment.                                                                                                                                                        | 07 |
|      | (b) | Explain Mechanical Properties Of Material used for process equipment.                                                                                                                               | 07 |
| Q.2  | (a) | Define Corrosion and explain Types of Corrosion observed in Process Equipment.                                                                                                                      | 07 |
|      | (b) | Explain following terms with respect to industrial bearing.                                                                                                                                         | 07 |
|      |     | (1) Bearing life                                                                                                                                                                                    |    |
|      |     | (2) Bearing rating life                                                                                                                                                                             |    |
|      |     | (3) Bearing average/minimum life                                                                                                                                                                    |    |
|      |     | (4) Bearing maximum life                                                                                                                                                                            |    |
|      |     | (5) Basic dynamic load rating for bearing                                                                                                                                                           |    |
|      |     | (6) Dynamic equivalent load for bearing                                                                                                                                                             |    |
|      |     | OR                                                                                                                                                                                                  |    |
|      | (b) | What is packaging and gasket? Explain with neat sketch.                                                                                                                                             | 07 |
| Q.3  | (a) | Explain Design criteria for heat exchanger.                                                                                                                                                         | 07 |
|      | (b) | Write brief note on TEMA.                                                                                                                                                                           | 07 |
|      |     | OR                                                                                                                                                                                                  |    |
| Q.3  | (a) | Explain different types of jackets used in reaction vessel with neat sketch                                                                                                                         | 07 |
|      | (b) | List different types of evaporators. Explain standard vertical short tube evaporator with neat sketch.                                                                                              | 07 |
| Q.4  | (a) | Explain the design consideration of crystallizer.                                                                                                                                                   | 07 |
|      | (b) | Explain the design consideration ( features ) of column internals..                                                                                                                                 | 07 |
|      |     | OR                                                                                                                                                                                                  |    |
| Q. 4 | (a) | Write commands with its syntax required for making a drawing shown in fig.1                                                                                                                         | 07 |
|      | (b) | Draw symbols of elements of PFD and P&ID.                                                                                                                                                           | 07 |
| Q.5  | (a) | List different types of hazards in process industry.                                                                                                                                                | 07 |
|      | (b) | Explain safety measures to be taken for equipment used in process equipment design.                                                                                                                 | 07 |
|      |     | OR                                                                                                                                                                                                  |    |
| Q.5  | (a) | A shaft is transmitting 100KW at 160RPM find a suitable dia. For the shaft, If the maximum torque transmitted exceeds the mean by 25% take maximum allowable shear stress as 70 N/mm <sup>2</sup> . | 07 |
|      | (b) | What is the minimum required thickness of cylindrical shell with                                                                                                                                    | 07 |

the following parameter:-

1. Material SA 516 GR- 70
2. Inside dia = 2800mm
3. Corrosion allowance = 5.00mm
4. Weld joint type 1, 100% RT
5. Design pressure = 3 MPa
6. Design temperature = 200° C
7. Stress allowable from section II-D S= 130 MPa

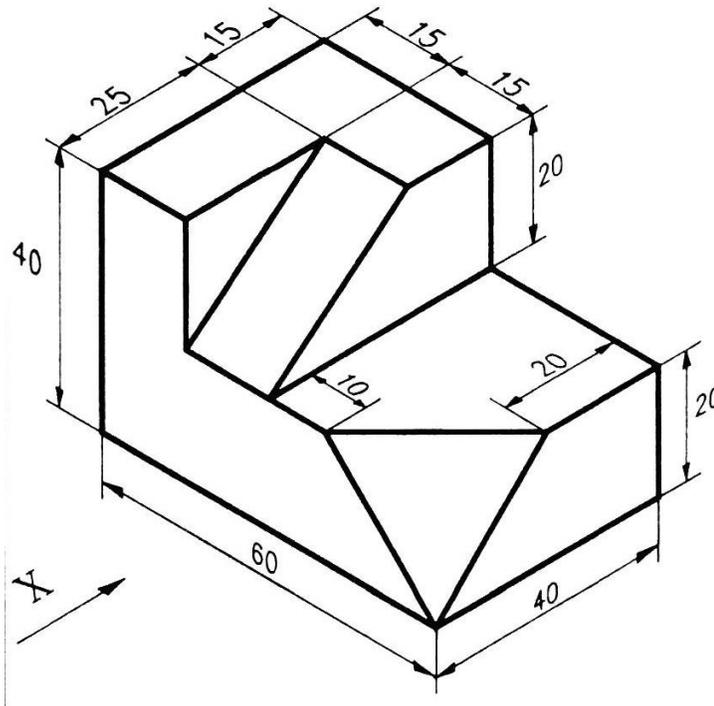


FIG-1 ALL DIMENSIONS ARE IN MM