

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering Sem. - V - Examination – June- 2011

Subject code: 355501

Subject Name: Fabrication Design

Date: 17/06/2011

Time: 02:30 pm – 05:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is Authentic

- Q.1** (a) Define the term “ Fabrication Design” and state the general design procedure with schematic diagram. **07**
- (b) Explain briefly the factors affecting selection of engineering materials as per ASME Sec.-II. **07**
- Q.2** (a) Explain with suitable examples the importance of codes and standards in fabrication design. **07**
- (b) Explain with suitable examples Stress – Strain diagrams of ductile and brittle materials **07**
- OR**
- (b) A mild steel rod of 12 mm diameter is tested for tensile strength with gauge length of 60mm. Following observation were recorded:
Final length = 80 mm; Final diameter = 7 mm; Yield Load = 3.4 kN and Ultimate Load = 6.1 kN.
Calculate :- 1. Yield stress, 2. Ultimate tensile test , 3. Percentage elongation. **07**
- Q.3** (a) Explain briefly the design preliminary and design considerations made in design of pressure vessel as per ASME Sec.- VIII **07**
- (b) Define the term “ Factor of safety. “ and explain briefly the factors affecting selection of the factor of safety. **07**
- OR**
- Q.3** (a) Explain design formula with neat sketches various types of “Heads” and “Closers” used in pressure vessels. **07**
- (b) Explain briefly the design considerations in various types of supports for pressure vessels. **07**
- Q.4** (a) Explain the following terms in connection with design of machine members subjected to varying loads. **07**
(i) Endurance limit (ii) Size factor (iii) Surface finish factor (iv) Notch sensitivity.
- (b) Explain basic design considerations in structural design like ‘ Transmission tower’ and ‘industrial shades.’ **07**
- OR**
- Q. 4** (a) Explain with suitable examples design of “Butt welded joints” and “ Single and Double fillet welded joints. **07**
- (b) A single riveted lap joint is made in 15 mm thick plates with 20 mm. diameter rivets. Determine the strength of the joint, if the pitch of rivets is 60 mm. Take $\sigma_t = 120$ MPa; $\sigma_c = 160$ MPa and $\tau = 90$ MPa. As shown in FIG.NO.1 **07**

- Q.5** (a) Explain the basic theorem to find out Centre of Gravity and Moment of Inertia of a 'TEE- Section.' As shown in FIG.NO.2 **07**
- (b) A simply supported beam 4 m long is subjected to two point loads of 2 kN and 4 kN each at distances of 1.5 m and 3 m from left end. Draw Shear Force and Bending Moment diagram for the beam.as shown in FIG. NO.3 **07**

OR

- Q.5** (a) As per ASME Sec.-VIII Div.-1 Calculate the thickness of cylindrical shell from the following data. **07**
- (i) Internal pressure = $P = 500 \text{ kN/ m}^2$
 - (ii) Nominal diameter of shell = $D = 1.2 \text{ m}$.
 - (iii) Allowable design stress = $\sigma_t = 118 \text{ MN / m}^2$
 - (iv) Corrosion allowance = 2 mm.
 - (v) Joint efficiency = $J = 0.85$
- Assume additional data if necessary.
- (b) A structural steel plate 75 mm wide and 10 mm thick loaded statically in tension by a load of 55 kN is welded to a plate with normal ' Transverse Lap Joint' welds as shown in FIG.NO.4 Determine the size of the weld length required to withstand the load. **07**

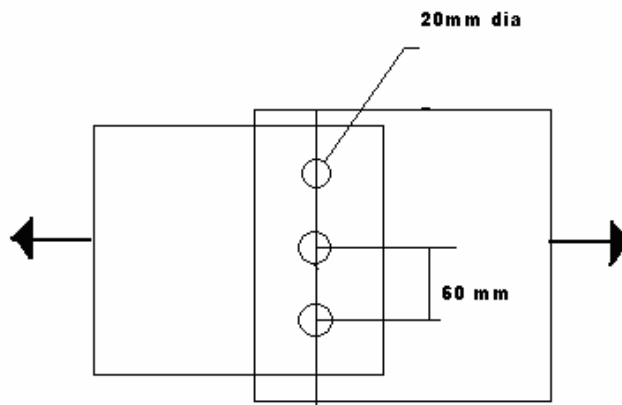


FIG NO.1
QUE. NO. 4(b)

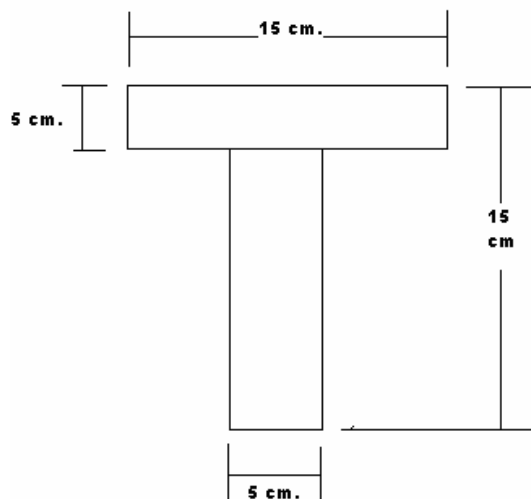


FIG. NO2
QUE. NO.5(a)

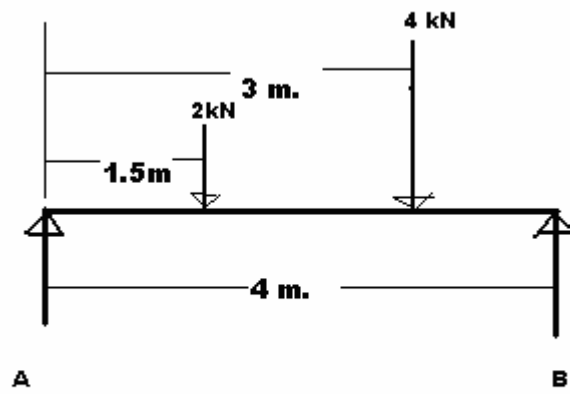


FIG NO. 3
QUE. NO^{5(b)}

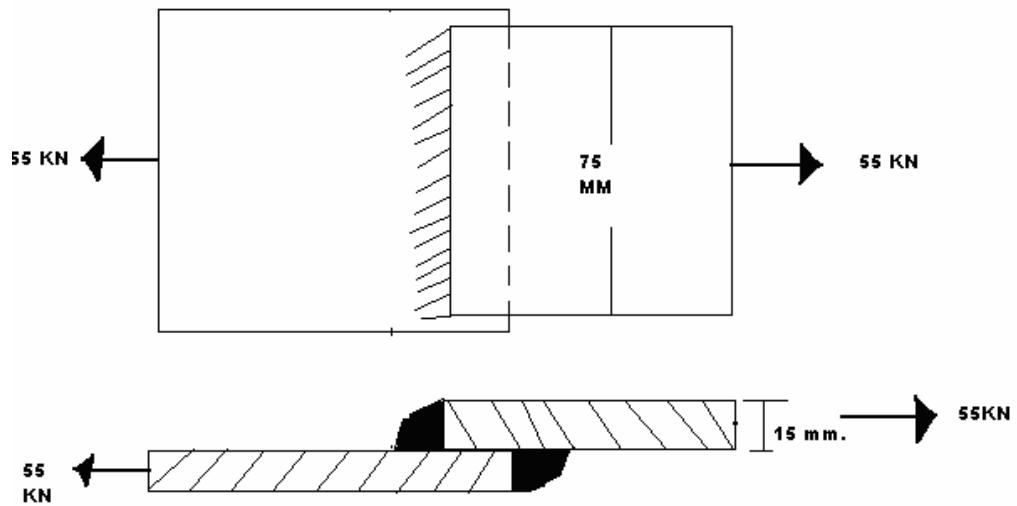


FIG.NO.4
QUE.NO 5b
