

GUJARAT TECHNOLOGICAL UNIVERSITY**Diploma Engineering - SEMESTER-V • Examination – WINTER • 2014****Subject Code: 3355501****Date: 26-11-2014****Subject Name: Fabrication 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. English version is considered to be Authentic.

- Q.1 (a) Classify the types of machine design and explain briefly 07
(b) Explain the general design procedure and computer aided design procedure. 07
- Q.2 (a) Explain stress strain diagram with neat sketch. 07
(b) A hydraulic press exerts a total load of 4.5MN. This load is carried by two steel rods, supporting the upper head of the press. 07
If the safe stress 85 N/mm^2 & $E=210 \text{ kN/mm}^2$. Find :
1. Dia. Of the rods
2. Extension in each rod in a length of 2.5 m.
- OR
- (b) A Steel bar 2.4 m long and 30mm square is elongated by a load of 500 KN if poisson's ratio is 0.25. Find the increase in volume. 07
Take $E = 0.2 \times 10^6 \text{ n/mm}^2$
- Q.3 (a) Define the following terms of riveted joint and show them in sketch of riveted joint 07
1. Pitch
2. Back pitch
3. Diagonal pitch
4. Margin
5. Caulking
6. Fullering
7. Efficiency of riveted joint
(b) A double riveted double cover butt joint is made in 12 mm thick plates with 18mm diameters rivets. find the efficiency of the joint for a pitch of 8cm, if
 $F_t=115\text{N/mm}^2$, $F_s=80\text{N/mm}^2$, $F_c=160\text{N/mm}^2$
- OR
- Q.3 (a) Explain strength of welded joint in the following cases 07
1. Long fillet weld subjected to torsion
2. Strength of butt joint.
(b) A plate 120 mm wide and 12 mm thick is to be welded to another plate by means of double parallel fillets. The plate are subjected to static load of 100 KN find the length of weld if the permissible shear stress in the weld does not exceed 58 N/mm^2 07
- Q.4 (a) Explain strength of welded joint in the following cases 07
1. Circular fillet weld subjected to torsion
2. Circular fillet weld subjected to bending moment
(b) A mild steel rod a 12mm dia. Was tested for tensile strength with the gauge length of 60mm following observation where recorded: 07

DATA:

Final length = 80mm, Final dia. = 7mm, Yield load = 3.4kN,

Ultimate load = 6.1kN

CALCULATE: Yield stress, Ultimate tensile stress, Percentage reduction in area, Percentage elongation

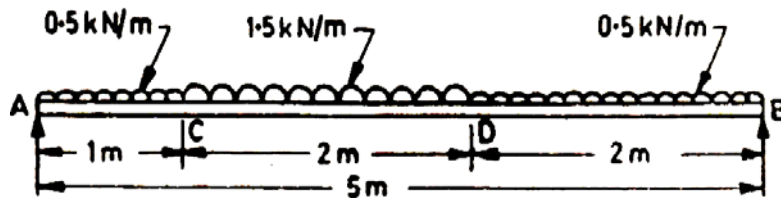
OR

- Q.4 (a) Explain the classification of pressure vessels as per codes. 07
(b) A shaft is transmitting 100 kW at 180 RPM. If the allowable stress in the material is 60 N/mm^2 . Find the suitable dia. for the shaft is not to twist more than 1° in a length of 3 m. take $C = 0.8 \times 10^6 \text{ N/mm}^2$ 07

- Q.5 (a) Write brief note different codes and standards used for pressure vessel fabrication. 07
(b) What is the minimum required thickness of a cylindrical shell with the following parameters? 07
1. Inside diameter = 2500 mm
 2. Corrosion allowance = 8 mm
 3. Weld joints = Type 1, 100% RT
 4. Design pressure = 2.75 MPa
 5. Material = SA-516, GR 70;
 6. Strength as per ASME SEC II A = 128 MPa
 7. Design Temperature = 150°C

OR

- Q.5 (a) Explain the methods of corrosion prevention of structures. 07
(b) Draw shear force and bending moment diagram for a simply supported beam loaded as shown in fig. 07



find the position and value of maximum bending moment that will occur in the beam
