Seat No.: _____   Enrolment No.: _____

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

Subject Code: 3355501   **Date: 2-05-2017**
Subject Name: Fabrication Design
Time: 2.30 TO 5.00 PM   **Total Marks: 70**
Instructions:
  1. **Attempt all questions.**
  2. **Make suitable assumptions wherever necessary.**
  3. **Figures to the right indicate full marks.**
  4. **Each question carry equal marks (14 marks)**

Q.1 (a) Explain the basic requirement for designing machine element.   **07**
      (b) A hydraulic press exerts a total load of 3.8 MN. This load is carried by to steel   **07**
           rods, supporting the upper head of the press. If the safe tress 81 N/mm^2 &   E
           = 210 kn/mm^2. Find:
           1) Diameter of the rods &
           2) Extension in each rod in a length of 2.5 m.

Q.2 (a) Explain stress-strain diagram with neat sketch.   **07**
      (b) The following results were obtained in a tensile test on a mild steel specimen or   **07**
           original dia. 15mm and gauge length 30 mm.
           Load at limit of proportionality = 60 kN
           Extension at 80kN load is = 0.038 mm
           Load at yield point = 80kN
           Maximum load = 130 kN
           When the two parts where fitted together after being broken, the length between
           gauge lengths was found to be 55.6 mm and dia. At the neck was 15.8mm.
           Calculate young's modulus, yield stress, ultimate tensile stress, percentage
           elongation and percentage reduction in area.

                                      OR

      (b) A hollow shaft is required to transmit 500 KW at 100 r.p.m the maximum torque   **07**
           being 16% greater than the mean. The shear stress is not to exceed 61 N/mm^2 &
           twist in a length of 2 m not to exceed 1.4 degrees. Find the external diameter of
           the shaft, if the internal diameter to the external diameter is 3/8. Take a modulus
           of rigidity as 84 GN/m^2.

Q.3 (a) Writes a short note on: **07**
           1) Resilience
           2) Proof Resilience
           3) Modulus of Resilience

      (b) A shaft is transmitting 110 KW at 180 r.p.m. Find a suitable diameter For the   **07**
           shaft, If the maximum torque transmitted exceeds the mean by 28 % take
           maximum allowable shear stress as 85 N/mm^2.

                                      OR
Q.3 (a) List different types of riveted joint and draw their sketches   **07**
      (b) A double riveted double cover butt joint in plates 30 mm thick is made with 28   **07**
           mm diameter rivets at 120 mm pitch.
           Taking Value f_t=130N/mm2; fs= 110 N/mm2; fc= 220N/mm2

Find efficiency of the joint taking the stress the riveting double shear as twice than that of single shear.

Q.4 (a) Explain strength of welded joint in the following cases: **07**
1. Long fillet weld subjected to torsion
2. Strength of butt joints.

(b) A plate 120 mm wide and 20 mm thick is to be welded to another plate by means **07** of double parallel fillets. The plate is subjected to static load of 90 KN. Find the length of weld if the permissible shear stress in the weld does not exceed 64 N/mm².

OR

Q.4 (a) Explain in detail the classification of various types of supports used in pressure **07** vessels and draw neat sketches of any two.

(b) Give the classification of pressure vessels as per code **07**

Q.5 (a) Write a report on ASME sec. VIII Div-1 **07**
(b) What is the minimum required thickness of cylindrical shell with the following **07** parameter:
1. Inside diameter = 2000 mm
2. Corrosion allowance = 2 mm
3. Weld joint = Type 1, 100% RT
4. Design pressure = 2.25 MPa
5. Material = SA-516, GR 70;
6. Strength as per ASME SEC II A = 123 MPa
7. Design Temperature = 130 °C

OR

Q.5 (a) Explain design consideration of Industrial shade in details. **07**
(b) A 6M span simply supported beam is loaded as shown in figure. **07**
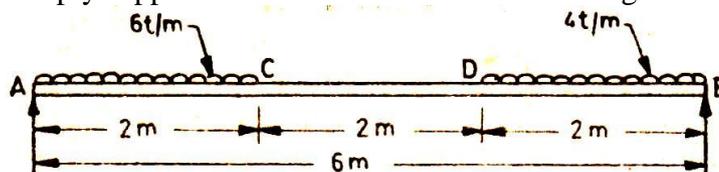
Draw the shear force and bending moment diagrams and give the values of the same, at point A,B,C and D.

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