Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA ENGINEERING – SEMESTER – V-EXAMINATION – WINTER 2015

Subject Code: 3355501 **Date: 19/12/2015**

Subject Name: Fabrication Design

Time: 10:30 AM TO 1:00 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 the basic requirement for designing machine element.	07
	(b)	What do you mean by factor of safety? Explain the selection criteria for 'factor of safety'.	07
Q.2	(a)	Write brief note on : 1. Fatigue 2. Endurance limit	07
	(b)	A mild steel rod a 12mm dia. Was tested for tensile strength with the gauge length of 60mm following observation where recorded: 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	07
		OR	
	(b)	A mild steel rod supports a tensile load of 80 kN. If the stress in the rod is limited to 100 N/mm^2. Find the size of the rod when the cross-section is 1) Circular 2) Square 3) Rectangular with width = 3 x thk.	07
Q.3	(a)	Explain strength of transverse fillet welded joint with neat sketch.	07
	(b)	A double riveted joint lap joint is made between 15 mm thick plate. The rivet diameter and pitch are 25mm and 75 mm respectively if the ultimate stress are 400 N/mm^2 in tension, 320N/mm^2 in shear and 640N/mm^2 in crushing, Find the minimum force per pitch which will rupture the joint. If the above joint is subjected to a load such the factor of safety is 4. Find out the actual stress developed in the plates and rivets.	07
		OR	
Q.3	(a)	Explain design of riveted joint used for structural use (Lozenge Joint)	07
	(b)	A plate 100 mm wide and 10 mm thick is to be welded to another plate by means of double parallel fillets. The plate are subjected to static load of 80 KN find the length `of weld if the permissible shear stress in the weld does not exceed 55 N/mm^2.	07
Q.4	(a)	Explain the design consideration in design of pressure vessels with respect to internal pressure.	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 $C = 80 \times 10^3$ N/mm^2.	07
		OR	

Q. 4	(a)	Compare ASME Sec.-VIII DIV-1 & DIV-2	07
	(b)	A hollow shaft of 40 mm outer dia. and 25mm inner dia. is subjected to a twisting moment of 120 N.M. Simultaneously, it is subjected to an axial thrust of 10000 N. A bending movement of 80 N.M. Calculate the max. Compressive and shear stresses.	07
Q.5	(a)	Explain different factors affecting design of structure.	07
	(b)	What is the minimum required thickness of a cylindrical shell with the following parameters? 1. Inside diameter = 3000 mm 2. Corrosion allowance = 5 mm 3. Weld joints = Type 1,100% RT 4. Design pressure = 3.5 MPa 5. Material = SA-516, GR 60; 6. Strength as per ASME SEC II A = 122 MPa 7. Design Temperature = 100 °C	07

OR

Q.5	(a)	Explain applicability of steel as structural material. Explain different types of structural steels and its application	07
	(b)	Explain SF & BM diagram with neat sketch for simply supported beam with a point load at its mid point.	07

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