Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering Semester –V Examination Dec'11- Jan'12

Subject code: 355501 **Date: 20/12/2011**

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 Authentic.**

Q.1 (a) Define the term " Machine Design" State the General and Computer Aided Design procedure with schematic diagram. **07**

(b) Give the classification of engineering materials as per ASME Sec-II. And Describe the mechanical properties of materials. **07**

Q.2

(a) List the various codes and standards used in Fabrication Design and state the importance of codes and standards in Fabrication Industries. **07**

(b) Define the term " Factor of Safety" and explain the selection criteria for "Factor of Safety" **07**

OR

(b) A mild steel Rod support a tensile load of 75 Kg-N. If the stress in the rod is limited to 120 N / mm^2. Find the size of the rod when the cross section is (i) Circular (ii) Square and (iii) Rectangle with 'b=3t" **07**

Q.3

(a) Explain design preliminary and design considerations made in design of pressure vessel as per ASME Sec-VIII . **07**

(b) A mild steel Rod of 12 mm diameter was tested for tensile Strength with gauge length 60 mm. The following observations was recorded **07**

(i) Final Length = 80 mm.
(ii) Final Diameter = 7 mm.
(iii) Yield load = 3.4 K-N
(iv) Ultimate load = 6.1 K-N

From this observations calculate (i) Yield stress
(ii) Ultimate Tensile stress (iii) Percentage reduction in area
(iv) Percentage elongation.

OR

Q.3 (a) Explain design formula with neatch schetches various types of "Heads and Closers " used in pressure vessels. **07**

(b) A shaft is transmitting 100 KW power at 140 r. p. m. Find the suitable diameter of shaft. If maximum torque transmitted is exceed. min. 20 %. Take max. Allowable shear stress is 80 N / mm^2. **07**

Q.4

(a) Explain with suitable examples design of cylindrical and spherical pressure vessels under internal Pressure. **07**

(b) As per ASME Sec.-VIII Div.-I Calculate the thickness of cylindrical shell from the following date: **07**

(i) Internal pressure = P = 550 kN / m^2

(ii) Nominal diameter of shell = D = 1.5 m

(iii) Allowable design stress = ƃ t = 118 MN / m^2

(iv) Joint efficiency = J = 0.85

Assume suitable data if necessary.

OR

Q. 4 (a) Describe the classification of Pressure Vessels as per Codes and Standard. And draw neat sketches of various types of supports for pressure vessels. **07**

(b) A double riveted double cover butt joint in plates of 16 mm thick is to be made with 20 mm dia. of rivets at 80 mm. pitch the permissible stresses as follow **07**

(i) Ft (Plate) = 140 N / mm^2

(ii) Ft (Rivet) = 120 N / mm^2

(iii) Fs (Rivet) = 100 N / mm^2

(iv) Fc (Rivet) = 150 N / mm^2

Find the efficiency of the joint taking the strength of the rivet in double shear as twice of the single shear. Draw the neat sketch of the joint.

Q.5

(a) Explain basic design considerations in structural design like Transmission Tower Industrial Shades. **07**

(b) As shown in FIG. NO. 1. a plate 100 mm. wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet weld. The plates are subjected to a load of 50 Kg-N. Find the length of the weld so that the maximum stress should not exceed 56 N / mm^2. Consider the joint is under **07**

(i) Static loading (ii) Fatigue loading.

OR

Q.5 (a) Explain with respect to structural design, simple design, semi rigid design and Fully rigid design. **07**

(b) As shown in FIG. NO. 2. a simply supported beam 6 m long is subjected to two point loads of 3 kN and 6 kN each at distances of 2 m. and 4 m. from the left end. Draw S.F. and B. M. diagrams for the beam **07**

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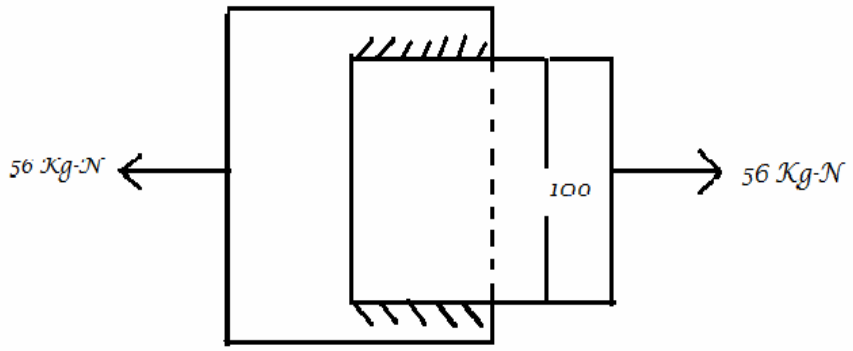
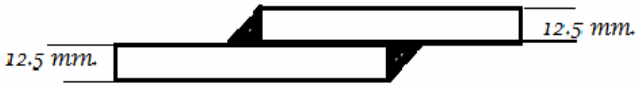


FIG. NO. 1
QUE.NO.5(b)



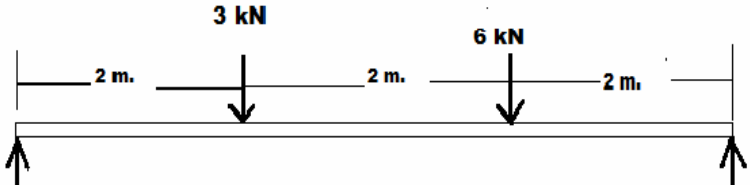


FIG. NO. 2
QUE.NO.5(b)