Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C. Sem- I Remedial Examination March / April 2010

Subject code: X11901

Subject Name: STRENGTH OF MATERIALS

Date: 08 / 04 /2010 **Time: 12.00 noon – 02.30 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Draw shear force diagram (SFD) and bending moment diagram (BMD) neatly for the beam as shown in ***figure-1*** showing the values at salient points.	**07**
	(b)	Define the terms, Shear force, Bending moment, Point of contra-flexure.	**07**
Q.2	**(a)**	Define the terms Complementary shear stress, Resultant stress, Angle of obliquity.	**07**
	(b)	For the element shown in the ***figure-2***, find the normal stress, tangential stress and resultant stress on the plane AB. Also, find principal stresses and principal planes. Use any method.	**07**
		OR	
	(b)	For torsion of a circular shaft, derive the equation $T/I_P = \tau/R = C\theta/L$ with usual notations	**07**
Q.3	**(a)**	Analyze the fixed beam as shown in ***figure-3*** and draw SFD and BMB for the same. Take EI constant.	**07**
	(b)	Write the equation for instantaneous stress for impact loading. Using the same show that the stress induced due to sudden loading is twice that of the stress due to gradual loading.	**07**
		OR	
Q.3	**(a)**	Analyze the fixed beam as shown in ***figure-4*** and draw SFD and BMB for the same. Take EI constant.	**07**
	(b)	Differentiate riveted and welded connections.	**07**
Q.4	**(a)**	Analyze the continuous beam as shown in ***figure-5*** and draw SFD and BMD for the same. Take EI constant.	**07**
	(b)	Derive the relation between the rate of loading, shear force and bending moment.	**07**
		OR	
Q.4	**(a)**	Calculate the slope at supports A and B terms of EI for the beam as shown in ***figure-6***.	**07**
	(b)	Find out the maximum deflection for a simply supported beam subjected to U.D.L throughout the span.	**07**

Q.5 **(a)** Write down the basic assumptions made in pure bending and derive the basic equation for bending stress and radius of curvature. **07**

(b) Plot bending stress distribution diagram for a rectangular beam of size 300X450mm over a span of 6meters simply supported and carrying udl of 50kN/m over entire span. **07**

OR

Q.5 **(a)** Derive the equation for Shear stress at a section with usual notations. **07**

(b) Plot Shear stress distribution diagram for, I-section, T-section,H-section. **07**

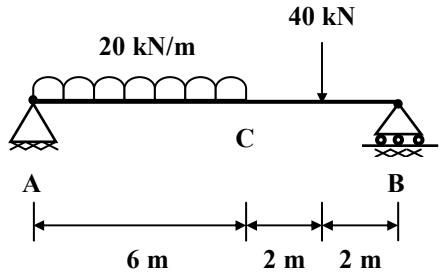

FIGURE- 1 Q-1 (a)

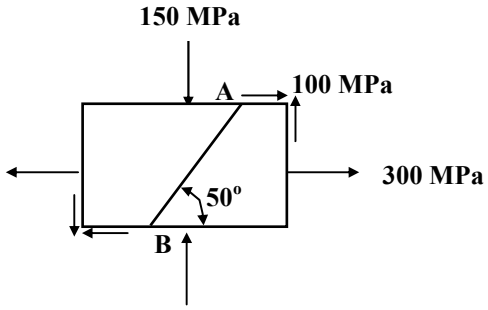

FIGURE- 2 Q-2 (b)

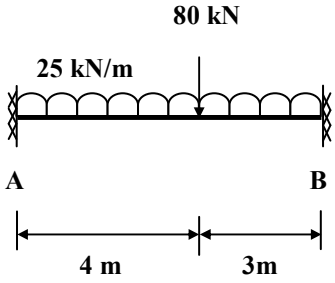

FIGURE- 3 Q-3(a)

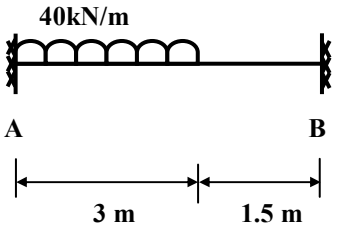

FIGURE- 4 Q-3(a) OR

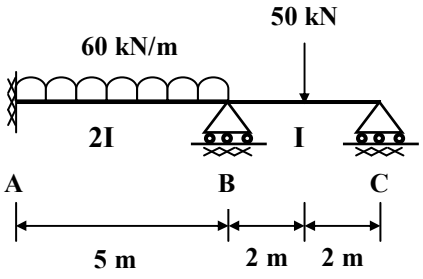

FIGURE- 5 Q-4 (a)

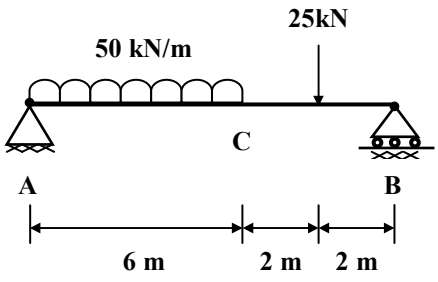

FIGURE- 6 Q-4 (a) OR

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