Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-Vth Examination December 2010

Subject code: 150103

Subject Name: Aircraft structure II

Date:16 /12 /2010 **Time: 03.00 pm - 05.30 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)**	A quadrant ring beam of radius 'r', supports a concentrated load 'P' at the free end, calculate vertical & horizontal deflection at free end.	**06**
	(b)	What do you understand by unsymmetrical bending? Explain the torsion of thin walled closed sections.	**04**
	(c)	Explain about limit load for load factor determination.	**04**
Q.2	**(a)**	Explain Flight envelop diagram.	**07**
	(b)	Find slope and deflection at point B for the cantilever beam as shown in figure.1using unit load method. take EI=20000 kN.m^2.	**07**
		OR	
	(b)	Find horizontal deflection at point D for the frame shown in figure. 2 using any method. take EI=20000 kN.m^2.	**07**
Q.3	**(a)**	Find horizontal deflection at point C for the truss shown in figure.3 Castigliano's first theorem. take EI= 2.1 X 10^5 N/mm^2, A=500 mm^2.	**08**
	(b)	Analyze the beam shown in figure 4 using Castigliano's second theorem.	**06**
		OR	
Q.3	**(a)**	State and prove with usual notations Castigliano's first theorem	**06**
	(b)	Analyze the truss shown in figure 5 using Castigliano's second theorem.	**08**
Q.4	**(a)**	State and explain with usual notations Castigliano's second theorem	**03**
	(b)	Analyze the beam as shown in figure 6 using flexibility system approach.	**11**
		OR	
Q.4	**(a)**	Differentiate Flexibility and Stiffness.	**03**
	(b)	Analyze the beam as shown in figure 7 using stiffness system approach.	**11**
Q.5	**(a)**	A box beam as shown below is subjected to a vertical shear force of 250 kN. The bending Analysis, neglecting bending stress gives axial stiffener between cross section 1 cm apart as Shown in figure 8. Determine the shear flow in the box beam.	**07**
	(b)	The vertical shear action on a channel section is 3 kN. Find the shear flow and shear center of the section as shown in figure 9. Assume constant thickness of 10 mm throughout the section. I = 1.21 x 10^8 mm ^{4}	**07**
		OR	
Q.5	**(a)**	The vertical shear action on a channel section is 150 KN. Find the shear flow and shear center of the section as shown in figure 10. Assume thickness in flange as 9.7 mm and thickness of web 6.7 mm. I = 71.97 x 10^6 mm ^{4}	**07**
	(b)	Explain thin walled open sections & closed sections and define shear center with its practical significance.	**07**

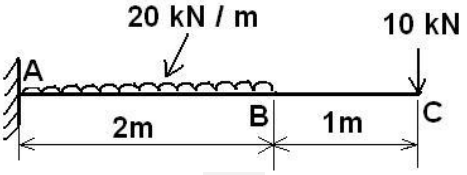

Fig. 1

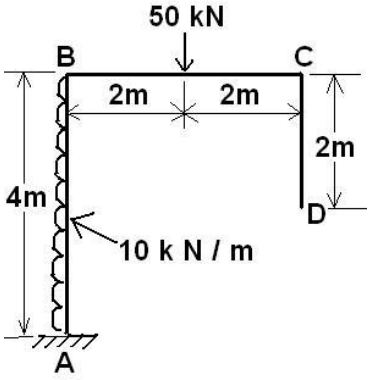

Fig. 2

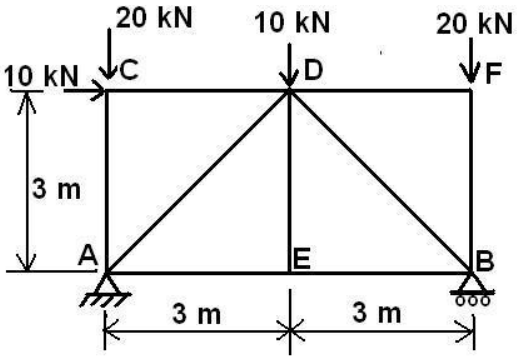

Fig. 3

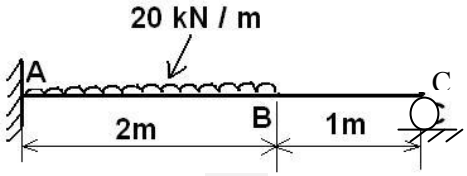

Fig. 4

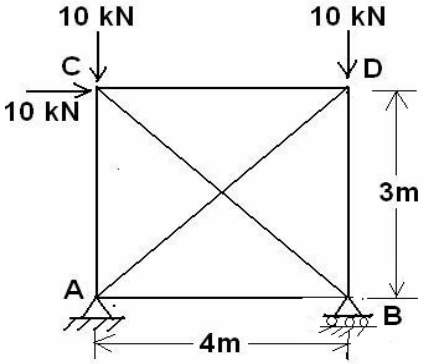

Fig. 5

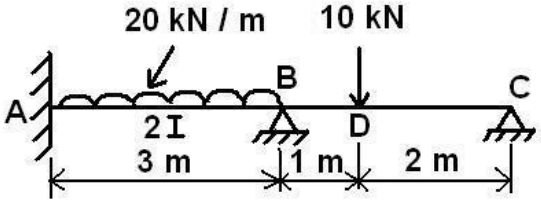

Fig. 6

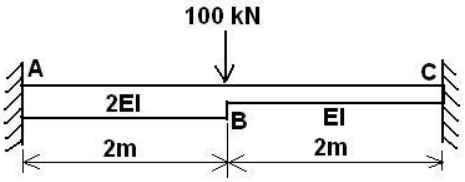

Fig. - 7

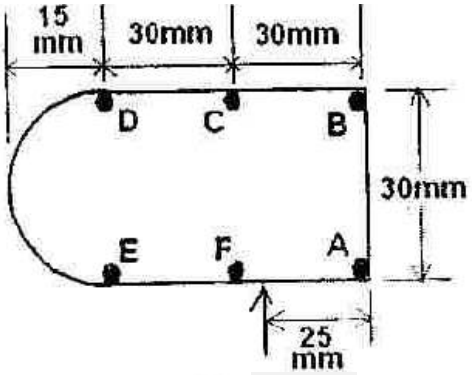

Fig. 8

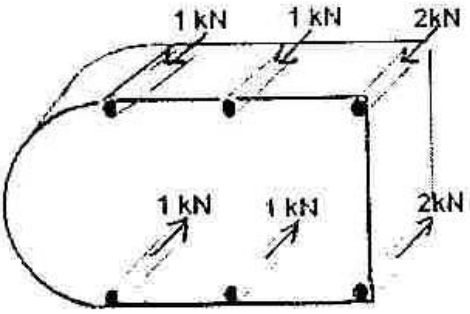

Fig. 8

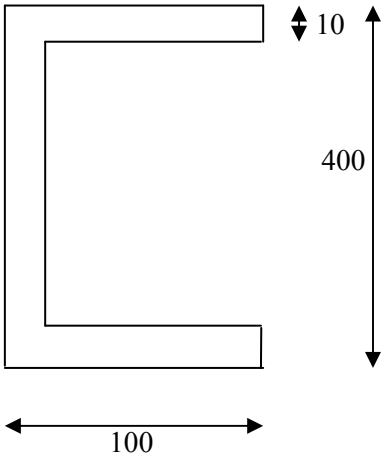

Figure 9

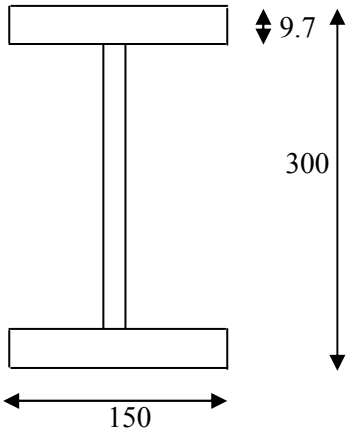

Figure 10

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