Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV EXAMINATION – WINTER 2025

Subject Code:3140101 Date:24-11-2025

Subject Name:Aircraft Structures

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain composite materials	**03**
	(b)	Define ground load, air load, monocoque, fatigue	**04**
	(c)	Write short note on Safe life and fail-safe structures	**07**
Q.2	**(a)**	Define truss. Enlist types of truss	**03**
	(b)	Define determinate structure. What are the advantages of indeterminate structures?	**04**
	(c)	Find out forces in members of truss using method of joint. Refer fig. 1	**07**
		OR	
	(c)	Find slope & deflection at point B for a cantilever beam shown in fig. 2 using Castigliano's first theorem. Take EI = 10 x 10^{13} N mm^2	**07**
Q.3	**(a)**	Explain stress & strain	**03**
	(b)	Write statement of moment area theorem I & II	**04**
	(c)	Write short note on moment distribution method	**07**
		OR	
Q.3	**(a)**	When a force of 1000 N is applied on a body, it gets compressed by 1.2 mm. Determine the strain energy	**03**
	(b)	Write statement of Reciprocal theorem in different ways	**04**
	(c)	Write difference between flexibility method & stiffness method	**07**
Q.4	**(a)**	Explain shear centre	**03**
	(b)	Explain applicability of bending theory	**04**
	(c)	Explain symmetrical bending with neat sketch	**07**
		OR	
Q.4	**(a)**	Explain torsion of beams	**03**
	(b)	Write difference between torsion of open section & closed section beams	**04**
	(c)	Explain shear of closed section beams	**07**
Q.5	**(a)**	Write difference between column & strut	**03**
	(b)	Explain bending of thin plate having a small initial curvature	**04**
	(c)	Explain energy method to calculate buckling load in column	**07**

OR

Q.5	**(a)**	State the assumption made in Euler's theory of column buckling	**03**
	(b)	A hollow rectangular column having outside dimensions 200 mm x 150 mm and inside dimension 150 mm x 100 mm. It's length is 5 m, it's ends are fixed at both the ends. Calculate Euler's Buckling load for the column. Take E = 2 x 10^5 N/mm^2	**04**
	(c)	Explain in brief buckling of thin plates	**07**

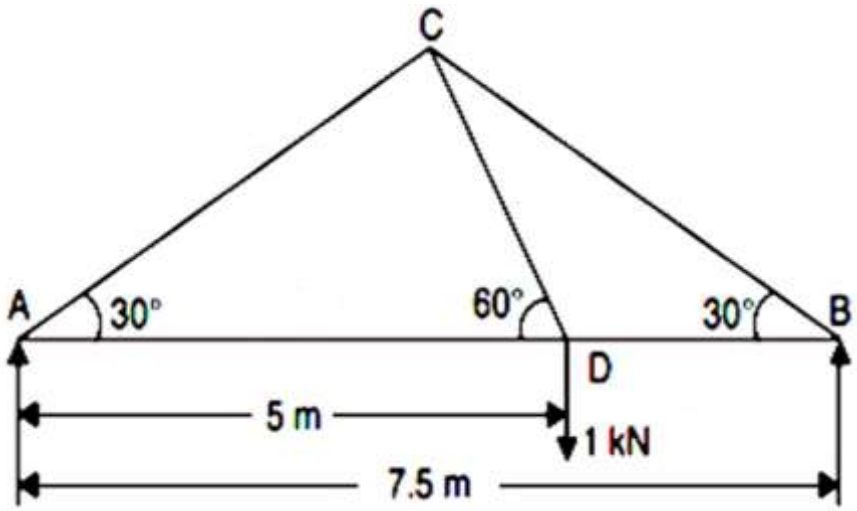

Fig. 1

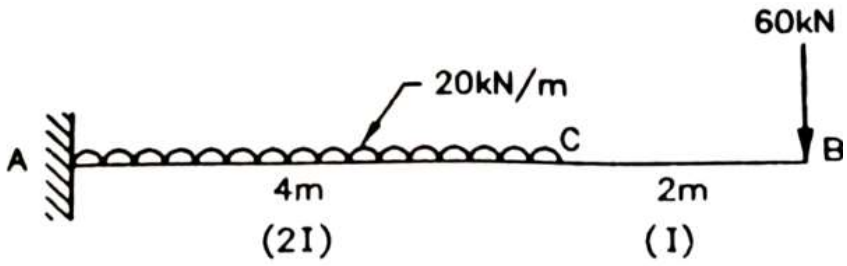

Fig. 2