Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – SUMMER 2025

Subject Code:3140101 Date:19-05-2025

Subject Name:Aircraft Structures

Time:10:30 AM TO 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. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	What are the functions of ribs and spars?	**03**
	(b)	Mention key advantages of sandwich structure.	**04**
	(c)	Explain the types of load on Aircraft and its parts in flight.	**07**
Q.2	**(a)**	State the uses of stringers and longerons.	**03**
	(b)	Explain the role of bulkheads in detail.	**04**
	(c)	Explain the energy method to calculate the buckling loads in columns.	**07**
		OR	
	(c)	Derive energy equation method for bending of thin plates.	**07**
Q.3	**(a)**	How the structure of passenger aircraft is different from fighter aircraft? Discuss in detail.	**03**
	(b)	Name the different type of Materials used in Aircraft wing.	**04**
	(c)	Write short note on unit load method.	**07**
		OR	
Q.3	**(a)**	Define Principal Moment of Inertia.	**03**
	(b)	Suggest different way of reducing the effect of buckling in long column.	**04**
	(c)	Explain the derivation for Bending stress in unsymmetrical section.	**07**
Q.4	**(a)**	Enlist various methods to find slope and deflection. Mention the assumptions required for deriving the differential equation.	**03**
	(b)	What is load factor? How it is determined?	**04**
	(c)	Define: Crushing Load, Slenderness Ratio and Radius of Gyration.	**07**
		OR	
Q.4	**(a)**	Explain stress & strain.	**03**
	(b)	Enlist different types of trusses.	**04**
	(c)	Draw the probable sketches that represent the buckled shape of the column with different support conditions.	**07**
Q.5	**(a)**	What is the difference between Symmetrical Bending and Unsymmetrical Bending?	**03**
	(b)	Explain monocoque fuselage structure.	**04**
	(c)	Explain strain and displacement relationships for open and single cell closed section thin-walled beams.	**07**
		OR	
Q.5	**(a)**	Write down the difference between torsion of open and closed Sections.	**03**
	(b)	State the assumption made in Euler's theory of column buckling.	**04**
	(c)	Explain stability of beam under transverse and axial loads.	**07**

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