Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2024

Subject Code:3140101 Date:03-07-2024

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 different loads acting on aircraft?	**03**
	(b)	With neat sketch explain spar, ribs, stringers and skin functions.	**04**
	(c)	What is V-N diagram? Explain its importance as a structure point of view.	**07**
Q.2	**(a)**	What is the difference between Symmetrical Bending and Unsymmetrical Bending?	**03**
	(b)	Explain reciprocal theorem.	**04**
	(c)	Explain the energy method to calculate the buckling loads in columns.	**07**
		OR	
	(c)	Explain the principal of least work for statically indeterminate structure.	**07**
Q.3	**(a)**	Enlist different types of trusses.	**03**
	(b)	Explain the role of bulkheads and longerons in detail.	**04**
	(c)	Enlist various methods to find slope and deflection. Mention the assumptions required for deriving the differential equation.	**07**
		OR	
Q.3	**(a)**	Explain how to find of degree of indeterminacy of structure.	**03**
	(b)	Derive the strain energy equation for a member subjected to shear force.	**04**
	(c)	Derive the equation for the shear flow of open section.	**07**
Q.4	**(a)**	Define: Stress, Strain, Shear Modulus.	**03**
	(b)	Write down the assumptions made in the theory of plane truss.	**04**
	(c)	Explain the derivation for bending stress in unsymmetrical section.	**07**
		OR	
Q.4	**(a)**	Enlist the different type of materials used in aircraft.	**03**
	(b)	Explain theorem of virtual work and its applications.	**04**
	(c)	State the assumptions and limitations of Euler's Theory of Column Buckling.	**07**
Q.5	**(a)**	Define principle moment of inertia.	**03**
	(b)	Explain monocoque fuselage structure.	**04**
	(c)	Determine the value of slope at the free end of the cantilever beam with UDL of W and length L using Area-Moment method.	**07**
		OR	
Q.5	**(a)**	Write down the difference between torsion of open and closed Sections.	**03**
	(b)	Explain semi monocoque fuselage structure.	**04**
	(c)	Explain strain and displacement relationships for open and single cell closed section thin-walled beams.	**07**

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