Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 3140101 Date: 27-11-2024

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)**	What are the different loads acting on aircraft?	**03**
	(b)	With neat sketch explain spar, ribs, stringers and skin functions.	**04**
	(c)	Write short note on factor of safety-flight envelope.	**07**
Q.2	**(a)**	What is the difference between Symmetrical Bending and Unsymmetrical Bending?	**03**
	(b)	Write advantages & disadvantages of indeterminate structure.	**04**
	(c)	Explain the energy method to calculate the buckling loads in columns.	**07**
		OR	
	(c)	Derive the equation for the shear flow of open section.	**07**
Q.3	**(a)**	Derive formula to find strain energy due to axial loading.	**03**
	(b)	Explain the role of bulkheads and longerons in detail.	**04**
	(c)	Write short note on unit load method.	**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)	Enlist the advantages of slope deflection method. Explain equilibrium equations with neat sketch.	**07**
Q.4	**(a)**	Explain the State of Plane Stress.	**03**
	(b)	Explain calculation of section properties.	**04**
	(c)	Explain the derivation for bending stress in unsymmetrical section.	**07**
		OR	
Q.4	**(a)**	Explain stress & strain.	**03**
	(b)	Explain theorem of virtual work and its applications.	**04**
	(c)	Draw the probable sketches that represent the buckled shape of the column with different support conditions.	**07**
Q.5	**(a)**	Define principle moment of inertia.	**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 in brief: Buckling of thin plates.	**07**

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