Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170110 Date:30-11-2024

Subject Name: Introduction to Aeroelasticity

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 does "aeroelasticity" mean to you?	**03**
	(b)	Explain the problems with aero elasticity.	**04**
	(c)	Write a short note about the deformation of structures and influence.	**07**
Q.2	**(a)**	Define the energy method.	**03**
	(b)	Describe the Aero elasticity classification.	**04**
	(c)	Explain Wing loading and deformations in detail.	**07**
		OR	
	(c)	Describe the geometry of a typical airfoil section using a drawing and the relevant equation.	**07**
Q.3	**(a)**	Define Swept Wing.	**03**
	(b)	Explain One Dimensional Aeroelastic Model of Airfoils.	**04**
	(c)	Describe "Divergence of 2-D airfoil" using the relevant equations.	**07**
		OR	
Q.3	**(a)**	Define flutter.	**03**
	(b)	Describe how flutter affects a 2D airfoil.	**04**
	(c)	Find the expression for the aileron control reversal speed for a two-dimensional wing.	**07**
Q.4	**(a)**	Explain the physics of flow over a three-dimensional airfoil for supersonic flow in short.	**03**
	(b)	Describe how flutter affects a straight wing.	**04**
	(c)	Write a note on Theodorsen Theory.	**07**
		OR	
Q.4	**(a)**	Explain physics of flow over a 2 D airfoil for supersonic flow in short.	**03**
	(b)	Explain effect of flutter on Swept wing	**04**
	(c)	Explain Kernal Function Approach.	**07**
Q.5	**(a)**	Define deformation.	**03**
	(b)	Explain is P-k Method.	**04**
	(c)	Discuss the finite-state model in detail.	**07**
		OR	
Q.5	**(a)**	What is aileron reversal?	**03**
	(b)	Explain U-g Method.	**04**
	(c)	Explain in detail about Torsion Flutter of Uniform Wing.	**07**

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