Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170110 Date:10-01-2023

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 do you mean by Aeroelasticity?	**03**
	(b)	Write a note on "Solution of Aero elasticity problems".	**04**
	(c)	Write a short note on Deformation of Structures and Influence Coefficient.	**07**
Q.2	**(a)**	Define Structure analysis.	**03**
	(b)	Explain classification of Aero elasticity.	**04**
	(c)	Explain the Lift Distribution for the Steady Roll Case.	**07**
		OR	
	(c)	Explain the 2-D and 3-D Supersonic flow.	**07**
Q.3	**(a)**	What is U-g Method?	**03**
	(b)	Explain energy method of Aeroelastic structure	**04**
	(c)	Derive the general form of the Aeroelastic Equation.	**07**
		OR	
Q.3	**(a)**	Importance of p-k method in flutter calculation.	**03**
	(b)	What are control effectiveness and control reversal?	**04**
	(c)	For a 2-D wing derive an expression for the aileron control reversal speed.	**07**
Q.4	**(a)**	What is finite state model?	**03**
	(b)	Shortly explain Flutter Analysis by Assumed Mode Method.	**04**
	(c)	Explain the Aerodynamic lift and moment for a Harmonically oscillating Aerofoil.	**07**
		OR	
Q.4	**(a)**	What is Kernal Function Approach?	**03**
	(b)	Shortly explain the Effect of Changes in Position of the Flexural and Mass Axes.	**04**
	(c)	Explain Theodorsen Theory.	**07**
Q.5	**(a)**	Define deformation.	**03**
	(b)	Explain wing loading.	**04**
	(c)	Write the types of flutter and explain.	**07**
		OR	
Q.5	**(a)**	Define swept wing.	**03**
	(b)	Define Zero Aerodynamic Damping.	**04**
	(c)	Explain the Static Aeroelastic Behaviour of a fixed Root Flexible wing.	**07**

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