Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160113 Date:16-12-2022

Subject Name:Advance Aerodynamics

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 do you mean by Aerothermodynamics?	**03**
	(b)	Difference between subsonic and supersonic flow.	**04**
	(c)	Define Hypersonic flow. Explain with neat sketch thin shock layer and entropy layer.	**07**
Q.2	**(a)**	Define Mach number and Shockwave.	**03**
	(b)	Explain viscous retraction with sketch.	**04**
	(c)	Write a note on Recapitulation with neat sketch.	**07**
		OR	
	(c)	Explain shock expansion theory.	**07**
Q.3	**(a)**	Define shock angle and deflection angle.	**03**
	(b)	Explain Low density flow.	**04**
	(c)	Derive an equation on "Hypersonic shock relation in terms of hypersonic similarity parameters".	**07**
		OR	
Q.3	**(a)**	Discuss in short "wave rider".	**03**
	(b)	Explain Newtonian flow with appropriate sketch.	**04**
	(c)	Derive L/D = Cotα equation for flat plate using aerodynamic forces.	**07**
Q.4	**(a)**	Define compressible flow and Incompressible flow.	**03**
	(b)	Explain Modified Newtonian law with appropriate sketch.	**04**
	(c)	Discuss on comparison between newtonian and exact results for the pressure coefficient on a sharp wedge and a sharp cone	**07**
		OR	
Q.4	**(a)**	Define critical mach number.	**03**
	(b)	Discuss supersonic flow over a cone.	**04**
	(c)	Write a note on Aerodynamic heating.	**07**
Q.5	**(a)**	Define Drag divergence mach number.	**03**
	(b)	Write a note on "Prandtl-Glauert Compressibility correction".	**04**
	(c)	Derive velocity potential equation with sketch.	**07**
		OR	
Q.5	**(a)**	What do you mean by supersonic airfoil drag?	**03**
	(b)	Derive "Linearized supersonic pressure coefficient formula"	**04**
	(c)	Explain Rayleigh flow with sketch.	**07**

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