Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160113 Date:02/12/2021

Subject Name:Advance Aerodynamics

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)**	Define Hypersonic flow in technical language.	**03**
	(b)	What is the difference between aero thermodynamics and aerodynamics?	**04**
	(c)	Explain construction of subsonic open type wind tunnel with neat sketch.	**07**
Q.2	**(a)**	Prove Cp=2sin2 ɵ for Newtonian theory.	**03**
	(b)	What is the difference between supersonic and hypersonic wind tunnel?	**04**
	(c)	Explain Solid blockage and wake blockage	**07**
		OR	
	(c)	Explain Centrifugal force corrections to Newtonian theory with neat sketch.	**07**
Q.3	**(a)**	Define wind tunnel balances.	**03**
	(b)	Explain Hypersonic expansion wave relation.	**04**
	(c)	Explain Aerodynamic heating.	**07**
		OR	
Q.3	**(a)**	List out flow visualization techniques.	**03**
	(b)	Define The velocity potential equation.	**04**
	(c)	Explain Critical Mach number and Drag divergence mach number.	**07**
Q.4	**(a)**	What is The sound barrier and Area Rule.	**03**
	(b)	With neat sketch explain thin shock layer.	**04**
	(c)	Define Supercritical Airfoil, Rayleigh flow and Fanno flow.	**07**
		OR	
Q.4	**(a)**	Enlist Application to supersonic airfoils.	**03**
	(b)	Explain Shock expansion method.	**04**
	(c)	Define The velocity potential equation.	**07**
Q.5	**(a)**	Define “High temperature flow” characteristic for hypersonic flow.	**03**
	(b)	Explain Low density flow.	**04**
	(c)	Why car is not fly at Subsoinc, Supersoinc and hypersonic speed?	**07**
		OR	
Q.5	**(a)**	Explain flow over an airfoil case for hypersonic case.	**03**
	(b)	Difference between supersonic flow and hypersonic flow.	**04**
	(c)	Derive the Linearized supersonic pressure coefficient formula.	**07**

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