

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VI EXAMINATION – SUMMER 2026

Subject Code:3160113

Date:29-05-2026

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)	Write the applications of hypersonic flow.	03
	(b)	Define Hyper Sonic Flow. Explain it.	04
	(c)	Write a note on Supersonic Flow and Subsonic flow	07
Q.2	(a)	What does the term "aerothermodynamics" mean?	03
	(b)	Explain the expression of newtonian theory.	04
	(c)	Explain construction of subsonic type wind tunnel with neat sketch.	07
OR			
	(c)	Write a note on Drag Divergence Mach number.	07
Q.3	(a)	Describe the deflection and shock angles.	03
	(b)	Describe the wave relation of hypersonic expansion.	04
	(c)	Derive Hypersonic shock relations in terms of hypersonic similarity parameters.	07
OR			
Q.3	(a)	Define Mach Number independence	03
	(b)	Describe the impact on a blunt body traveling at hypersonic speed.	04
	(c)	Describe the correction for Prandtl-Glauert compressibility.	07
Q.4	(a)	What is Fanno flow?	03
	(b)	Explain linearized Supersonic flow over an airfoil.	04
	(c)	Write a brief note on Newton's sine-squared law.	07
OR			
Q.4	(a)	Discuss in short “wave rider”.	03
	(b)	Write a note on the entropy layer with sketch.	04
	(c)	Explain supersonic flow over a cone using a sketch.	07
Q.5	(a)	Write application to supersonic airfoils.	03
	(b)	Define the "high temperature flow" characteristic of hypersonic flow.	04
	(c)	Using aerodynamic forces, derive the equation $L/D = C_{ot}\alpha$ for flat plates.	07
OR			
Q.5	(a)	Define Critical Mach number.	03
	(b)	Explain Tangent-Wedge method.	04
	(c)	Derive Prandtl-Mayer expansion wave relations.	07
