Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170209 Date:16-05-2025

Subject Name:Automotive Aerodynamics and Aesthetics

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)**	Explain the boundary layer thickness in context with automotive aerodynamics	**03**
	(b)	Explain the SAE aerodynamic axis system with neat sketch.	**04**
	(c)	Explain the following : (i) flow separation (ii) venturi effect	**07**
Q.2	**(a)**	Explain the effect of surface roughness on vehicle drag.	**03**
	(b)	Discuss the Various resistance facing by the moving vehicle relative to the speed.	**04**
	(c)	Explain the relative air speed and pressure condition over the upper profile of the moving car.	**07**
		OR	
	(c)	Explain profile drag and discuss the drag coefficient over various shape of body.	**07**
Q.3	**(a)**	Define the Base drag and explain it in short.	**03**
	(b)	Explain the basic of lift and lift coefficient in short.	**04**
	(c)	Explain the Trailing vortices drag and attached transverse vortices with neat sketch	**07**
		OR	
Q.3	**(a)**	Explain the under body dams technique for reducing the lift.	**03**
	(b)	Explain the impact of rear end spoiler on vehicle aerodynamics.	**04**
	(c)	Enlist the various drag reduction techniques and explain any two in details with neat sketch	**07**
Q.4	**(a)**	Define : (i) Hatch back (ii) fast back (iii) square back	**03**
	(b)	Explain the cab roof deflector impact on vehicle aerodynamic resistance.	**04**
	(c)	Explain the effect of different cab to trailer body heights in details with neat sketch.	**07**
		OR	
Q.4	**(a)**	Explain the tractor-trailor skirting in short.	**03**
	(b)	Explain the any one flow visualization technique for vehicle aerodynamic testing.	**04**
	(c)	Explain the effect of different cab to trailer body gap in details with neat sketch	**07**
Q.5	**(a)**	Give the importance of clay modeling in vehicle aesthetic design.	**03**
	(b)	Explain any one on-road testing method for vehicle drag measurement.	**04**
	(c)	Explain the construction and working principle of suction type wind tunnel used to test vehicle.	**07**
		OR	
Q.5	**(a)**	Explain the impact of under body roughness on drag of vehicle.	**03**
	(b)	Explain the notchback with neat sketch.	**04**
	(c)	Explain the body styling process in details considering the aesthetic of vehicles.	**07**

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