Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170209 Date:10-01-2023

Subject Name:Automotive Aerodynamics and Aesthetics

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 is the importance of aerodynamics in a vehicle?	**03**
	(b)	Write the typical drag coefficient for the given class of vehicles: (i) Saloon car (ii) Buses and coaches (iii) Light van (iv) Ridged truck and draw bar trailer	**04**
	(c)	Derive a formula for calculating the opposing resistance of a body passing though the air.	**07**
Q.2	**(a)**	Explain boundary layer transition point.	**03**
	(b)	Explain flow separation and flow reattachment for the low speed and high speed of a car.	**04**
	(c)	Draw a diagram and show the relative air speed and pressure conditions over the upper profile of a moving car.	**07**
		OR	
	(c)	Give the types of wind tunnel and explain the wind tunnel testing with neat sketch.	**07**
Q.3	**(a)**	Explain cabriolet car.	**03**
	(b)	Explain: (i) after flow wake (ii) Vortices.	**04**
	(c)	Explain the effects of under floor to ground clearance on the surrounding air speed, pressure and aerodynamic lift with neat sketch.	**07**
		OR	
Q.3	**(a)**	Explain the effects of rear end spoiler.	**03**
	(b)	Explain: (i) pressure drag (ii) Aerodynamic lift.	**04**
	(c)	Draw the different car body style configurations and explain each in short.	**07**
Q.4	**(a)**	Describe an importance of aesthetics in Automotive.	**03**
	(b)	Explain Yaw angle with a velocity diagram.	**04**
	(c)	Classify the cab to trailer gap seals and explain each with neat sketch.	**07**
		OR	
Q.4	**(a)**	Explain tractor and trailer skirting.	**03**
	(b)	Explain digital aesthetic design process in short.	**04**
	(c)	Write a short note on Cab roof deflectors.	**07**
Q.5	**(a)**	Explain Full sized tape drawing.	**03**
	(b)	Explain the effect of rear end tail extension on drag coefficient.	**04**
	(c)	Explain technical criteria for aesthetic design of exterior and interior of an automotive.	**07**

OR

Q.5	**(a)**	Explain Clay modeling for the body styling process regarding the automobile aesthetics.	**03**
	(b)	Describe full scale testing in wind tunnel.	**04**
	(c)	Enlist On- road testing and measurement methods and explain on-road measurement of the wind noise.	**07**

****