Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170209 Date:08/06/2022

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)**	Discuss the effects of surface finish on air flows over body.	**03**
	(b)	List out the aerodynamics forces and explain each in brief.	**04**
	(c)	Explain drag coefficient for the various shaped solids.	**07**
Q.2	**(a)**	Describe an importance of aesthetics in automotive.	**03**
	(b)	Explain digital aesthetic design process in short.	**04**
	(c)	Explain (i) concept sketching (ii) Full sized tape drawing (iii) Clay modeling.	**07**
		OR	
	(c)	Explain technical criteria for aesthetic design of exterior and interior of an automotive.	**07**
Q.3	**(a)**	Give the advantages of closed wind tunnel over open wind tunnel.	**03**
	(b)	Define vehicle lift and compare negative lift with positive lift.	**04**
	(c)	Explain the effect of following on a coefficient of drag: (i) Reynolds's number (ii) Frontal area and overall length of a vehicle (iii) Influence of wind shield angle.	**07**
		OR	
Q.3	**(a)**	Describe the importance of deflector used over the truck's cabin with aerodynamics.	**03**
	(b)	Write a short note on under body roughness.	**04**
	(c)	Give the types of wind tunnel and explain the wind tunnel testing with neat sketch.	**07**
Q.4	**(a)**	Enlist On- road testing and measurement methods.	**03**
	(b)	Explain squareback drag with a neat diagram.	**04**
	(c)	Explain various methods used for the reduction of Aerodynamic drag with neat diagram.	**07**
		OR	
Q.4	**(a)**	Discuss about the effects of rear end spoiler.	**03**
	(b)	Explain Hatchback drag with neat diagram.	**04**
	(c)	List out the methods of lift control and explain each with neat diagram.	**07**
Q.5	**(a)**	Explain SAE aerodynamics axis system.	**03**
	(b)	Explain boundary layer velocity profile.	**04**
	(c)	Explain the effects of rounding sharp front cab body edges for the Commercial vehicles.	**07**

OR

Q.5	**(a)**	Write the principles of commercial vehicle aerodynamics.	**03**
	(b)	Draw a graph to show the flow body pressure distribution with and without cab roof deflector for a cab with trailer.	**04**
	(c)	Write a short note on dust flow patterns at the rear.	**07**

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