Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170203 Date:01-12-2023

Subject Name: Vehicle Dynamics

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)**	Explain the boundary layer in context with vehicle aerodynamic.	**03**
	(b)	Explain Under steer and Over steer	**04**
	(c)	Derive the dynamic axle loading equation for vehicle.	**07**
Q.2	**(a)**	Explain Braking Efficiency and Brakes factor	**03**
	(b)	Explain the effect of slip angle during cornering of vehicle.	**04**
	(c)	Draw and explain vehicle's fixed coordinate system.	**07**
		OR	
	(c)	Explain motion of vehicle in earth Fixed Co Ordinate System with suitable example..	**07**
Q.3	**(a)**	Explain Anti-Lock Braking System.	**03**
	(b)	Explain Tire Cornering forces with Equations.	**04**
	(c)	Explain the brake factor and its important with neat sketch	**07**
		OR	
Q.3	**(a)**	Enlist the types of Suspension. write a short note on anyone of them.	**03**
	(b)	Explain the resisting forces acting on motorcycle body	**04**
	(c)	Explain the method of roll center analysis for independent suspension system	**07**
Q.4	**(a)**	Define: (i) Pitching moment, (ii) Camber angle, (iii) Drag force	**03**
	(b)	Explain Factors affecting rolling resistance	**04**
	(c)	Explain Quasi-static Rollover of a suspended Vehicle.	**07**
		OR	
Q.4	**(a)**	Justify importance of trail.	**03**
	(b)	Explain the phenomenon of bump steer.	**04**
	(c)	Explain the tire axis system in detail with neat labeled sketch.	**07**
Q.5	**(a)**	Explain Tractive Properties for Tyre.	**03**
	(b)	Write a Short Note on aerodynamic Drag and Force.	**04**
	(c)	Explain steering system forces and moments	**07**
		OR	
Q.5	**(a)**	Define active suspension.	**03**
	(b)	Introduce Front & Rear suspensions of Motorcycle.	**04**
	(c)	Derive the expression for anti-pitch geometry with necessary assumptions.	**07**

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