Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 170203 **Date: 07-12-2013**

Subject Name: Vehicle Dynamics

Time: 10:30 TO 01:00 **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain motion of vehicle in Earth fixed coordinate system with suitable diagram.	**07**
	(b)	Derive the equation to calculate the dynamic axle load for the following condition of four wheeler. i) When the vehicle on level ground under static condition. ii) When the vehicle on grads with low speed acceleration.	**07**
Q.2	**(a)**	Enlist the parameters which limit the maximum acceleration of a vehicle and derive the expression for the maximum tractive forces that can be obtained from the engine.	**07**
	(b)	Differentiate drum brake and disk brake based on construction and dynamics point of view.	**07**
		OR	
	(b)	Explain : Brake factor, Brake proportioning and Braking efficiency	**07**
Q.3	**(a)**	What is braking coefficient? Explain the parameters which affect braking coefficients.	**07**
	(b)	Define suspension roll center and roll axis. Explain the procedure for finding roll centers for solid axle suspension and independent suspension.	**07**
		OR	
Q.3	**(a)**	Enlist the primary functions of a suspension system. Explain various types of independent suspension system.	**07**
	(b)	Compare active suspension and passive suspension system based on different performance mode.	**07**
Q.4	**(a)**	Differentiate Ackerman steering and Davis steering mechanism. Explain the fundamental condition for true rolling.	**07**
	(b)	Define ride and explain ride dynamic system.	**07**
		OR	
Q.4	**(a)**	Draw and explain the model representing the roll moment applied to a vehicle axle in cornering.	**07**
	(b)	Explain different tire properties and enlist the parameters which affect tire properties.	**07**
Q.5	**(a)**	Draw and explain tire axis system.	**07**
	(b)	Explain different aerodynamic forces acting on a passenger car with neat sketch.	**07**
		OR	
Q.5	**(a)**	Explain various resistances to motion of a vehicle and explain their effect on performance of a vehicle.	**07**
	(b)	What is the role of following aerodynamic aids of vehicle? i) Air dams (ii) Rear Spoiler (iii) Bumper Spoiler	**07**

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