Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2170203 **Date: 29/04/2017**

Subject Name: Vehicle Dynamics

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.**

Q.1	**(a)**	Explain importance of SAE Axis system and vehicle Earth Coordinate system for understanding universal convention of vehicle's dynamic forces.	**07**
	(b)	Write a short note on aerodynamic drag & Aerodynamic lift.	**07**
Q.2	**(a)**	Show arbitrary forces acting on a vehicle with a clear sketch of vehicle moving on up gradient, with hitch load at an acceleration ax and derive the dynamic forces Wf & Wr acting on front & rear tyres.	**07**
	(b)	Draw the figure showing pressure distribution along the center line of car and explain aerodynamic aids.	**07**
		OR	
	(b)	Discuss the effect of Road Roughness on vehicle vibration during ride.	**07**
Q.3	**(a)**	Explain under steer and over steer.	**07**
	(b)	Explain Camber thrust. Write a short note on Cornering force produced by a vehicle tire.	**07**
		OR	
Q.3	**(a)**	Give the detail of tire notation :- 195/620R16 . Explain effect of high tire pressure, low tire pressure & tread wear rating on performance of vehicle.	**07**
	(b)	Explain Wheelbase, Fork offset, Trail & Wheel flop for motorcycle.	**07**
Q.4	**(a)**	Explain tire cornering forces with neat sketch.	**07**
	(b)	Differentiate Ackerman steering and Davis steering mechanism. Explain the fundamental condition for true rolling.	**07**
		OR	
Q.4	**(a)**	Explain the effect of Acceleration, Rapid direction change & vehicle performance on location & height of motor cycle's centre of gravity.	**07**
	(b)	Describe total braking force of front axle & Rear axle with the graph and explain the necessity of brake proportioning	**07**
Q.5	**(a)**	What do we want from a suspension geometry? Explain Active suspension.	**07**
	(b)	Explain Types of Tires and its advantages and dis-advantages in detail along with neat sketches.	**07**
		OR	
Q.5	**(a)**	Explain Tire cornering forces with equations	**07**
	(b)	Define suspension roll center and roll axis. Explain the procedure for finding roll centers for solid axle suspension and independent suspension.	**07**

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