

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (OLD) EXAMINATION – SUMMER 2019

Subject Code: 170203

Date: 16/05/2019

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 fundamental approach to modeling for vehicle dynamics. **07**
(b) Explain terminology and tire axis system. **07**
- Q.2** (a) Explain power limited acceleration. **07**
(b) Explain anti lock brake system and braking efficiency. **07**
- OR**
- (b) Explain traction-limited acceleration. **07**
- Q.3** (a) Draw neat sketches to describe types of suspensions used in automobiles and its advantages and disadvantages. **07**
(b) Derive the dynamic forces W_f & W_r acting on front & rear tyres, for the arbitrary forces acting on a vehicle moving on up gradient, with hitch load at an acceleration a_x . Draw neat sketch of vehicle showing all the forces acting on a moving vehicle. **07**
- OR**
- Q.3** (a) Explain : How four wheel steering system improve low speed maneuverability and high speed cornering? **07**
(b) Explain in detail effect of Aerodynamic drag and Aerodynamic aids on performance of vehicle **07**
- Q.4** (a) Explain relationship and impact of vehicle speed to stopping distance, stopping time and energy consumed in braking **07**
(b) Explain the importance of power to weight ratio in automobile. **07**
- OR**
- Q.4** (a) Define Neutral steer, Over steer and Under steer conditions in a vehicle and describe the dependent parameters. **07**
(b) Explain the following turning response properties: Under steer gradient, Neutral steer, Under steer, Over steer, Characteristic speed and Critical speed **07**
- Q.5** (a) Explain the concept of Ride performance and write detailed note about various Excitation forces, their impact on ride and damping characteristics. **07**
(b) Explain the sources of vehicle ride vibration. **07**
- OR**
- Q.5** (a) Explain the factors affecting rolling resistance. **07**
(b) Define cornering stiffness and camber stiffness. Discuss the parameters affecting cornering properties of tire. **07**
