

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 a_x and derive the dynamic forces W_f & W_r 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**
