

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170203

Date: 23/11/2019

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.

- Q.1** (a) Explain the effect of dynamic axle load on performance of vehicle. **03**
 (b) Draw and explain vehicle Fixed Coordinate system **04**
 (c) Draw and Explain various Aerodynamic Forces and Moments acting on the vehicle. **07**
- Q.2** (a) Explain Pressure distribution around the vehicle **03**
 (b) List the various shape of vehicles and give the value of Aerodynamic Drag coefficient for each shape of vehicle. **04**
 (c) Explain wind tunnel test with neat sketch. **07**
- OR**
- (c) What is braking coefficient? Explain the parameters which affect braking coefficients **07**
- Q.3** (a) Give the name of major elements of tyre and their suitable materials. **03**
 (b) Discuss in details various factors affecting on tyre life. **04**
 (c) Explain slip angle, inflation pressure and tread design. **07**
- OR**
- Q.3** (a) Construction of Bias & Radial tyre with the help of neat sketch. **03**
 (b) Define ride and explain ride dynamic system. **04**
 (c) Draw clear sketch of Tyre axis system and explain the details. **07**
- Q.4** (a) Explain Difference between dependent and independent suspensystem **03**
 (b) Explain anti squat and anti pitch suspension geometry. **04**
 (c) Explain Active suspension and Roll centre analysis. **07**
- OR**
- Q.4** (a) Explain Anti dive suspension geometry. **03**
 (b) Explain MacPherson Strut Suspension system. **04**
 (c) Draw quarter car model of vehicle representing passive suspension system. Obtain the mathematical model for the same in steady state vibration for sprung and unsprung mass. **07**
- Q.5** (a) Differentiate between Davis steering and Ackerman steering mechanism. **03**
 (b) Explain steering system forces and moments. **04**
 (c) Explain under steer and over steer. **07**
- OR**
- Q.5** (a) What is the important of rollover? List types of rollover of the vehicle. **03**
 (b) Discuss the stability of vehicle resting on slop and running on a curved track. **04**
 (c) Explain various resistances to motion of a vehicle and explain their effect on performance of a vehicle. **07**
