

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. **07**
- i) When the vehicle on level ground under static condition.
 - ii) When the vehicle on grads with low speed acceleration.
- 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? **07**
- i) Air dams
 - (ii) Rear Spoiler
 - (iii) Bumper Spoiler
