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GUJARAT TECHNOLOGICAL UNIVERSITY BE- SEMESTER- 7th • EXAMINATION - SUMMER 2015

Subject Code: 170203 Subject Name: VEHICLE DYNAMICS Time: 02.30PM-05.00PM

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- 4. Draw neat sketches and graphs wherever required to justify your answer.
- (a) Explain importance of SAE Axis system and vehicle Earth Coordinate system **Q.1** 07 for understanding universal convention of vehicle's dynamic forces.
 - **(b)** Draw a sketch of arbitrary forces acting on a vehicle and derive the dynamic 07 forces W_f & W_r acting on front & rear tyres, considering vehicle moving on up gradient, with hitch load and acceleration a_x .
- Q.2 (a) Describe importance of power to weight ratio and its relation with fuel 07 consumption.
 - Explain Power limited acceleration criteria, in terms of characteristics of tractive **(b)** 07 effort available in each gear with respect to speed of vehicle.

OR

- (b) For constant deceleration condition during braking derive Stopping distance and 07 stopping time. Also explain energy absorbed during braking.
- Draw forces acting on brake shoes of drum brake and explain importance of Q.3 (a) 07 brake factor.
 - Discuss the factors affecting tyre to road friction coupling. 07 **(b)**

OR

- Draw a graph of maximum braking force on front and rear brakes and explain Q.3 **(a)** 07 the criteria of brake proportioning in vehicles as well as ABS system. 07
 - Explain braking efficiency and pedal force gain. **(b)**
- **O.4** Draw the figure showing pressure distribution along the center line of car and **(a)** 07 explain aerodynamic aids.
 - Explain in detail the Ride excitation sources in a vehicle. **(b)** 07 OR
- Define Neutral steer, Over steer and Under steer conditions in a vehicle and **Q.4** 07 (a) discuss the dependent parameters. Explain Anti dive suspension geometry. 07 **(b)**
- Explain the functions of vehicular suspension and types of front and rear 07 **Q.5 (a)** suspensions.
 - Explain functions of vehicular steering systems and steering geometry errors. 07 **(b)**

OR

- Draw clear sketch of Tyre axis system and explain the details. Q.5 (a)
 - (b) Explain different types of vehicle types and discuss characteristic performance 07 parameters of tyres.

Date:12/05/2015

Total Marks: 70

Enrolment No.