

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# C. U. SHAH UNIVERSITY

## Winter Examination-2019

**Subject Name : Vehicle Dynamics**

**Subject Code : 4TE07VDY1**

**Branch: B.Tech (Automobile)**

**Semester : 7**

**Date : 13/11/2019**

**Time : 10:30 To 01:30**

**Marks : 70**

**Instructions:**

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  - (2) Instructions written on main answer book are strictly to be obeyed.
  - (3) Draw neat diagrams and figures (if necessary) at right places.
  - (4) Assume suitable data if needed.
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**Q-1            Attempt the following questions:**

- |    |                                                                                                                                                                             |   |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| a) | What is represented by hysteresis mechanism?                                                                                                                                | 1 |
| b) | What is Drag force?                                                                                                                                                         | 1 |
| c) | Spring Shackles are used to join.....                                                                                                                                       | 1 |
| d) | What is the difference between open loop and closed loop in steering system?                                                                                                | 1 |
| e) | What are Euler angels?                                                                                                                                                      | 1 |
| f) | The intersection between the road load curves and any of the tractive effort curves is..... Speed that can be sustained in that gear.                                       | 1 |
| g) | What do you mean by Brake Factor?                                                                                                                                           | 1 |
| h) | What are the basic functions of Tyre?                                                                                                                                       | 1 |
| i) | Maximum Performance in longitudinal acceleration of a motor vehicle is determined by one of two limits- engine power or traction limits on the drive wheels. True or false? | 1 |
| j) | Define 'Suspension roll'.                                                                                                                                                   | 1 |
| k) | What is Drag Co-efficient?                                                                                                                                                  | 1 |
| l) | Define 'Wheel centre'.                                                                                                                                                      | 1 |
| m) | The analysis of power limited acceleration involves examination of the engine characteristic and their interaction through power train. True or false?                      | 1 |
| n) | Define 'Steering geometry errors'.                                                                                                                                          | 1 |

**Attempt any four questions from Q-2 to Q-8**

**Q-2            Attempt all questions**

- |    |                                                       |    |
|----|-------------------------------------------------------|----|
| a) | Explain Anti Squat and Anti dive suspension geometry. | 07 |
| b) | Write a short note on Adaptive Cruise Control.        | 07 |

**Q-3            Attempt all questions**

- |    |                                                                           |    |
|----|---------------------------------------------------------------------------|----|
| a) | Explain Power limited acceleration based on power train.                  | 07 |
| b) | Draw a neat sketch of Pressure distribution along the centerline of a car | 07 |



and explain how the knowledge of Pressure distribution can be utilized.

- Q-4**            **Attempt all questions**
- a) Enlist the parameters, which affect cornering properties of tire and mention their effect on the cornering properties.            **07**
  - b) Explain steering geometry error with sketches.            **07**
- Q-5**            **Attempt all questions**
- a) Explain the factors affecting rolling resistance.            **07**
  - b) Explain cornering equation with respect to bicycle model and derive the equation of steer angle.            **07**
- Q-6**            **Attempt all questions**
- a) Explain camber thrust and aligning moment.            **07**
  - b) What is the effect of steering torque, arising from later inclination angle and caster angle while steering?            **07**
- Q-7**            **Attempt all questions**
- a) Define suspension roll center and roll axis and explain the procedure for finding roll centers for independent suspension with sketch.            **07**
  - b) Explain Suspension effect on cornering.            **07**
- Q-8**            **Attempt all questions**
- a) Explain motion of vehicle in Earth fixed coordinate system with suitable diagram.            **07**
  - b) Explain anti-lock braking system with neat sketch.            **07**

