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B.Tech.(AE) (2011 Onwards) (Sem.-6) VEHICLE DYNAMICS Subject Code : BTAE-603 M.Code : 71219

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- (a) What do you mean by free vibration?
- (b) Explain magnification factor.
- (c) How dunkerley's method is different from Hozler method?
- (d) What is wheel hop?
- (e) What is an eigen value problem?
- (f) What is tractive effort?
- (g) What do you mean by Rayleigh's coefficient?
- (h) Define camber and camber thrust.
- (i) Write a note on directional stability of vehicle.
- (j) What is meant by roll center?

SECTION-B

- 2. Explain single, two and multi degree of freedom system.
- 3. Write down the requirements of a vehicle suspension system.

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- 4. a) An automobile having a mass of 3000 kg deflects its suspension springs 0.03 m under static conditions. Determine the natural frequency of the automobile in the vertical direction by assuming damping to be negligible.
 - b) What methods are available for solving the governing equations of a vibration problem?
- 5. Explain in details Gough's tyre characteristics.

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6. Define ride and explain ride dynamic system.

SECTION-C

7. Explain the following Turning response properties:

Under steered gradient, Neutral steer, Under steer, Over steer, Characteristic speed and Critical speed

- 8. Write a short note on :
 - a) Lograthmic decrement
 - b) Rayleigh"s upper bound method
 - c) Vehicle suspensions in force apt directions (
- 9. For the system shown in figure given below, determine the natural frequency. Take $m_1 = m_2 = m_3 = m \text{ kg}$ and $k_1 = k_2 = k_3 \text{ kN/m}$



NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.