

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2011 Onwards) (Sem.-6)

VEHICLE DYNAMICS

Subject Code : BTAE-603

Paper ID : [A2382]

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 has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Write briefly :

- (a) Define natural frequency.
- (b) State magnification factor.
- (c) What is the directional stability of vehicles?
- (d) State tractive effort.
- (e) How Holzer method is different from Rayleigh's method?
- (f) Differentiate over and under steer.
- (g) Write four examples of forced vibrations.
- (h) What is wheel hop?
- (i) What is wheel shimmy?
- (j) Write a note on directional stability of vehicle.

SECTION-B

2. Describe in brief Dunkerley's method.
3. Explain in detail Gough's tyre characteristics.
4. For a typical motor car, the road resistance is given by 23 N per 1000N, the air resistance by the expression $0.0827 V^2$. Transmission efficiency is 88% in top speed; car weighs 19934 N when fully loaded. Calculate the acceleration in m/s^2 at 48km/hr, assuming the torque at 48 km/hr in the top gear is 25% more than at 144 km/hr.
5. Write short notes on stability of a vehicle on a slope, a curve and a banked road.
6. Explain in brief forced vibration by matrix inversion.

SECTION-C

7. Explain in detail suspension in force and apt directions. Also discuss transient effects in cornering.
8. Explain briefly :
 - (a) Orthogonality of mode shapes
 - (b) Steady state cornering
9. Write short notes on:
 - (a) Vibration absorber
 - (b) Rayleigh's upper bound method
 - (c) Driving force in steering