Roll No.

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Subject:	**Vehicle Dynamics**
Paper :	**AE - 308**
Time :	**3 Hours**

Total no of Question-17

Max. Marks: **60**

Section - A is compulsory. Attempt any four questions from section – B and any two questions from section – C.

SECTION – A   2X10 = 20

1. a)   What is forced vibration?
   b)   Define transmissibility.
   c)   What are mode shapes?
   d)   Define natural frequency.
   e)   What do you understand by wheel wobble?
   f)   What is understeer?
   g)   What is meant by vehicle dynamics?
   h)   When does maximum braking effect occurs?
   i)   What is camber thrust?
   j)   What do you understand by roll axis.

SECTION – B   5X4 = 20

2. Explain the function of vibration absorber.
3. Discuss Holzer's method for branched system.
4. A single degree of freedom spring mass system has a natural frequency of 10 cycles per seconds. Another single degree of freedom spring mass system is attached to it. The latter had a natural frequency of 20 cycles / second. Using Dunkerley's equation find out the approximate fundamental frequency of composite system.
5. What is oversteer? Discuss the effects of braking in an automobile.
6. What are the various forces and movements acting on a vehicle? Discuss.

SECTION – C   10X2 = 20

7. A mass of 3 kg is supported on an isolator having a spring constant of 3000 N/m and viscous damping. If the amplitude of free vibration of the mass falls to one half of its original value in 2 seconds, determine the damping coefficient of the isolator.

P.T.O.

8. The sprung parts of a vehicle weigh 95 kN , its centre of gravity is 105 cm behind the front axle and the wheel base is 230 cm. The combined stiffness of the springs of the front suspension is 21 kN/m and that of the rear suspension is 28 kN/m. The radius of gyration of the sprung parts about a horizontal transverse axis through the centre of gravity is 0.925 m. Calculate the natural frequencies of pitch and bounce motion of the vehicle body.

9. Write notes on:
   a) Orthogonality of mode shapes
   b) Magnification factor.

—————End—————