

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Third Year)

MECHANICAL ENGINEERING

Paper - III : Mechanical Vibrations

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 is compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

- 1) a) What is meant by damping?
b) What is the equivalent stiffness of spring?
c) Discuss dynamic magnifier.
d) Explain about transmissibility.
e) What are the eigen values and eigen vectors?

UNIT - I

- 2) a) Explain different types of free vibrations.
b) How can we obtain the frequency, phase and amplitude of a harmonic motion from the corresponding rotating factor.

OR

- 3) Determine the natural frequency of the simple pendulum of length L, mass m, if the mass of rod is
a) negligible
b) not negligible

UNIT - II

- 4) a) Explain logarithmic decrement.
b) Explain about structural damping and Interfacial damping.

OR

- 5) A coil of spring stiffness 4 N/mm supports vertically a mass of 20kg at the free end. The motion is resisted by the oil dash pot. It is found that the amplitude at the beginning of the fourth cycle is 0.8 times the amplitude of the previous vibration. Determine the damping force per unit velocity. Also find the ratio of the frequency of damped and undamped vibrations.

UNIT - III

- 6) a) Determine the equivalent viscous damping from frequency response curve.
b) Discuss about the energy dissipated by damping.

OR

- 7) a) Explain Combined Rectilinear and angular modes of vibration.
b) Explain about viscous damping.

UNIT - IV

- 8) Determine the Natural frequency of the free longitudinal vibration using equilibrium method.

OR

- 9) A shaft of 40mm diameter and 2.5m long has a mass of 15kg per meter length. It is simply supported at the ends and carries three masses 90kg, 140kg, and 60kg at 0.8m, 1.5m and 2m respectively from the left support. Taking modulus of elasticity as 200 GPa. Find the frequency of the Transverse vibration.

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