

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2710908

Date: 19/05/2016

Subject Name: Vibration and Noise

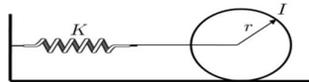
Time: 02:30 pm to 05:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Determine the natural frequency of the following system. 07



(b) Explain Lagrange's equation for deriving the equation of motion of vibrating system. 07

Q.2 (a) Explain phase plane method to solve transient vibration problem 07

(b) Derive the natural frequencies for a semi definite system of two degree of freedom with suitable example. 07

OR

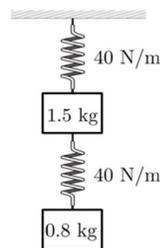
(b) Explain the demerits of dynamic vibration absorber. 07

Q.3 (a) Two bodies having equal masses as 60 kg each and radius of gyration 0.3 m are keyed to both ends of a shaft 0.8 m long. The shaft is 0.08 m in diameter for 0.3 m length, 0.10 m diameter for 0.2 m length and 0.09 m diameter for rest of the length. Find the frequency of torsional vibration. Take $G = 9 \times 10^{11} \text{ N/m}^2$. 07

(b) Explain flexibility and stiffness influence coefficients. 07

OR

Q.3 (a) Figure shows a vibrating system having two degree of freedom. Determine the two natural frequencies of vibrations and the ratio of amplitudes of the motion of two masses for the two modes of vibration. 07



(b) Explain orthogonal properties of normal modes. 07

Q.4 (a) Explain Rayleigh method for determining the natural frequencies of vibrating system. 07

(b) Discuss the relation between the vibration and noise pollution. 07

OR

Q.4 (a) Explain Hamilton principal of vibration. 07

(b) Discuss the design principle for reducing the noise. 07

Q.5 (a) Discuss active and passive vibration control 07

(b) Derive the differential equation for longitudinal vibration of a bar. 07

OR

Q.5 (a) Explain time and frequency domain vibration analysis. 07

(b) Derive the differential equation for transient vibration of a beam. 07