

I.D. No. 24480

B. Tech. 7th Semester F. Scheme (Mechanical Engg.–VII)

Examination, May–2014

MECHANICAL VIBRATION

Paper–ME-409-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions in all. Question Number 1 is compulsory and select at least one question from each section. Assume the suitable data and equation wherever required to explain the concept.

1. Explain the following short type questions with suitable examples :
 - (a) What do you understand by Vibration ? What are the ways to reduce it ?
 - (b) Single Degree of Freedom system
 - (c) Vibration Absorber
 - (d) Vibrating String. 4×5

Section–A

2. Explain the vector and complex number method of representing Harmonic motion. 20

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3. A body is subjected to two harmonic motions given below. What harmonic motion should be given to the body to bring it to the equilibrium ?

$$X_1 = 15 \sin (wt + \pi/6)$$

$$X_2 = 8 \cos (wt + \pi/3)$$

Section-B

4. Explain the concept Rotor Unbalance, Critical Speeds and Whirling of Rotating Shafts with suitable example and mathematical derivation. 20
5. Explain the various types of Vibration Measuring Instruments. 20

Section-C

6. Explain the concept of Vibration Absorber, Centrifugal Vibration Absorber and Vibration Damper with suitable example. 20
7. Derive the expression for displacement in case of forced vibration having harmonic excitation. 20

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Section-D

8. Derive the expression for Lateral Vibration of Beam. 20
9. A simply supported beam of length l is deflected by a force P applied at a point distance c from one end. Find the resulting transverse vibrations when the load is suddenly removed. 20