Roll No. .....

OLE-24480

B. Tech. 7th Semester (ME) Examination – April, 2021

MECHANICAL VIBRATION

Paper : ME-409-F

Time : Three Hours] ***[Maximum Marks : 100***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any ***five*** questions in all. Question number ***one*** is compulsory and select ***one*** question from each Section. Assume the suitable data and equation whenever required to explain the concept.

1. Explain the following short type questions with suitable examples : $5 \times 4 = 20$

(a) What do you understand by Vibration ? Explain.

(b) Multi Degree of Freedom system

(c) Vibration Absorber

(d) Vibrating String

SECTION – A

2. A machine weights 18kg and is supported on spring and dashpots. The total stiffness of springs is 12 N/mm and damping coefficient is 0.2 N-s/mm. The system is initially at rest and a velocity of 120 mm/s is imparted to the mass. Determine : 20

(i) the displacement and velocity of mass as a function of time; and

(ii) the displacement and velocity after 0.5 sec.

3. Explain under damping, critical damping and over damping with suitable examples. 20

SECTION – B

4. What do you mean by Impulse Excitation ? Explain the system response to an Impulsive Input. 20

5. What do you mean by Critical Speed of a Shaft ? Find out the Critical Speed for a Shaft without Damping. 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

SECTION – D

8. Derive the expression for Lateral Vibration of Beam. 20

9. Derive the equation for transverse vibration of strings (wave equations). 20