Roll No. .....

24480

B. Tech. 7th Semester (ME) Examination – February, 2022

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 ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Explain beats phenomenon. $5 \times 4 = 20$

(b) Explain logarithmic decrement.

(c) Whirling of Rotating Shafts

(d) Centrifugal Vibration Absorber

(e) Natural Frequencies and Normal Modes

UNIT – I

2. Add the following vector analytically and check the solution graphically. 20

$X_1 = 8 \sin(\omega t + 30^\circ)$

$X_2 = 10 \sin(\omega t - 60^\circ)$

3. Write differential equation of motion for single degree of freedom having damped, free vibrations. Also discuss about the solution for over damping. 20

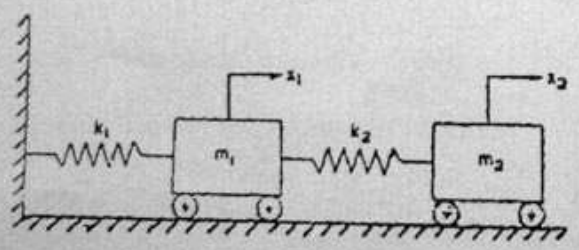
UNIT – II

4. Drive an equation for transient vibration and also discuss about the steady state vibrations. 20

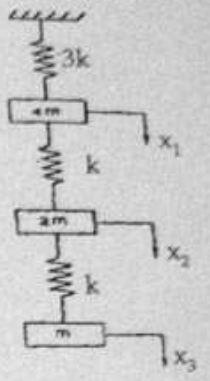
5. Determine the shock spectrum of a rectangular pulse. 20

UNIT – III

6. Find the principle coordinates for two degree of freedom system as shown in figure. When $m_1 = m_2 = m$ and $k_1 = k_2 = k$. 20

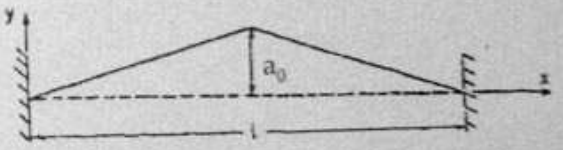


7. Using matrix method determine the natural frequency of system as shown in figure. 20



UNIT – IV

8. A uniform string of length L and a large initial tension S, stretched between two supports is displaced laterally through a distance a_0 at the center as shown in fig and is released at t=0. Find the equation of motion for the string. 20



9. Find normal function and derive equation for lateral vibration of beam. 20