PRN:		Course Code :	MET 2704.1

Final Year **B. Tech** End Semester Examination Winter 2023

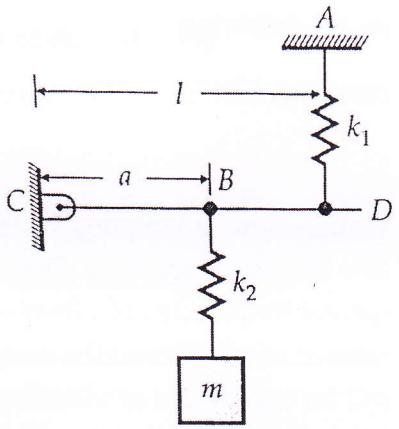
Mechanical Vibrations

Day and Date: Tuesday, 05/12/2023 Max Marks: **100**

Time : 2.00 to 5.00 PM Duration: **03** hrs

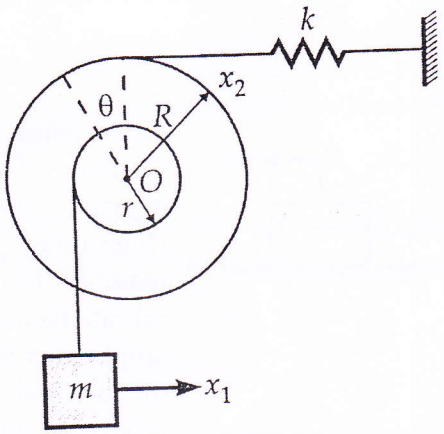
Instructions: All questions are compulsory.

Q.1	**Attempt the following**	Marks	Bloom's Level	CO
a)	What is vibration? How vibrations are classified?	08	1	2704.1.1
b)	Find the natural frequency of the system shown in figure assuming the bar CD weightless and rigid.	08	3	2704.1.1



OR

b)	Find the natural frequency of the system shown in figure.	08	3	2704.1.1



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Q.2

Attempt the following

a) Explain Magnification factor and its frequency response curve. 08 2 2704.1.2

b) A body of mass 100 kg is suspended from a spring of 180N/m. A dashpot is connected between the mass and ground with a damping resistance of 1N at velocity of 6 m/sec. Determine i) critical damping coefficient ii) amplitude of the body 10 cycles after it was released from an initial amplitude of 2.5 cm. 08 3 2704.1.2

OR

b) A mass of 1 kg is to be supported on a spring having a stiffness of 9800 N/m. The damping coefficient is 4.9 N-sec/m. Determine the natural frequency of the system. Also find the logarithmic decrement and the amplitude after three cycles if the initial displacement is 0.30 cm. 08 3 2704.1.2

Q.3 **Attempt any two from the following**

a) Explain co ordinate coupling. 08 2 2704.1.3

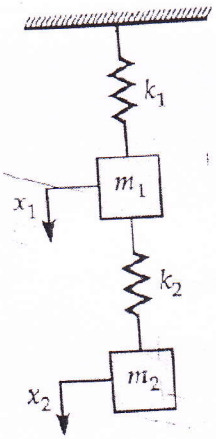
b) 

Figure shows a vibrating system having two degrees of freedom. Determine the two natural frequencies of vibrations and the ratio of amplitudes of the motion of m1 and m2 for two modes of vibration. M1= 1.5 kg, M2= 0.80 kg, k1=k2=40 N/m 08 3 2704.1.4

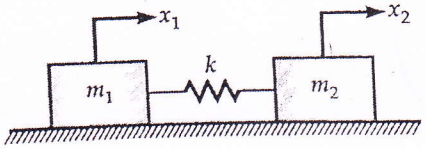
c) 

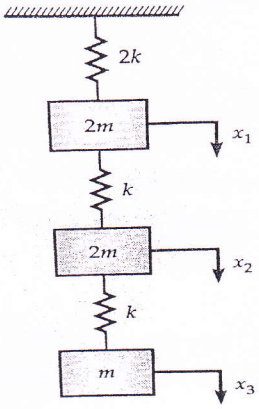
Figure shows a vibrating system having two degrees of freedom. Determine the two natural frequencies of vibrations and the ratio of amplitudes of the motion of m1 and m2 for two modes of vibration. m_1= 10 kg, m_2= 15 kg, k=320 N/m 08 3 2704.1.4

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Q.4 **Attempt any two from the following**

a) Explain Flexibility influence coefficient matrix, and stiffness influence coefficient matrix. 08 2 2704.1.4

b) Describe Holzer's method used to determine the natural frequencies of three rotor system. 08 2 2704.1.4

c) 

Using matrix method, determine the natural frequencies of the system shown in figure. 08 3 2704.1.4

Q.5 **Attempt any Two of the following**

a) What is FFT analyzer? What facilities are available in modern FFT analyzer. 09 2 2704.1.4

b) What are the steps involved in vibration condition monitoring? How the vibration monitoring helps to carry out preventive maintenance of rotating machines. 09 2 2704.1.4

c) What are the types of exciters? Describe working and use of electromagnetic exciter. 09 2 2704.1.4

Q.6 **Attempt any Two of the following**

a) Show that as the distance from a point source doubles, the sound intensity level increases by 6 dB? 09 2 2704.1.5

b) What are the auditory and non auditory effects of noise on human being? What are the sound pressure limits during day and night time in India?[09 2 2704.1.5

c) What is decibel scale? What is its importance? How are the incoherent sound pressure levels added? 09 2 2704.1.5

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