BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH   SEMESTER: V
BRANCH: MECHANICAL   SESSION: MO/2022

SUBJECT: ME303 MECHANICAL VIBRATIONS

TIME: 2 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

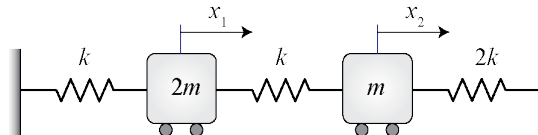|		CO	BL
Q1 (a) Find the natural frequency of the pendulum shown in Figure when the mass of the connecting bar (*m*) is not negligible compared to the mass of the pendulum bob (*M*).	[5]	CO1	Evaluate

rod of mass *m* and length *l*

Bob of mass *M*
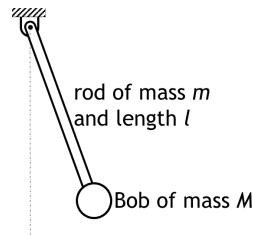
		CO	BL
Q2 (a) What is logarithmic decrement?	[2]	CO1	Understand
Q2 (b) A vibrating system consisting of a mass of 2.5 kg and a spring of stiffness 20 N/cm is viscously damped such that the ratio of any two consecutive amplitudes is 0.02. Determine the damping factor ζ.	[3]	CO1	Evaluate

		CO	BL
Q3 (a) A spring-mass-dashpot system is excited by a harmonic force. At resonance, the amplitude is measured to be 0.6 cm. At 0.80 resonant frequency, the amplitude is measured to be 0.5 cm. Determine the damping factor ζ of the system.	[5]	CO1	Evaluate

		CO	BL
Q4 (a) What are normal modes of vibration in a two degree of freedom system?	[2]	CO2	Remember
Q4 (b) What do you understand by mode shapes?	[3]	CO2	Understand

		CO	BL
Q5 (a) Determine the natural frequencies of the system shown in Figure.	[5]	CO3	Analyse

:::::: 27/09/2022 M ::::::