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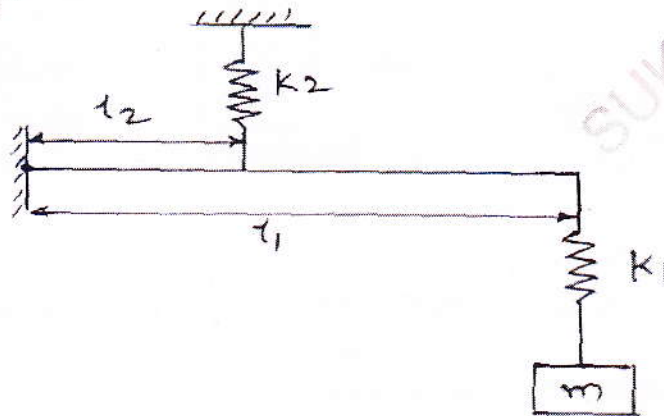
B.E. (Mech.) (Part - IV) (Semester - VIII)
Examination, May - 2018
NOISE AND VIBRATION
Sub. Code: 68510

Day and Date : Friday, 11 - 05 - 2018
 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

- Instructions :
- 1) All questions are compulsory.
 - 2) Assume suitable data wherever necessary.
 - 3) Draw neat sketch wherever necessary.

- Q1) a) Enlist different methods of vibration analysis. Using Equilibrium method derive equation of motion for standard spring - mass - system. [8]
- b) Derive the equation of natural frequency for system shown in figure. [8]



OR

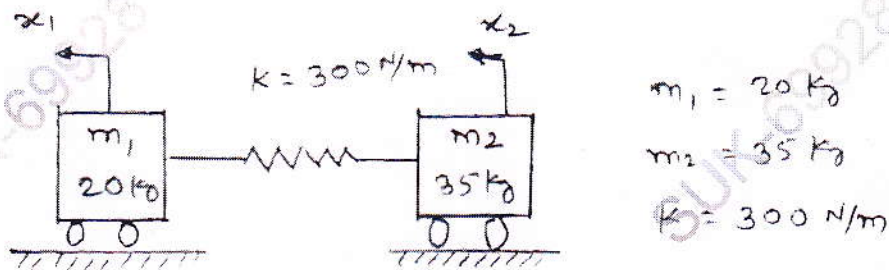
- b) A vibrating system consists of a mass of 50 kg, a spring of stiffness 30 kN/m and a damper. The damping provided is only 20% of the critical value. Determine the damping factor, critical damping coefficient, natural frequency of damped vibrations, logarithmic decrement and the ratio of two consecutive amplitudes. [8]

P.T.O.

- Q2) a) Derive the equation of Force Transmissibility. Also explain plot of transmissibility versus frequency ratio. [8]
- b) A single cylinder vertical petrol engine of total mass 320 kg is mounted upon a steel chassis and causes static deflection of 2 mm. The reciprocating parts of engine have a mass of 24 kg and move through a vertical stroke of 150 mm with SHM. A dashpot attached to the system offers a resistance of 490 N at a velocity of 0.3 m/s. Determine,
- The speed of driving shaft at resonance and
 - The amplitude of steady state vibration when the driving shaft rotates at 480 rpm. [10]
- Q3) a) Explain torsionally equivalent shaft. [8]

OR

- With the help of neat sketch explain Dry Friction Damper. [8]
- Derive the equation of natural frequency and mode shapes for the system of two masses shown in figure. [8]



- Q4) a) Derive the equation of motion for multi degree spring mass system. [8]
- OR
- Explain Maxwell reciprocal theorem. [8]
- Determine the natural frequencies of the system shown in fig. 4b using Matrix Iteration Method. Solve up to first mode shape. [10]
- Q5) a) Explain in brief with neat sketch the instruments Vibrometer, Frahm's tachometer. State whether used to measure displacement, velocity and/or frequency. [8]
- An undamped vibration pick up has a natural frequency of 1 cps. It is used to measure a harmonic vibration of 4cps. If the amplitude indicated by the pickup is 0.125 cm, what is the correct amplitude? [8]

Q6) Attempt any two:

- Write short note on Octave band analysis and its importance.
- Discuss Subjective and objective assessment of sound.
- At a distance of 4 m from a point source, the sound pressure level is 92 dB. Assuming a free progressive spherical wave, and standard atmospheric conditions, calculate the sound pressure level at source.

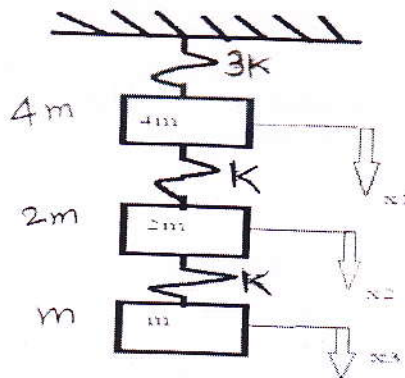


Fig 4b

