U.S.N

P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Second Semester, B.E. - Mechanical Engineering (MMDN)
Semester End Examination; May/June - 2018
**Advanced Theory of Vibrations**

Time: 3 hrs   *Max. Marks: 100*

*Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I
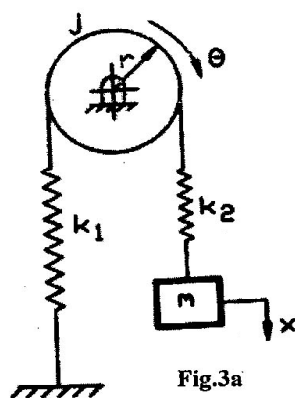
1. Obtain the response equations for a single degree of freedom system subjected to an impulse excitation.   20

2. Find the undamped spectrum for the sinusoidal pulse force shown in Fig. 2. Using initial conditions $x(0) = 0$ and $x(0) = 0$.
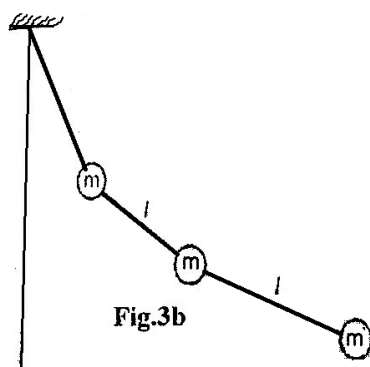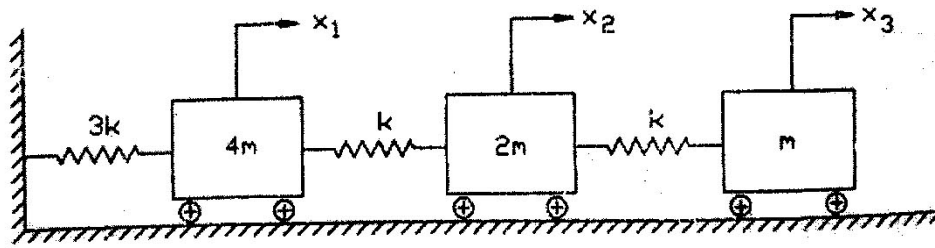

Figure2

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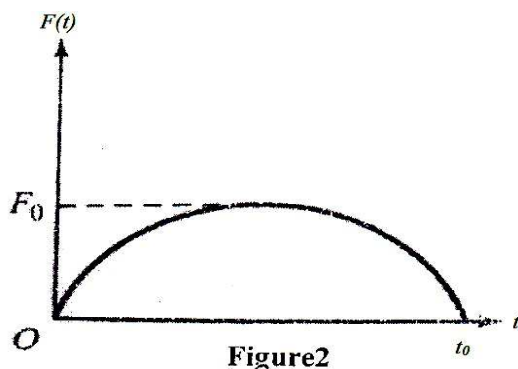
UNIT - II

3 a. Find the flexibility influence coefficient of the system shown in Fig. 3a.

Fig.3a

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b. Find the flexibility influence coefficient of the system shown in Fig. 3b.

Fig.3b

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4. Using influence coefficients, determine the three natural frequencies and the corresponding mode shapes.
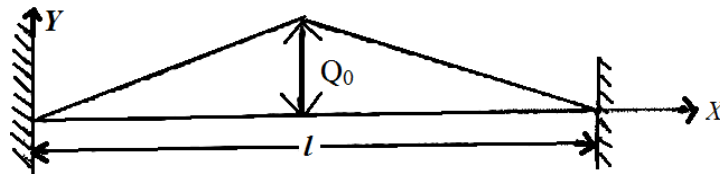

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UNIT - III

5. Derive the general solution for longitudinal vibrations of bars.

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6. A uniform string of length '*l*' and large initial tension *S*, stretched between two supports is displaced laterally through a distance Q_0 at the center as shown in below figure and is released at $t = 0$. Find the equation of the string.

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UNIT - IV

7 a.	Sketch and explain piezoelectric transducers.	10
b.	Explain with a schematic diagram of a LVDT transducer.	10
8 a.	Briefly discuss about experimental modal analysis.	10
b.	With a neat sketch, explain frequency measuring instruments.	10

UNIT - V

9 a.	Explain frequency response curves for linear hard spring and soft spring system.	10
b.	Explain perturbation method for non-linear system.	10
10 a.	Discuss the difference between linear and non-linear system.	10
b.	Discuss about phase-plane trajectories for a hard spring system.	10

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