Total No. of Questions :8] *[Total No. of Printed Pages :3*

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MVSE - 201

M.E./M.Tech., II Semester

Examination, June 2014

Structural Dynamics

Time : Three Hours

Maximum Marks : 70

Note : 1. Attempt any five questions.
2. All questions carry equal marks.
3. Missing data, if any, may be suitably assumed.

1. a) Explain D'Alembert's Principle and its applications.
   b) A body of mass 8 kg is supported on a spring of stiffness 2340 N/m and has a dashpot connected to it having damping coefficient 1.96 N-S/m. In what ratio will the amplitude of vibration be reduced after 5 cycles of vibration.

2. a) Describe the principle of vibration isolation.
   b) For the system shown in fig. 1, (i) Draw the free body diagram and derive the equations of motion (ii) Show these equations in matrix form and give mass, stiffness and damping matrix.

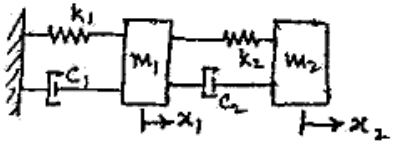

Fig. 1

3. An undamped system is subjected to the rectangular pulse as shown in fig.2 Using Duhamel's integral obtain expression for displacement response.

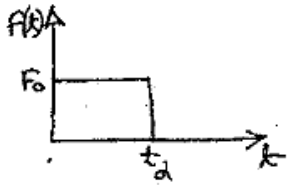

Fig. 2

4. a) Using Rayleigh's Method, derive the expression for natural frequency of undamped SDOF system in free vibration.
   b) Describe equivalent viscous damping. Derive expression for equivalent viscous damping if damping is of coulomb type.

5. Determine the natural frequencies for the system shown in fig. 3.

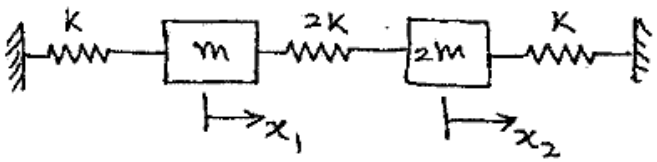

Fig. 3

6. Determine natural frequencies and mode shapes of a three storey building approximated by a 3-degree-of-freedom model (mass and stiffness as shown in fig. 4).

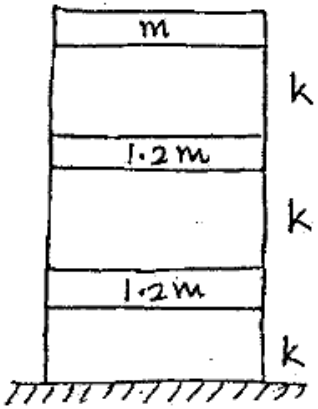

Fig. 4

7. Obtain an expression for the general solution of displacement response of the longitudinal vibration of a slender straight elastic bar prismatic in cross section.

8. Write short notes on any four of the following.
   a) Principle of accelerometer
   b) Dynamic magnification factor
   c) Principle of vibration absorbers
   d) Eigen value problem
   e) Rayleigh-Ritz method.

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