Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MVSE-201

M.E./M.Tech. II Semester

Examination, June 2017

Structural Dynamics

Time : Three Hours

Maximum Marks : 70

Note: i) Answer any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data wherever necessary.

1. a) Derive the solution of harmonic vibration of undamped SDOF systems for initial conditions μ_0 and i_0 of displacement and velocity respectively. Plot the response.
   b) Explain step, Ramp and pulse excitations.

2. a) Discuss critical damping with example.
   b) Model ϕ system shown in fig.1 by a block attached to a single spring of an equivalent stiffness. Determine the natural frequency of vibration.

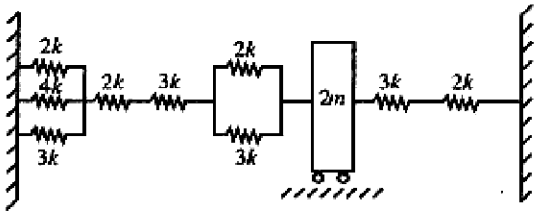

Figure 1

3. Derive an expression for motion of G concentrated mass having free viscously damped vibration. Show that the decay in amplitude of virbration is exponential.

4. What is laplace transformation and its application. Find the laplace transform of a pulse of height A and duration τ in fig.2. Deduce the laplace transform of unit empulse.

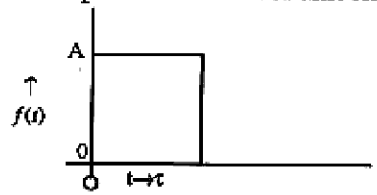

Figure 2 (Rectangular pulse)

5. Discuss in detail.
   a) Central difference method
   b) Newmark's method for numerical evaluation of dynamic response of SDOF system.

6. a) State and explain the orthogonality principle of normal modes.
   b) Discuss the method of matrix iteration.

7. Discuss the Rayleigh's method of estimating fundamental frequency of continuous system and explain modifications made in Rayleigh Ritz approach.

8. Write notes on any Four of the following.
   a) Beat phenomenon.
   b) Eigen value problem.
   c) Lagrange's equation.
   d) Transverse vibration of string.
   e) Torsion of shafts.

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