7. Discuss in detail the Eigen value problem and the methods used for solving the problem.

8. Discuss in brief :
   a) Rayleigh - Ritz method
   b) Free torsional vibration of shafts
   c) Modal and spectral matrices
   d) New mark's method of non linear systems

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Roll No ....

MVSE-201

M.E./M.Tech., II Semester
Examination, December 2016

Structural Dynamics

Time : Three Hours

Maximum Marks : 70

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

1. a) A mass 'm' is attached to the mid point of a beam of length L figure. 1 the mass of beam is small in comparison to 'm'. Determine the natural frequency of free vibration of beam in vertical direction.
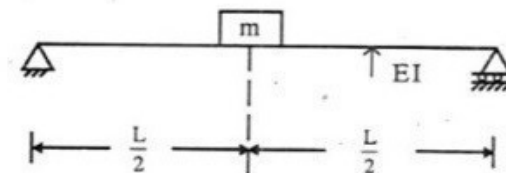

Figure - 1

b) What is logarithmic decrement? For a system having mass long and spring constant 12 kN/m, the amplitude decreases to 0.2 of the initial value after six consecutive cycles. Find the damping coefficient of the damper.

2. Write the equation of motion for the one storey one way frame shown in figure-2. The flexural rigidity of beam and columns is as noted. The mass lumped at the beam is 'm' otherwise, assume the frame to be mass less and neglect damping.
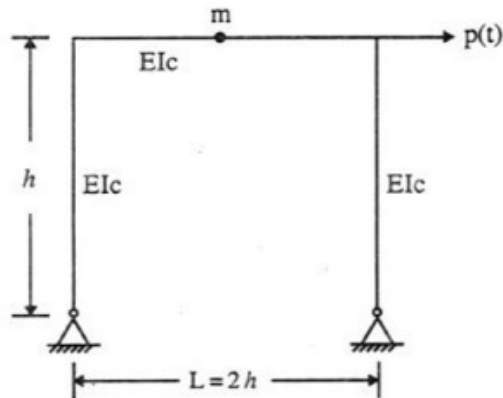
m

EIc

p(t)

h   EIc   EIc

L = 2h

Figure - 2

3. An undamped system is subjected to the triangular pulse shown in figure.3, using Duhamel's integral, obtain an expression for displacement response.
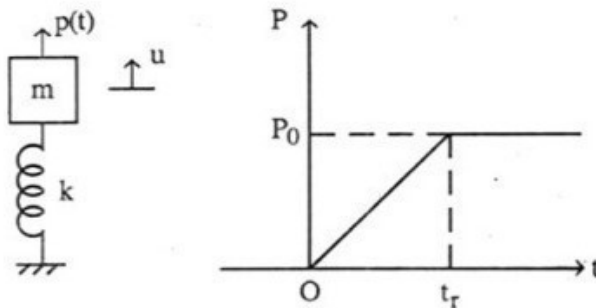
p(t)

m

u

k

P

P_0

O t_r t

Figure - 3

4. From the two degree of freedom system figure-4 $k_1 = k$, $k_2 = 2k$, $m_1 = m$, $m_2 = 2m$, find the angular frequencies, the corresponding mode shape and the equation of motion.
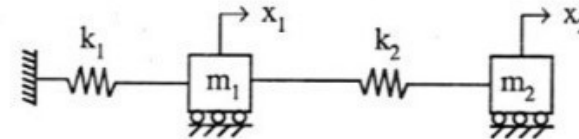
x_1 x_2

k_1 m_1 k_2 m_2

Figure-4

5. A three storey frame with rigid beams is shown in figure-5. Determine the natural frequencies and mode shapes.

$m_1 = 2000$ kg

$m_2 = 2000$ kg $k_1 = 1500$ kN/m
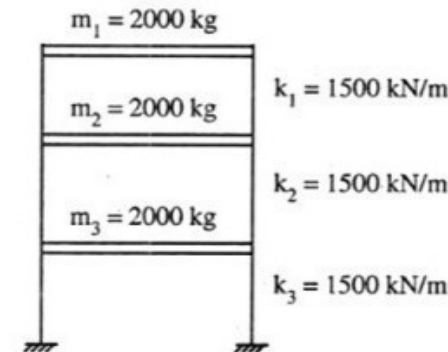
$m_3 = 2000$ kg $k_2 = 1500$ kN/m

$k_3 = 1500$ kN/m

Figure - 5

6. For the cantilever beam determine the natural frequencies of lumped mass system figure-6.

50 kg   50 kg

0.5m   1m

$EI = 10$kN - M^2

Figure - 6

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