

Code No: G8703/R13

M. Tech. I Semester Supplementary Examinations, December-2016

**STRUCTURAL DYNAMICS**

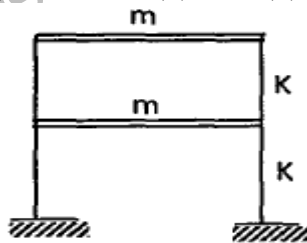
(Common to SE and SD)

Time: 3 hours

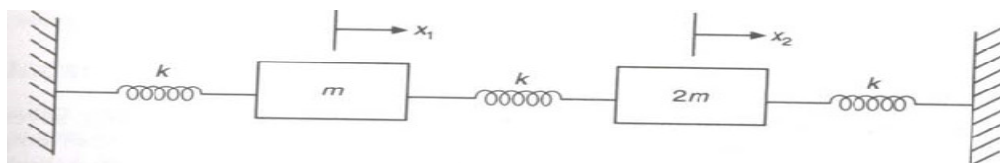
Max. Marks: 60

*Answer any FIVE Questions*  
*All Questions Carry Equal Marks*

- 1 Explain the following 12m  
 a) Methods of Discretization  
 b) Equations of Motion.
- 2 Discuss about 12m  
 a) Logarithmic decrement  
 b) Dynamic magnification factor  
 c) Band width.
- 3 The natural period of a SDOF system is 0.75 sec. The system is subjected to some initial displacement 25mm and allowed to vibrate its own. The displacement observed after 2.5 sec was 10 mm. If the mass of the system is 500kg, determine (i) circular natural frequency, (ii) stiffness, (iii) damping ratio, (iv) damped circular natural frequency and (v) critical damping coefficient of the system (vi) period and frequency of vibration. 12m
- 4 a Find out the response of the two degree of freedom system as shown in Fig with the initial condition  $x_1(0) = x_2(0) = 0$  and  $\dot{x}_1(0) = \dot{x}_2(0)$ . 8m

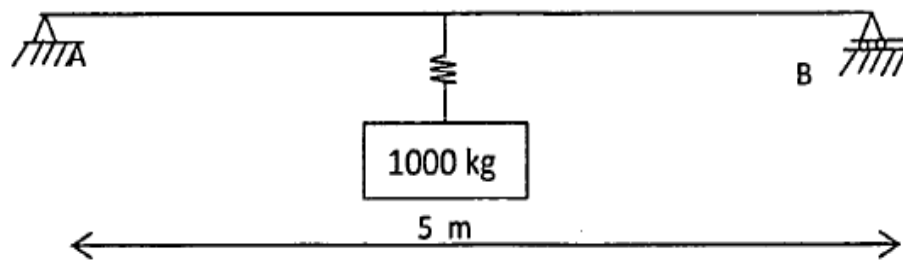


- b What is the meant by Eigen values? 4m
- 5 Find the natural frequency and mode of vibration for the system shown. 12m

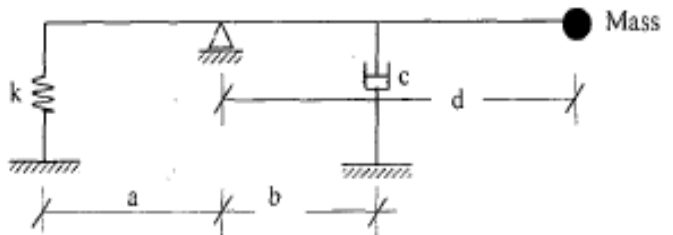


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- 6 Determine the natural frequency of the beam shown in figure. The moment of inertia  $I$  of the beam is  $450 \times 10^6 \text{ mm}^4$  and modulus of elasticity  $E = 1.8 \times 10^5 \text{ N/mm}^2$  and the stiffness of the spring is  $50 \times 10^6 \text{ N/m}$ . If the system undergoes free vibration with an initial displacement of  $2 \text{ mm}$ , find the response of the system at time  $2 \text{ seconds}$  12m



- 7 a What are the different methods employed for the dynamic analysis of structures? 4m  
 b Derive the Equilibrium equation of motion for the structural system shown in fig. Find out the natural frequency of the system. 8m



- 8 a Explain about the free and forced vibration of continuous systems. 6m  
 b Write any two methods of finding natural frequency of multi degree freedom system. 6m

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