Total No. of Questions : 6]

SEAT No. :

P4183

[Total No. of Pages : 2

[4960]-36

M.E. (Civil) (Structures)

STRUCTURAL DYNAMICS

(2008 Pattern)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any two questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures in bold to the right, indicate full marks.***
4) ***If necessary, assume suitable data and indicate clearly.***
5) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) Derive the various solutions for single degree of freedom systems subjected to damped vibrations. **[15]**

b) What are different types of damping? Explain with suitable examples. **[10]**

Q2) a) Derive the expression for a single degree of freedom system subjected to forced damped vibration. **[15]**

b) Explain transmissibility with a suitable example. **[10]**

Q3) a) A single degree of freedom system consists of a weight W=9.81 kN, a spring stiffness 20 kN/cm and a dashpot with coefficient 0.071 kN/cm/s. Find i) damping factor, ii) logarithmic decrement and c) ratio of any two consecutive amplitudes. **[15]**

b) A 500 N instrument is installed at a location where vertical acceleration is 0.1g and at frequency = 10 Hz. The instrument is mounted on a rubber pad of stiffness 12,800 N/m and damping such that the damping factor is 0.10. Determine the acceleration transmitted to the instrument. **[10]**

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SECTION - II

Q4) a) Explain orthogonality of modes. **[10]**

b) Find the natural frequencies and mode shapes for the system shown in Fig. 1. **[15]**

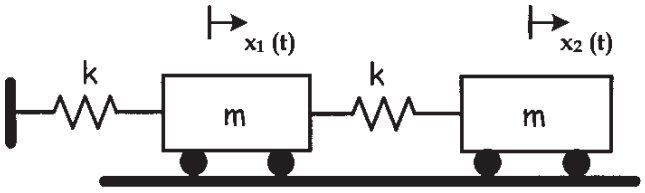

Fig. 1

Q5) a) What are the characteristics of non-linear systems? **[15]**

b) Explain Stodola Method. **[10]**

Q6) a) What is modal superposition method? **[10]**

b) Determine the natural frequencies and modes of vibrations of a uniform simply supported beam. **[15]**

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