Total No. of Questions : 8]

SEAT No. :

P3889

[Total No. of Pages : 2

[5155]-138
M.E. (Civil-Structures)
STRUCTURAL DYNAMICS
(2013 Course) (Semester - I) (End Semester)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Figures to the right indicate full marks.***
3) ***If necessary, assume suitable data and indicate clearly.***
4) ***Use of electronic pocket calculator is allowed.***

Q1) Explain with suitable examples the various forms of damping and their effects on the response of structures. **[10]**

Q2) Explain convolution integral with an example. **[10]**

Q3) A 750 kg machine is mounted on a platform and is subjected to an excitation force F as shown in Fig. 1. The combined stiffness of the columns supporting the platform is k. Determine the amplitude of the motion and the force transmitted to the foundation when $k = 2 \times 10^6$ N/m. **[10]**

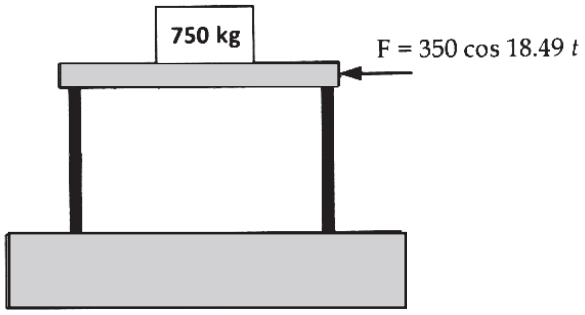

Fig. 1

Q4) Explain linear acceleration method. **[10]**

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Q5) Determine the natural frequencies and mode shapes for the system shown in Fig.2. Consider $m_1 = 9$ kg; m_2; = 1 kg; $k_1 = 24$ N/m; $k_2 = 3$ N/m; $k_3 = 3$ N/m and $c_1 = c_2 = c_3 = 0$. **[10]**

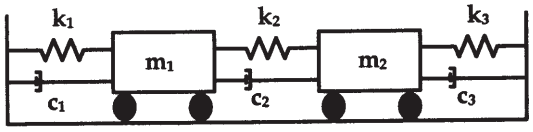

Fig. 2

Q6) Determine the natural frequencies of the system shown in Fig. 3 by the Stodola method. Consider $m_1 = m_2 = m_3 = m$ and $k_1 = k_2 = k_3 = k$. **[10]**

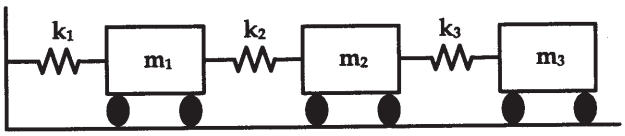

Fig. 3

Q7) Explain step-by-step procedure of Wilson-θ method. **[10]**

Q8) The assumed modes for the uniform beam shown in Fig. 4 are $\frac{x}{l}$ and $\sin\left(\frac{\pi x}{l}\right)$. Determine the two natural frequencies and modes shapes using the Rayleigh-Ritz method. **[10]**

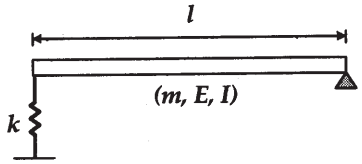

Fig. 4