SEAT No :

P 3910

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M.E. (Mechanical) (Design Engineering)
ADVANCED MECHANICAL VIBRATIONS
(2013 Credit Pattern) (502208) (Semester-II)

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

Instructions to the candidates:

1) *Attempt any five questions.*

2) *Draw neat diagrams wherever necessary.*

3) *Use of non-programmable scientific calculator is allowed.*

4) *Assume suitable data wherever necessary.*

5) *Figures to the right indicate full marks.*

Q1) Find the natural Frequency and mode shapes of three degree of freedom system as shown in Fig. No. 1 using matrix method (Eigen values and Eigen vector). **[10]**
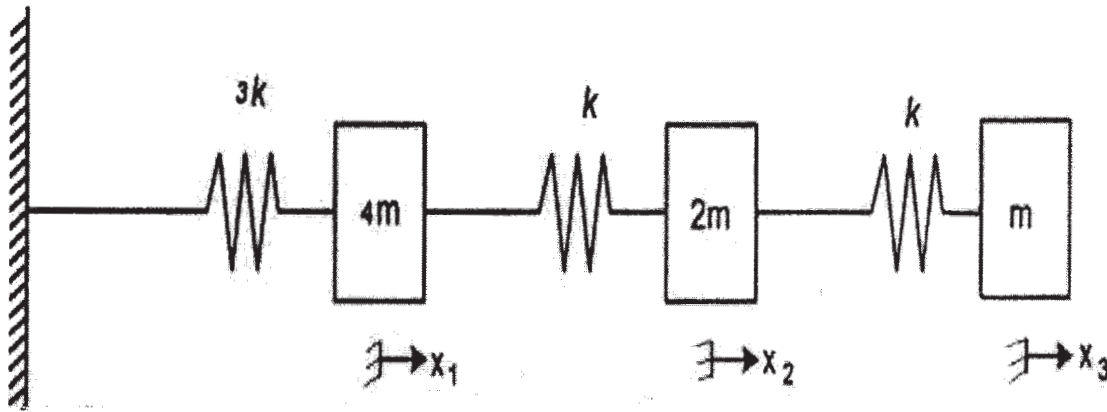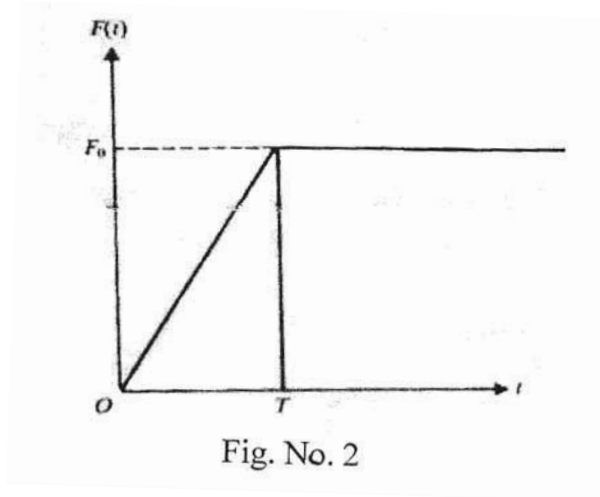

Fig. Q. 1

Q2) Find frequency equation of a uniform beam fixed at one end and free at the other for transverse vibration. **[10]**

Q3) a) Determine the forced response of the un-damped single degree of freedom system to the forcing function shown in Fig.No.2. **[5]**

Fig. No. 2

b) Determine flexibility influence coefficient of the triple pendulum of lengths L_1, L_2, L_3 and masses m_1, m_2, m_3 attached by the string as shown in Figure No.3. **[5]**
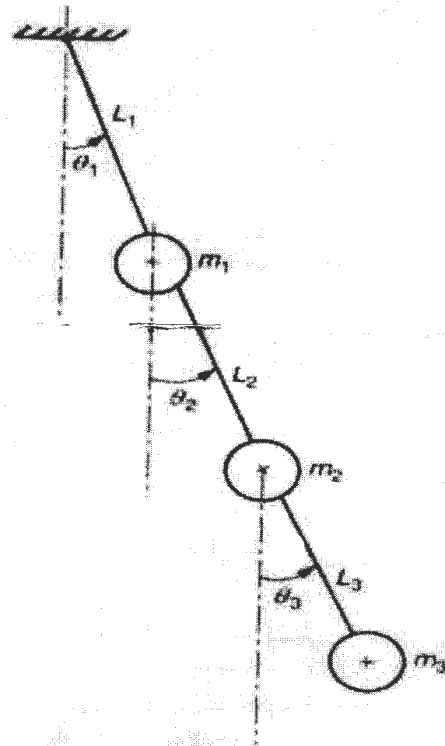

Figure No. 3

Q4) Analyze un-damped dynamic vibration absorber and show frequency response for main system and absorber system. **[10]**

Q5) a) Explain how time domain and frequency domain techniques are used for condition monitoring. **[5]**

b) Explain FFT analyzer with a block diagram. **[5]**

Q6) a) How are the mean square value, auto correlation function and power spectral density function of a stationary random process related? **[5]**

b) Explain with neat sketch wide-band and narrow band processes. Define white noise, ideal noise and band limited noise. **[5]**

Q7) Write notes on (Any Four). **[10]**

a) Holzer Method

b) Rayleigh's method

c) Duhamel's Integral

d) Fault diagnosis

e) Continuous system and its characteristics

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