

PART - B (12 × 2 = 24 Marks)

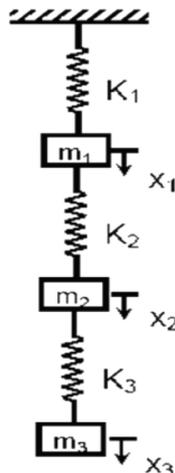
Answer ALL Questions

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|--|---|----|-----|
| 11. What are the sources of vibration? | 2 | K2 | CO1 |
| 12. What is critical damping? | 2 | K2 | CO1 |
| 13. What is meant by principal coordinates? | 2 | K2 | CO2 |
| 14. What is semi definite system? | 2 | K1 | CO2 |
| 15. What are influence coefficients? | 2 | K1 | CO3 |
| 16. What are continuous systems? | 2 | K1 | CO3 |
| 17. List any three vibration isolating materials. | 2 | K1 | CO4 |
| 18. What is dynamic balancing? | 2 | K1 | CO4 |
| 19. State the importance of vibration analysis. | 2 | K2 | CO5 |
| 20. What are uses for vibration exciters? | 2 | K2 | CO5 |
| 21. List out any four vibration measuring devices or equipment. | 2 | K2 | CO5 |
| 22. List out any four important criteria for selecting a sensor for vibration measurement. | 2 | K2 | CO5 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) The natural frequency of a spring-mass system is 20 Hz and when extra 3 kg mass is attached to its mass the natural frequency reduces by 4 Hz. Determine the mass and stiffness of the system. 11 K3 CO1
- OR**
- b) With the help of neat sketch explain viscous damping of vibrating system. (A2). 11 K3 CO1
24. a) A horizontal spring mass system with damping has mass of 5 kg attached to the spring of stiffness 980 N/m, If the coefficient of friction is 0.025, Calculate: (i) Frequency of free vibration, (ii) the number of cycles to 50% reduction in amplitude if the initial amplitude is 5 cm. (iii) time taken to reach the 50% reduction in amplitude. 11 K3 CO2
- OR**
- b) What is co-ordinate coupling? Determine the natural frequencies of such system with dynamic coupling? 11 K4 CO2
25. a) Obtain natural frequencies and modal vectors and mode shapes of the system shown in Fig. below, using Eigen value method. 11 K3 CO3



OR

b) Derive the general form of deflection equation for a transverse vibration of beam. 11 K3 CO3

26. a) Discuss how vibration analysis can be used as a condition monitoring tool. 11 K4 CO4

OR

b) With the help of neat sketch explain dynamic vibration concept. 11 K4 CO4

27. a) Discuss the following: (i) Parameters for selection of sensors and (ii) Accelerometer mountings. 11 K3 CO5

OR

b) With the help of neat sketch explain the following: (i) any one vibration exciter and (ii) Frahm read tachometer. 11 K4 CO5

28. a) A rotor having mass of 5 kg is mounted mid-way on 1 cm diameter shaft supported at the ends by two bearings. The bearing span is 40 cm. Because of certain manufacturing inaccuracy, the CG of disc is 0.02 mm away from the geometric centre of the rotor. If the system rotates at 3000 rpm, find the amplitude of steady state vibrations and dynamic force transmitted to bearings. Neglect damping and weight of shaft. Take $E=1.96 \times 10^{11}$ MPa. 11 K3 CO1

OR

b) Discuss briefly the time and frequency domain analysis in vibration analysis. 11 K4 CO5