

PART C (6 x 5 = 30 Marks)

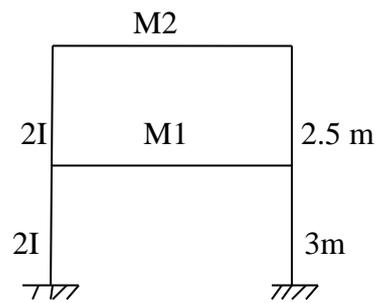
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|-----|---|---|-----|-------------------|
| 21. | Compare static and dynamic loads | 5 | CO1 | [K ₂] |
| 22. | What is Duhamel integral? Derive the equation with a neat sketch | 5 | CO2 | [K ₃] |
| 23. | Outline Wilson method of numerical solution | 5 | CO3 | [K ₃] |
| 24. | Compute the magnification factor of forced vibration produced by a machine operating at a speed of 600 rpm, installed at the middle of the beam. The static deflection at the middle of the beam due to weight of the machine $W = 5000\text{N}$ is $\delta_{st} = 0.25\text{mm}$. Neglect the weight of the beam and consider the viscous damping force of 500N at a velocity of 25mm/sec | 5 | CO4 | [K ₃] |
| 25. | Explain the effects of blast loads on structures | 5 | CO5 | [K ₂] |
| 26. | Define damping. List and explain the various types of damping | 5 | CO2 | [K ₂] |

Answer any FOUR Questions

PART D (4 x 10 = 40 Marks)

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|-----|--|----|-----|-------------------|
| 27. | An oscillatory system with a natural frequency of 4 Hz starts with initial amplitude of 1.5cm and an initial velocity of 15cm/sec. calculate all vibratory parameters involved and the time taken to reach the first peak. | 10 | CO1 | [K ₃] |
| 28. | A single degree of freedom system is subjected to free vibration with damping. Derive the solution for the system and discuss with respect to critical damping, over damping and under damping | 10 | CO2 | [K ₃] |
| 29. | (i) Explain numerical solution to response using new mark method.
(ii) Explain the various variables involved in state space response using Direct Integration Technique | 10 | CO3 | [K ₃] |

30. Determine the natural frequency and mode shapes for the structure shown in figure $E = 2.5 \times 10^4 \text{ N/mm}^2$, $I = 5 \times 10^5$, $m_1 = 1360 \text{ kg}$, $m_2 = 660 \text{ Kg}$ 10 CO4 [K₃]



31. What is Base Isolation? Explain the elements with a neat sketch, working principle, advantages and limitations of base isolation 10 CO5 [K₃]
