

M.Tech. Structural Engineering & Construction (CBCS Pattern) Semester-II  
**PSES22 - Structural Dynamics**

P. Pages : 2

Time : Three Hours



**GUG/S/25/11014**

Max. Marks : 70

- Notes :
1. Solve **any five** questions.
  2. All questions carry equal marks.
  3. Due credit will be given to neatness and adequate dimensions.
  4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Differentiate between. 7
- i) Free vibration and forced vibration.
  - ii) Random excitation and Harmonic excitation.
- b) A spring mass system consist of spring with stiffness 'k' N/mm and mass 'w' N. It has 7  
natural frequency of vibration 15 Hz. If an extra 30 N mass is coupled at 'w' and the  
natural frequency reduces by 2.8 Hz. Find 'k' and 'w'.
2. Explain in detail. 14
- i) Degree of freedom system.
  - ii) Harmonic Excitation
  - iii) simple harmonic motion.
  - iv) D'Alembert's principle.
3. Find and draw the mode shapes for given problem shown in figure 1. 14

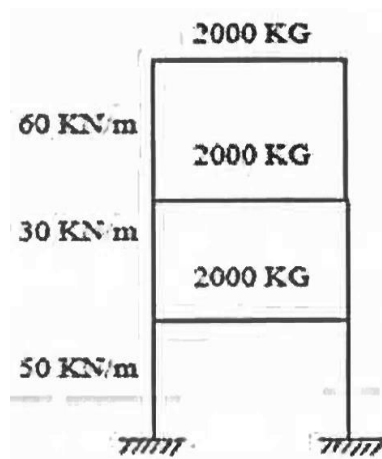


Figure – 1

4. Find the distribution of seismic forces at floor levels for RCC frame shown below in zone III. **14**
- Find the distribution of seismic forces at floor levels for RCC frame shown below in zone III.
- i) Spacing of frames is 3.5 m c/c.
  - ii) Slab thickness – 130 mm
  - iii) All beams – 420 x 420 mm
  - iv) All columns – 550 x 550 mm
  - v) LL on all floor – 2.0 kN/sqm. Derive the solution of equation of motion for the beam subjected to uniformly distributed load.

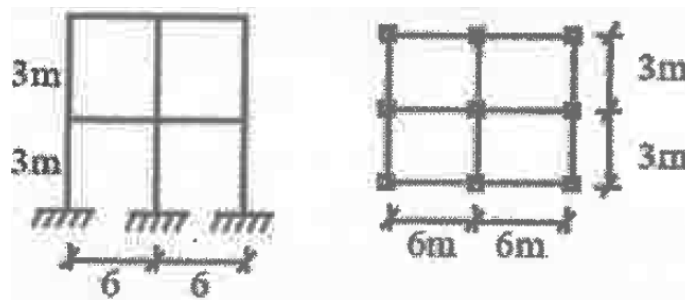


Figure - 2

5. Explain Response of continuous systems to dynamic loads. **14**
6. Explain in detail the free transverse vibration of continuous beam subjected to moving Live Load. **14**

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