

**B.E DEGREE EXAMINATIONS, APRIL/MAY 2012
(Regulation 2004)**

8th Semester Civil Engineering

CE 481 Structural Dynamics and Earthquake Engineering

Time: Three hours

Max Marks: 100

Answer ALL questions

(IS 1893:2002(Part1),IS 13920:1993 and IS 456:2000 are permitted)

Part-A (10x2=20 marks)

1. Differentiate between static loading and dynamic loading.
2. State the differences between free and forced vibration.
3. State the equation of motion for an undamped free vibration of a two degree of freedom system.
4. How you will define the fundamental natural frequency for a multidegree of freedom system?
5. Differentiate between intensity and magnitude of an earthquake.
6. What are the different types of seismic waves occurring during an earthquake?
7. What is meant by liquefaction?
8. What are the different effects of soil – structure interaction?
9. What is meant by confinement?
10. What is meant by strong column – weak beam concept of design?

Part-B (5x16=80 marks)

11. Determine the natural frequency of a weight 'w' suspended from a spring at the midpoint of a simply supported beam (Fig.Q11). The length of the beam is L, and its flexural rigidity is EI. The spring stiffness is k. assume the beam to be massless.

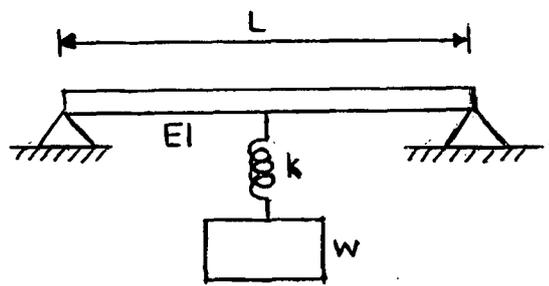


Fig. Q11

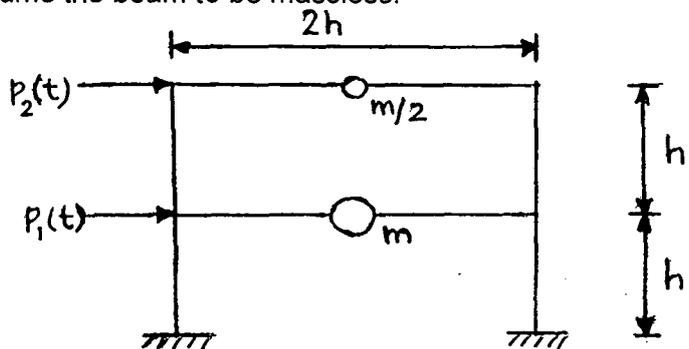


Fig. Q12a

- 12.a. Formulate the equations of motion for the two – storey shear frame with lumped masses shown in Fig.Q12a. . The beams are rigid and the flexural rigidity of the columns is EI. Neglect axial deformations in all elements.

(OR)

12.b. Plot the mode shapes of MDOF system as shown in Fig.Q12b.

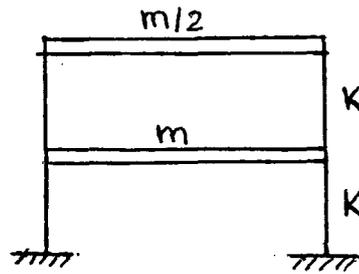


Fig.Q12b.

13.a Explain the various terms used for measurement of an earthquake. Also explain the seismic waves occurring during an earthquake and explain their salient parameters.

(OR)

13.b Explain in detail about any eight recent earthquakes occurred in India. Also explain the damages due to them.

14.a. Explain the behavior of soil under seismic loading? What is the effect of soil – structure interaction in the design of important structures?

(OR)

14.b. Explain the lessons learnt from the past earthquakes.

15.a. Explain in detail about Problems due to soft storey mechanism in buildings. How do you make such buildings less vulnerable against earthquake? Explain with sketches.

(OR)

15.b Explain in detail in detail about the various codal provisions to be followed in the earthquake resistant design of buildings.