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**Question Paper Code : 21217**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Seventh Semester

Civil Engineering

CE 2403 / CE 73 – BASICS OF DYNAMICS AND ASEISMIC DESIGN.

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

(IS 1893 and IS 13920 codes are permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State D' Alembert's principle.
2. Differentiate free and forced vibration.
3. What is meant by coupled and uncoupled equations of motion?
4. What is meant by mode shape?
5. What is epicentre?
6. What are the factors influencing ground motion?
7. What is meant by liquefaction of soil?
8. What is meant by zero period acceleration?
9. What is the concept of base isolation?
10. What do you mean by seismic dampers?

PART B — (5 × 16 = 80 marks)

11. (a) A mass of one kg is suspended by a spring having a stiffness of 600 N/m. The mass is displaced downward from its equilibrium position by a distance of 0.01m. Find
- (i) Equation of motion of the system
  - (ii) Natural frequency of the system
  - (iii) The response of the system as a function of time
  - (iv) Total energy of the system. (4 × 4)

Or

- (b) An SDOF system consists of a mass of 20 kg, a spring stiffness 2200 N/m and a dashpot with a damping coefficient of 60 N-s/m is subjected to a harmonic excitation of  $F = 200 \sin 5t$  N. Write the complete solution of the equation of motion.
12. (a) Determine the natural frequencies and modes of the system shown in fig.Q 12 (a).

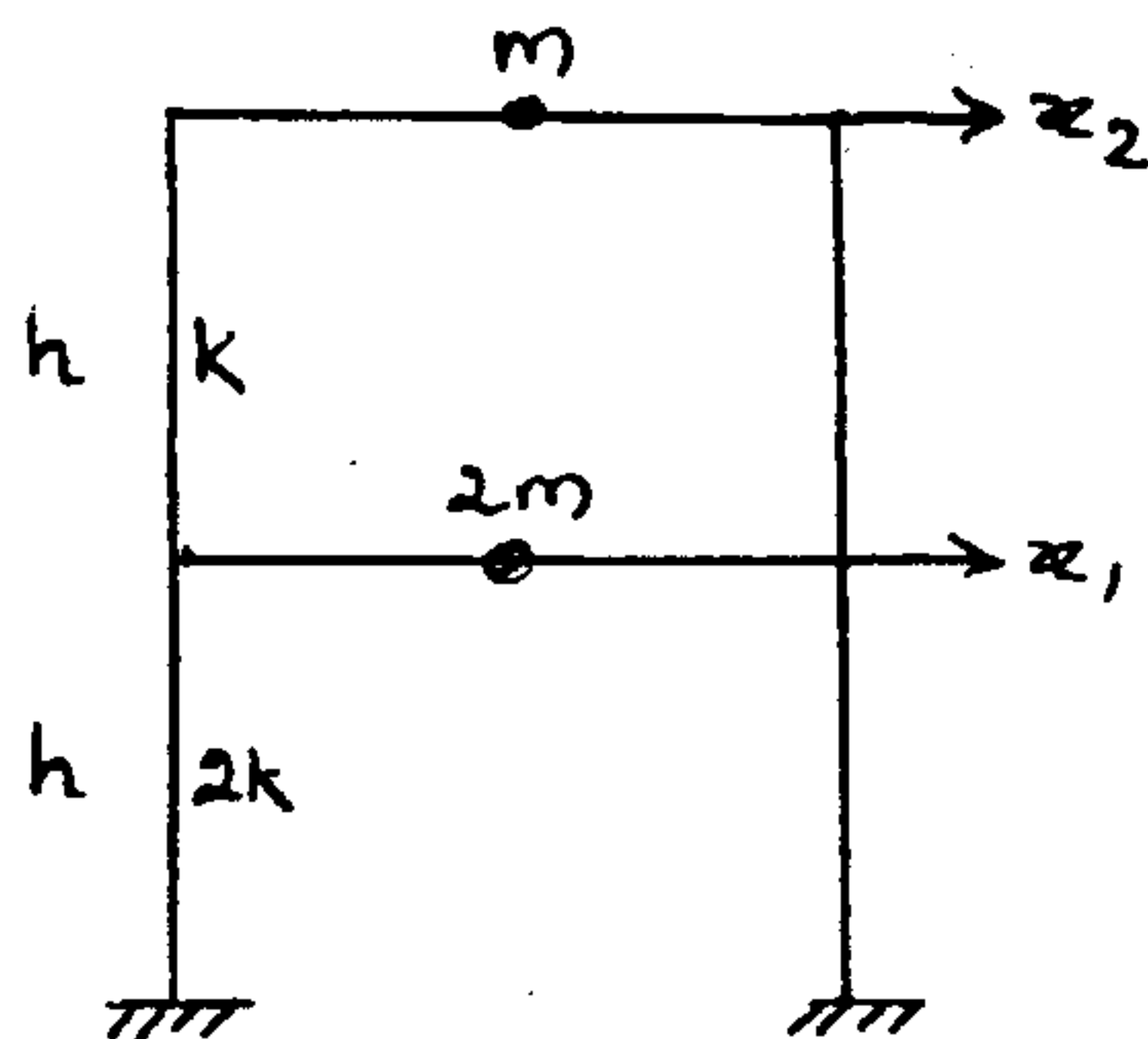


Fig. Q 12 (a)

Or

- (b) Determine the natural frequencies and modes of the system shown in Fig. Q 12 (b).

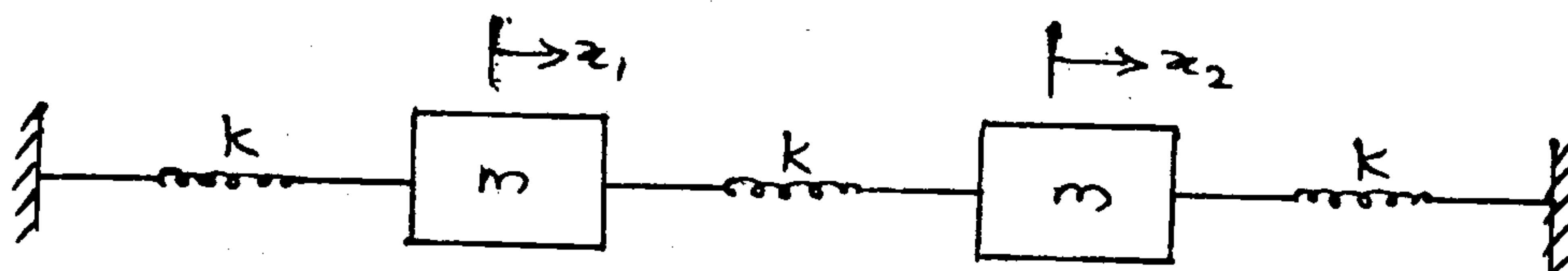


Fig. Q 12 (b)

13. (a) (i) Elastic rebound theory – Explain in detail. (6)  
(ii) Explain the types of fault with neat sketches. (6)  
(iii) Write short notes on magnitude of earthquake. (4)

Or

- (b) (i) Explain the types of earthquake. (10)  
(ii) Explain the seismogram with neat sketch. (6)
14. (a) (i) What are the concepts of peak ground acceleration? (10)  
(ii) Explain the response spectrum IS 1893:2002 with neat sketch. (6)

Or

- (b) (i) Write short notes on the two main categories of liquefaction of soil. (6)  
(ii) Briefly describe any five methods to reduce liquefaction of soil. (10)
15. (a) Briefly describe the type of plan irregularities and vertical irregularities of buildings with neat sketches.

Or

- (b) (i) Write short notes on any one type of dampers with neat sketch. (4)  
(ii) Write the step by step procedure for seismic analysis of RC buildings. (12)