

**Paper ID [A0625]**

(Please fill this Paper ID in OMR Sheet)

**B. Tech. (Sem. - 8<sup>th</sup>)****EARTHQUAKE RESISTANT STRUCTURES (CE - 404)****Time : 03 Hours****Maximum Marks : 60****Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

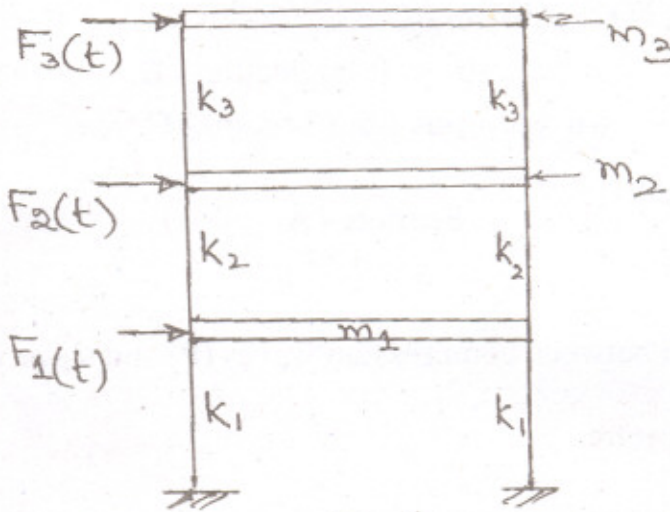
**Section - A****Q1)****(10 × 2 = 20)**

- a) Distinguish between compression waves (P) and shear waves (S).
- b) Define Epicentre.
- c) Define Logarithmic Decrement.
- d) Give the expression for computing design base shear along any principal direction.
- e) List types of shear walls.
- f) What are the specifications of concrete and steel from ductility considerations?
- g) For a system, the damping coefficient is greater than the value for critical damping. Name the system.
- h) Name an important property of normal modes.
- i) Write D'Alembert's equation of motion.
- j) What do you mean by Drift in a building? What is its permissible value?

## Section - B

(4 × 5 = 20)

- Q2) What are causes of earthquakes? In how many zones, our country has been divided with respect to earthquakes?
- Q3) A single degree of system consists of a mass with a weight of 300 N and a spring stiffness of 3000 N/m. By testing the system, it was found that a force of 100 N produces a relative velocity 10 m/sec. Find a) damping ratio b) damped frequency of vibration c) ratio of two consecutive amplitudes.
- Q4) Determine the stiffness matrix for the undermentioned shear building shown in Fig 1.



Take storey height 'h', modulus of elasticity 'E' and moment of inertia as 'I'.

- Q5) Compare Response Spectrum method and seismic coefficient method. What for these methods used? Which one is preferred out of the two?
- Q6) Write in brief about codal provisions for seismic design of masonry structures. Also write about various bands required to be provided for earthquake resistance of masonry structures.

## Section - C

(2 × 10 = 20)

- Q7) (a) Distinguish between centre of rigidity and centre of mass.  
(b) Discuss following in context of shear walls:

- (i) General dimensions.
- (ii) Reinforcement detailing.
- (iii) Adequacy of boundary elements.

Consider the case of simple rectangular shear wall.

**Q8)** Sketch neatly the detailing of reinforcement for two way three storey portal frame located in Zone IV of our country.

**Q9)** Write short notes on

- (a) Magnitude of an earth quake.
- (b) Strong column (beam weak) design philosophy.