

*Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any THREE questions from Part-B*

PART-A (22 Marks)

1. a) Explain the seismic zonation of India. [4]
- b) Explain the properties of various types of damped systems. [4]
- c) Distinguish between the center of mass and the center of stiffness. [3]
- d) Explain the factors influencing the acceleration coefficient. [4]
- e) Explain the application of weak-beam and strong-column concept in the design of earthquake resistant structures. [4]
- f) What are the various desirable attributes of an earthquake resistant building? [3]

PART-B (3x16 = 48 Marks)

2. a) Explain the characteristics of different types of seismic waves. [8]
- b) Explain the elastic rebound theory. [8]
3. a) Derive the equation of motion of a SDOF system of mass (m), damping coefficient (c) and stiffness coefficient (k) subjected to forced vibrations. [8]
- b) A SDOF structure of weight 500 kN is set into free vibration by releasing it from an initial displacement of 60 mm. The maximum displacement after one complete oscillation is 45 mm and it occurs in 0.8 sec. Evaluate the following: (i) logarithmic decrement (ii) damping ratio (iii) undamped natural frequency (iv) stiffness coefficient and (v) coefficient of viscous damping [8]
4. a) Explain the characteristics of different types of diaphragms. [8]
- b) Explain the structural behavior of various types of lateral load resisting elements. [8]
5. a) Explain the various parameters influencing the response reduction factor. [6]
- b) A five storeyed RC framed telephone exchange building with brick infills is to be constructed in Delhi, plan is as shown in figure .1. The height between floors is 4 m. The soil below the foundation is assumed to be medium soil. Dead load on roof is 3 kN/m² and 2 kN/m² on floors. The live load on roof is 2 kN/m² and 4 kN/m² on floor. Determine the storey shears of the building. Assume the size of the columns 400 mm × 400 mm and beams 300 mm × 350 mm. Use seismic coefficient method.

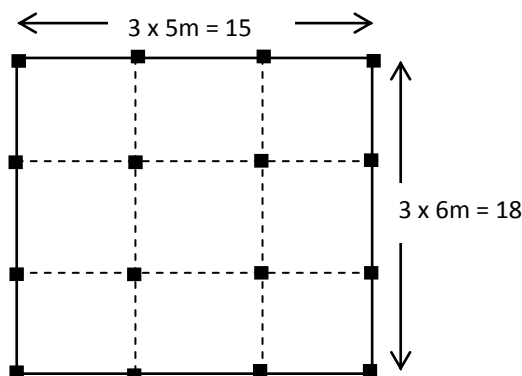


Figure. 1

[10]

6. Draw the ductile detailing provisions of an RCC column of an earthquake resistant structure and explain its salient features. [16]
7. Design the various elements of an RCC frame subjected to seismic weights as shown in figure.2. Adopt the storey height is equal to 3.6 m. Use equivalent static method.

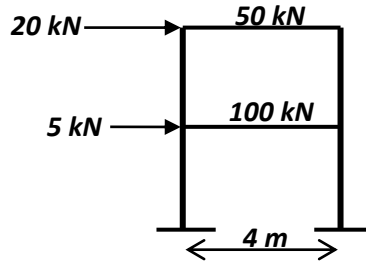


Figure. 2

[16]

