Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X20315

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Seventh Semester

Civil Engineering

CE 6701 – STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

(Common to PTCE 6701 – Structural Dynamics and Earthquake Engineering for B.E. (Part-Time) – Fifth Semester – Civil Engineering – Regulations 2014)

(Regulations 2013)

Time : Three Hours Maximum : 100 Marks

(Use IS : 1893 – 2002, IS 4326 – 1993, IS 13920 – 1993 are Permitted)

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. List the various forms of damping.
2. Write the difference between static loading and dynamic loading.
3. What is meant by mode super position technique ?
4. Enumerate properties of stiffness matrix and mass matrix.
5. Define magnitude of earthquake.
6. Mention a few disastrous earthquakes that had occurred around the world.
7. What is meant by ductility ?
8. Explain basic concept of Peak acceleration.
9. Write a short note on curvature ductility.
10. Write the concept of soft storey.

PART – B **(5×13=65 Marks)**

11. a) A vibrating system consisting of a weight of w = 50 N and a spring with stiffness of 4 N/mm is viscously damped. The ration of two successive amplitudes is 1 : 0.85 compute.

    a) Natural frequency (undamped) of the system

    b) Logarithmetic decrement

    c) Damping ratio

    d) The damping coefficient and

    e) Damped natural frequency.

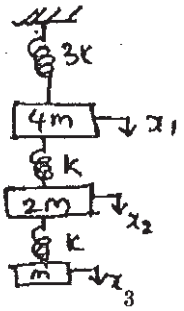
(OR)

b) Derive the equation of motion of a single degree of freedom system for free vibration and find the solution for

    a) Underdamped system.

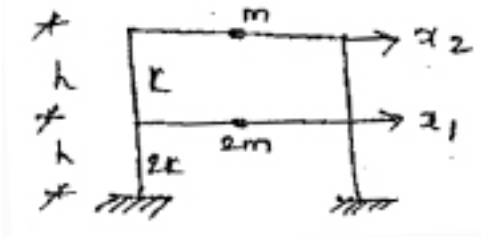
    b) Overdamped system.

12. a) Analyze the natural frequency and mode of the system.



(OR)

b) Solve the natural frequency and mode of vibration of the system.



13. a) i) Explain elastic rebound theory. **(5)**

ii) Explain the seismic susceptibility of Indian Subcontinent. **(8)**

(OR)

b) Discuss ground subsidence, slope instability due to Earthquake and methods of evaluating liquefaction potential. **(13)**

14. a) Explain the behaviour of reinforced cement concrete structure under earthquake forces. **(13)**

(OR)

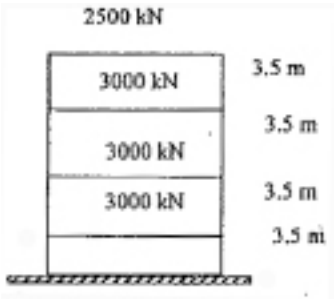
b) Summerise the evaluation of earthquakes forces as per IS 1893. **(13)**

15. a) i) Write short notes on Earthquake resistant design for Masonry structures. **(7)**

ii) Explain briefly about various Guidelines for Earthquake resistant design. **(6)**

(OR)

b) A four story R.C frame building as shown in figure is situated at Chennai. The height between the floors is 3.5 m and total height of a building is 14 m. The dead load and normal live load is lumped at respective floor. The soil below the foundation is assumed to be hard rock. Assume building is intended to be used as a hospital. Determine the total base shear distributed lateral force as per IS 1893.



PART – C **(1×15=15 Marks)**

16. a) Reproduce the guidelines for earthquake resistance design of masonry buildings.

(OR)

b) A RC chimney idealized as a lumped mass cantilever is subjected at the top level to a step force of F(t) = 4500 kN, Mass = 7×10^5 kg/m, EI = 2×10^{10} kN/m^2. Determine its response by treating it as a 2 DOF system. The height of the chimney is 16 m.

———————