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Reg. No. :

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Seventh Semester

Civil Engineering

15UCE703-STRUCTRUAL DYNAMICS AND EARTHQUAKE ENGINEERING

(IS 13920:1993, IS 4326:1993 and IS 1893(Part 1):2002 are permitted)

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In which situation the resonance will occur ………..   CO1- R

    (a) $\omega = \omega_n$ (b) $\omega > \omega_n$ (c) $\omega < \omega_n$ (d) $\omega \neq \omega_n$

2. The particles of the body move perpendicular to the axis, the   CO1- R
    vibration created are known as ……

    (a) longitudinal   (b) transverse   (c) torsional   (d) none of these

3. Characteristic vector is also known as   CO2- R

    (a) Modal vectors   (b) Eigen values   (c) Modal values   (d) Shape vector

4. Shear building is defined as ……..   CO2- R

    (a) Rotation   (b) No rotation   (c) Translation   (d) No translation

5. The point of origin of an earthquake below the surface of the   CO3- R
    earth is called

    (a) Epicentre   (b) Hypocentre   (c) Isoseists   (d) Focal depth

6. ------------------ are the instruments used to record the motion of   CO3- R
    the ground during an earthquake

    (a) Seismograph   (b) Seismogram   (c) Seismology   (d) None of the these

7. Which codal provisions used for ductile detailing for reinforced   CO4- R
    concrete structures

    (a) IS456:2002   (b) IS13920:1993   (c) IS1893 :2000   (d) IS4326:1993

8. The graph showing the variation of the maximum response with natural frequency to a specified forcing function is known as   CO4- R

   (a) Response spectrum   (b) bauschinger

   (c) Peak ground acceleration   (d) seismogram

9. The tension steel ratio on any face, at any section, shall not be less than   CO5- R

   (a) 0.24   (b) 0.22   (c) 0.23   (d) 0.21

10. For an ideal Rigid building, Time Period is   CO5- R

   (a) Equal to zero   (b) Less than zero   (c) Greater than zero   (d) Greater than 1

PART – B (5 x 2= 10Marks)

11. Define degree of freedom and its types.   CO1- R

12. State the equation of motion for an undammed free vibration of a two degree of freedom system.   CO2-U

13. What are the factors influencing Strong ground motion?   CO3-R

14. What is a design spectrum?   CO4-U

15. Define Ductility.   CO5-R

PART – C (5 x 16= 80Marks)

16. (a) A vibrating system consists of a mass of 5kg, spring of stiffness 120 N/m and a damper with a damping co-efficient of 5 N/s/m. determine a. Damping factor b. Natural frequency of the system c. Logarithmic decrement d. The ratio of two successive amplitude e. The number of cycles after which the initial amplitude reduces to 25%..   CO1-App   (16)

   Or

   (b) Derive the mathematical modeling of an SDOF system.   CO1- App   (16)

17. (a) Calculate the natural frequency and draw the mode shape for the shear building shown in fig.   CO2- App   (16)

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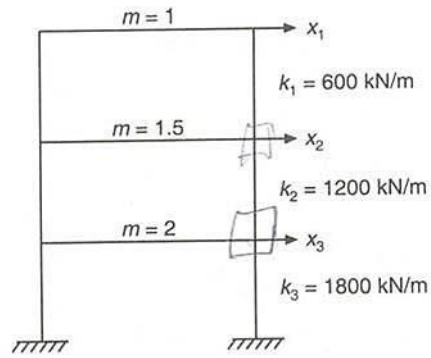
Or

(b) State and prove the orthogonality property of mode shapes. CO2- App (16)

18. (a) What is Fault? Explain the different types of faults with neat CO3-U (16)
sketches.

Or

(b) How earthquakes being measured. Explain them briefly. CO3-U (16)

19. (a) Explain in detail about Effects of Earthquake in different types of CO4-U (16)
structures

Or

(b) Explain the Behaviour of RCC and Steel Structures under CO4-U (16)
earthquake loading

20. (a) List out the codal provisions for architectural considerations and CO5- U (16)
structural design considerations as per IS 4326:1993.

Or

(b) Briefly describe the type of plan irregularities and vertical CO5- U (16)
irregularities of buildings with neat sketches

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