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**Question Paper Code: 47104**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Seventh Semester

Civil Engineering

14UCE704 - STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

(Note: Use of IS 13920:1993, IS 4326:1993 and IS 1893(Part 1):2002 are permitted in the End Semester Examinations)

(Regulation 2014)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

1. Unit of stiffness is .....

(a) Kg-m/s<sup>2</sup>

(b) N-s/m

(c) N/m

(d) N-s/m<sup>2</sup>

2. Natural frequency of suspended frequency is

(a)  $\omega_n = \sqrt{\frac{k}{m}}$

(b)  $\omega_n = \sqrt{\frac{m}{k}}$

(c)  $\omega_n = \sqrt{\frac{1}{km}}$

(d) None of the above

3. The graphical representations of the relative amplitude of the two co – ordinates and their phase angle relationship is called as

(a) Bending moment diagram

(b) Mohr's diagram

(c) Mode shape diagram

(d) Shear force diagram

4. The mode corresponding to the lowest frequency is called as

(a) Fundamental mode

(b) Third mode

(c) Second mode

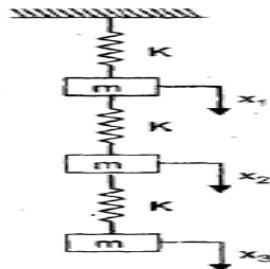
(d) None of the above

5. The movements of plates towards each other and collide
  - (a) Divergent boundary
  - (b) Convergent boundary
  - (c) Transform boundary
  - (d) Plate boundary
6. For an ideal Rigid building, Time Period is
  - (a) greater than one
  - (b) less than zero
  - (c) greater than zero
  - (d) equal to zero
7. ----- is defined as the force required to produce unit deformation
  - (a) Natural Period
  - (b) Stiffness
  - (c) Frequency
  - (d) Amplitude
8. The ratio between ultimate deformation to initial yielding
  - (a) Dilation factor
  - (b) Moment distribution
  - (c) Ductility factor
  - (d) Damping factor
9. ----- is the resistance to the motion of a vibrating body.
  - (a) Period
  - (b) Stiffness
  - (c) Damping
  - (d) Amplitude
10. Stress strain curve for a complete cycle of loading and unloading is known as
  - (a) pinching
  - (b) bauschinger
  - (c) hysteresis loop
  - (d) none of these

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. Split the harmonic motion  $x = 10 \sin (\omega t + 2\pi/6)$  into two harmonic motions one having phase angle of  $0^\circ$  and other having  $45^\circ$  phase angle. (8)
  
12. Determine the natural frequencies of the system shown in figure using matrix method. (8)



13. How do scientists measure the size of earthquakes? (8)
14. Explain the importance of ductility in earthquake resistant structures. (8)

15. Explain the salient features of earthquake resistance design and construction of building provisions as per IS 4326:1993 (8)