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

Question Paper Code : 31027

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Eighth Semester

Civil Engineering

080100067 – EARTHQUAKE RESISTANT STRUCTURES

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Use of Relevant IS code may be permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define stiffness.
2. What do you mean by resonant frequency?
3. What is meant by Degree of Freedom of a Dynamic System?
4. State the d'Alembert's principle.
5. Write down the equation of motion for a damped SDOF system subjected to forced vibration.
6. Distinguish between focus and epicenter of an earthquake.
7. How an earthquake magnitude is different from its intensity?
8. What are the characteristics of shear waves?
9. What is meant by ductility?
10. Brief on Base Isolation?

PART B — (5 × 16 = 80 marks)

11. (a) Derive the equation of motion for the free vibration SDOF system with and without damping. (16)

Or

(b) A vibrating system consists of weight W = 9.81 kN, a spring stiffness 20kN/m and a dashpot with coefficient 0.071 kN/cm/sec. Find (16)

(i) Damping factor

(ii) Logarithmic decrement

(iii) Natural frequency.

12. (a) A SDOF system of has an undamped natural frequency of 1.10 Hertz and a damping factor of 10 percent. The initial displacement is zero and initial velocity is 0.5 m/s. Determine the damper natural frequency and the equation of motion for the system.

Or

(b) Show that the log-decrement is also given by the equation, $\delta = 1/n \log(U_0/U_n)$ where U_n "represents the amplitude after n" cycles have elapsed.

13. (a) (i) Write in detail about the Critical damping and Damped circular frequency. (8)

(ii) Describe the theory of Vibrations. (8)

Or

(b) Explain free Vibration analysis of MDOF system.

14. (a) Explain strong motion characteristics and how they affect the structural response. (16)

Or

(b) Explain the acceleration response spectrum of IS-1893 detailing the factors on which the response acceleration depends. (16)

15. (a) Explain the soil structure interaction effects due to seismic forces.

Or

(b) Explain the concepts in design and detail on RC frame using IS 13920.

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