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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(CE) (2011 Onwards) (Sem.-6)**  
**ELEMENTS OF EARTHQUAKE ENGINEERING**

Subject Code : BTCE-602

Paper ID : [A2289]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A****1. Write briefly :**

- a) Define epicenter.
- b) Distinguish between compression waves(P) and shear waves(S).
- c) Give the expression for computing design base shear along any principle direction.
- d) List types of shear walls.
- e) What are the specifications of concrete and steel from ductility considerations?
- f) For a system the damping coefficient is greater than the value of critical damping. Name the system.
- g) Write D'Alembert's equation of motion.
- h) What is Fourier Spectrum?
- i) What is under damped system?
- j) List any two typical features of damages due to earthquake in masonry building.

**SECTION-B**

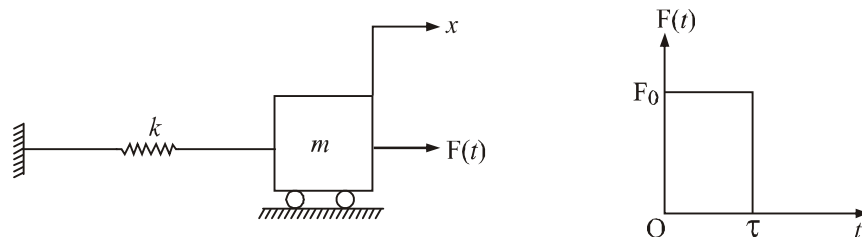
2. What are causes of Earthquake? In how many zones our country has been divided with respect to earthquake?
3. A single Degree of system consists of a mass with a weight of 300N and a spring stiffness of 3000N/m. By testing the system, it was found that a force of 100 N produces a relative velocity 10 m/sec. Find :
  - a) damping ratio
  - b) damped frequency of vibration.
  - c) ratio of two consecutive amplitude.
4. For under mentioned loads :
  - a) A suddenly applied force
  - b) Half sine wave load

Derive expressions for dynamic amplification factor for Single Degree of Freedom System.

5. Compare response spectrum method and seismic coefficient method. For what these methods are used? Which one is preferred out of the two?
6. Define seismology. Show a typical seismograph. Explain its working.

**SECTION-C**

7. Discuss the case of square pulse of finite duration. Derive relationship between magnitude factor and  $\tau/T$ . Refer Fig. 1 :

**Fig.1**

8. Write short note on :
  - a) ductility
  - b) classification of shear walls
9. Sketch neatly the detailing of reinforcement for two-way three storey portal frame located in zone IV of our country.