

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 100858

Roll No. 

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**B.TECH.**

**Theory Examination (Semester-VIII) 2015-16**

**EARTHQUAKE RESISTANT DESIGN OF STRUCTURE**

*Time : 3 Hours*

*Max. Marks : 100*

**Section-A**

**Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)**

- (a) Differentiate between Magnitude and Intensity of Earthquake.
- (b) What is meant by elastic rebound theory?
- (c) What is Seismology?
- (d) Define damping. What are its types?
- (e) Define D' Alembert's principle.
- (f) What is mean by Degrees of freedom?

- (g) What is meant by liquefaction of soil?
- (h) What is zone factor?
- (i) When special confining reinforcement is needed?
- (j) What is a shear wall?

### Section-B

**Q2. Attempt any 5 questions from this section. (10×5=50)**

- (a) Distinguish between :
  - (i) Body waves and surface waves
  - (ii) Rayleigh waves and love waves
- (b) Write a short notes on Hamilton's principle and principle of virtual displacements.
- (c) What are the causes of earthquake? Briefly explain them.
- (d) Write a short notes on
  - (i) strength and stiffness
  - (ii) stiff and flexible building

- (e) State the basic assumptions made in the analysis of earthquake resistant design of structures.
- (f) Write a short note on isolating devices used in buildings.
- (g) Strong bricks and weak mortar are recommended for masonry buildings. Why?
- (h) Write a short note on effect of transverse reinforcement.

### Section-C

**Note : Attempt any 2 questions from this section.**

(15×2=30)

- Q3. A four storied residential building is situated at Chennai, having 4 bays at 4 m centers in X-direction and 5 bays at 5 m centers in Y-direction. Total height of the building is 15 m. (4.5 m at the base and 3.5 m each for other stories). The building is supported on raft foundation resting on hard soil. The frame is made of RC and in filled with brick masonry. The weight due to all dead loads is 12 kN/m<sup>2</sup> on floors and 6 kN/m<sup>2</sup> on the roof. The floors are to cater for live load of 3 kN/m<sup>2</sup> on floors and 1.5 kN/m<sup>2</sup> on the roof. Determine the design seismic load on the structure.
- Q4. (a) Explain I.S. code provisions for design and construction of machine foundation.

(b) What is ductility? Explain with neat sketches how ductility can be introduced in RC structures as per IS 13920?

Q5. (a) Explain how to improve the seismic behaviour of masonry structures.

(b) Derive the equation of motion of a single degree of freedom system with damping under free vibration and hence find the solution for :

(i) Under damped system

(ii) Critically damped system

(iii) Over damped system

