

B. Tech 8th Semester Examination  
Earthquake Resistant Design (NS)  
CE-424

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

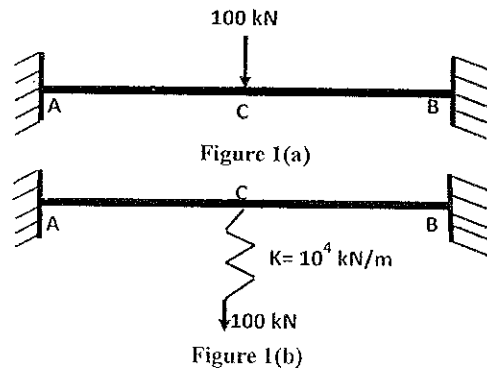
- Note : (i) Attempt one question from each section  
(ii) Section E is compulsory and carries equal marks  
(iii) Relevant codes can be allowed

SECTION - A

1. Discuss the types of earthquakes. (20)
2. Define and discuss: magnitude, moment and intensity of an Earthquake (20)

SECTION - B

3. A fixed beam of length 10 m as shown in the figure 1 (a) is loaded centrally (AC = BC = 5m) by 100 kN. Cross section of the beam is constant throughout of the length and is equal to 200mm × 200mm. Modulus of elasticity of the beam is 200 GN/m<sup>2</sup>. Find natural frequency of the beam. Also find the natural frequency for the beam in the figure 1 (b). The beam shown in the figure 1 (b) is applied 100 kN through a spring having stiffness 10<sup>4</sup> kN/m (k), the property of beam in both cases are same. (10+10=20)



4. Explain MDOF system. Find complete solution of forced damped vibration system. (5+15=20)

SECTION - C

5. Discuss the procedures for the evaluation of base shear of multi storey building frames under earthquake. Also enumerate the vertical distribution of base shear. (10+10=20)
6. Discuss the various steps of response spectrum analysis for the evaluation of base (20)

SECTION - D

7. Discuss various seismic hazards in India in the recent past. Also explain the nature of hazards due to tsunami. (10+10=20)
8. Discuss the amplification characteristics of various soil in the response spectrum used for the evaluation of equivalent static load under earthquake loading. Find the lateral load experienced by a single storey building, which has 10 kN floor weight, time period = 0.1 second, seismic zone V. Other parameters may be used suitably. (10+10=20)

SECTION - E

9. (a) Define intensity scale for earthquake measurement.  
(b) List seismic waves  
(c) Write the equation for MDOF un damped free vibration  
(d) Define response reduction factor  
(e) Explain flexible building structure  
(f) Explain rigid building structure  
(g) Role of damper for mitigation of earthquake demand.  
(h) Soil structure interaction  
(i) Name the IS codes used for calculation of dead load and live load.  
(j) Role of Hysteretic energy towards mitigation of earthquake demand. (10×2=20)