

[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2125)

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B. Tech 7th Semester Examination
Earthquake Engineering (OS)
CE-7004

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 A, B, C & D.
(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 cantilever beam made of two sections has a lumped mass (M) at the free end. Flexural rigidities (EI) of the half beam from the fixed end is twice of the remaining beam. Derive the differential equation of motion and obtain the period of oscillation. Self mass of the beam can be ignored. (20)
4. (a) Explain spring action and derive expression for equivalent stiffness for series and parallel combinations. (15)
(b) Enumerate damages in brief during the recent past earthquakes in India. (5)

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SECTION - C

5. A four story R.C. building is situated in seismic zone V of India. Floor weight from roof is 50 kN, 60 kN, 60 kN and 55 kN respectively. Time period of the building frame is 0.3 second (assume). Calculate the base shear and distribute to all four floors. Story height for each floor is 4 m. Take the values of importance factor and response reduction factor as 1.5 and 5. (20)
6. Discuss the steps for seismic resistant design as per the guidelines of IS: 1893 (part-1: 2002). Enumerate the role of ductility for earthquake resistant design. (15+5=20)

SECTION - D

7. Discuss the issues of seismic hazards arising because of land sliding during an earthquake. (20)
8. Discuss the term soil-structure interaction. Enumerate role of soil improvement for corrective measurement of seismic hazards. (5+15=20)

SECTION - E

9. (a) Define hypocenter.
(b) Define earthquake.
(c) Write the equation for SDOF systems for undamped free vibration.
(d) Define weak story.
(e) Define structural plan density.
(f) Write the relation in between the gravity load and lateral earthquake load.
(g) Explain the earthquake load is due to inertia (force).
(h) What are the soil conditions defined in the design spectrum in IS: 1893 (Part-1, 2002)?
(i) Name the IS code used for ductile detailing of R.C. Building frames.
(j) Define Base isolation technique for earthquake resistant design. (10×2=20)