Roll No. | | | | | | | | | | | | |

Total No. of Pages : 03

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 have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**
4. **Assume any missing data.**

SECTION-A

Q1 Answer briefly :

a) Differentiate between static degree of freedom and dynamic degree of freedom.

b) Enlist various codes of practice along with correct name related to earthquake engineering.

c) Draw mathematical model for any two structural system.

d) Give two virtue of good earthquake resistant design.

e) Define response spectrum.

f) What is the role of damping in any structure? What are the methods to determine the damping ratio in a system?

g) What are coupled shear walls?

h) Differentiate between magnitude and intensity of an earthquake.

i) Give the expression used for distributing lateral force along the height of building.

j) What is transmissibility ratio?

SECTION-B

Q2 Write a short note on centre of rigidity and centre of mass.

Q3 Classify and describe with suitable sketches different types of waves generated by an earthquake.

Q4 Find the natural frequency of system shown in figure. The mass of the beam is negligible in comparison to the suspended mass $E=2.1\times10^5$ N/mm^2. In addition to flexible beam which provides a spring action, there is a spring attached to the mass. $I=28125000mm^4$

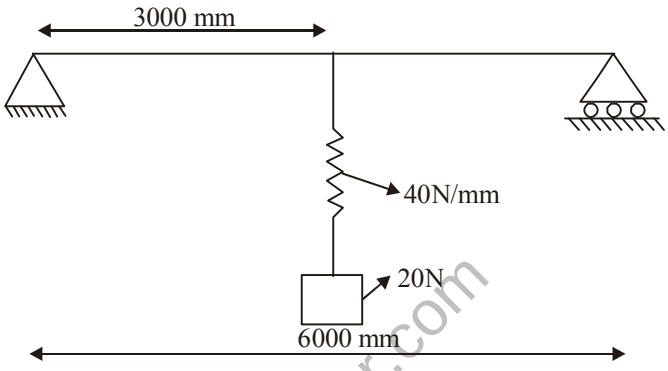

Figure -1

Q5 Describe the various earthquake resistant features that can be introduced in a masonry building to make it earthquake resistant.

Q6 Write a short note on seismic design philosophy.

SECTION-C

Q7 Write a short note on :

a) Response spectra

b) Indian seismic zoning map

Q8 A vibrating system consisting of a weight of W=10lb and a spring with a stiffness k = 20lb/in is viscously damped so that the ratio of two consecutive amplitudes is 1.00 to 0.85. Determine :

a) Natural Frequency of the Undamped System.

b) The Logarithmic Decrement.

c) Damping Ratio.

d) Damping Coefficient.

e) Damped Natural Frequency.

Q9 What is the necessity of ductile detailing? Explain with neat sketches the detailing for flexural members as per IS-13920.