

BE DEGREE END SEMESTER EXAMINATIONS, JULY/DECEMBER 2012**CIVIL ENGINEERING BRANCH****SEVENTH SEMESTER – REGULATIONS 2008****CE 9402 – STRUCTURAL DYNAMICS AND
EARTHQUAKE ENGINEERING****9**

Max Marks: 100

Time : 3 Hrs

Answer all Questions

[IS 1893:2002 (part1), IS 13920:1993, IS 456:2000 are permitted]

Part A

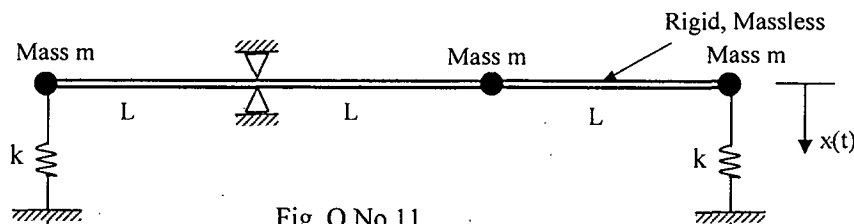
10 x 2 = 20

1. What is the difference between static and dynamic analysis of structures?
2. Define Degree of freedom. What is the degree of freedom for the water tank as a lumped mass model analysis?
3. What is meant by amplification factor? Draw the amplification graph with respect to frequency ratio.
4. What is meant by modal superposition and modal participation factor?
5. What is effect of (i) gravitational force and (ii) base excitation on the equilibrium equation of motion of system under vibration?
6. Describe the different types of waves generated during earthquake? In what way these waves help in assessing the location of earthquake shock?
7. How the performance of RC and steel structures differ under earthquake loading?
8. What is the role of stiffness characteristics of elements considering the behaviour of structures under earthquake loading?
9. Differentiate between intensity and magnitude of earthquake.
10. Define Response Reduction Factor.

Part B

5 x 16 = 80

11. Derive the Equilibrium equation of motion for the structural system shown in Fig.Q.No.11. Find out the natural frequency of the system.



12.

- a. Plot the mode shapes of MDOF system as shown in Fig. Q.No.12 (a).

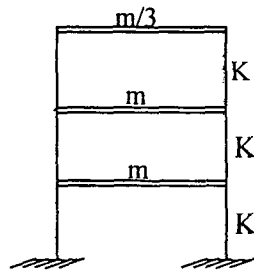


Fig. Q.No.12(a)

OR

- b. Find out the response of the multi-degree of freedom system as shown in Fig.Q.No.12(b) with the initial condition $x_1(0) = x_2(0)$ and $\dot{x}_1(0) = \dot{x}_2(0) = 0$

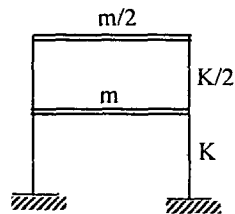


Fig. Q.No.12(b)

13.

- a. What are the lessons learned from the past Indian earthquakes? What is the influence of the same towards the development of Indian seismic codes pertaining to Aseismic design?

OR

- b. Explain briefly "Design Spectrum". What are the basic difference between Response Spectrum analysis and Time History analysis?

14.

- a. Explain the behaviour of soil under seismic loading? What is the effect of soil-structure-interaction in the design of important structures?

OR

- b. What are the different types of structural systems? Explain the performance of these different structures during earthquake.

15.

- a. Consider a five-storey reinforced concrete (OMRF) office building plan is as shown in Fig.Q.No.15(a). The building floors are at 3.5m c/c. The building is located at