Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18CE3014** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SEISMIC ANALYSIS AND DESIGN OF STRUCTURES** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | |
| 1. | a. | Explain the phenomenon of plate tectonics. | 8 |
| b. | Enumerate the reasons for the convertion of Bhuj to Zone V. | 4 |
| c. | Enlist the seismic instruments available for measurement of ground motion. | 4 |
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| 2. | a. | A free vibration test is conducted on an empty elevated water tank. A cable attached to the tank applied a horizontal force of 75kN and pulls the tank horizontally by 5cm. the cable is suddenly cut an the resulting free vibration is recorded. At the end of 4 cycles, the time is 2s and the amplitude is 25mm. compute i) damping ratio, ii) natural period of undamped vibration,  iii) damping coefficient, iv) number of cycles required for the displacement amplitude to decrease to 5mm. | 10 |
| b. | Find the natural frequency of the system shown in the figure. Take K1=k2= 2500 N/m and K3 = 3500N/m. m=1000kg.  m  K1 k3    K2 | 6 |
| 3. |  | Determine the natural frequency and mode shope of a three storey shear building with the following data.  m1=m2= 1300kg, m3 =1000kg, k1=k2= 2900kN/m, k3 =1800 kN/m. | 16 |
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| 4. | a. | Discuss briefly the lesson learnt from past earthquakes for the design of RCC structures. | 10 |
| b. | Explain the behavior of infill wall system subjected to lateral forces. | 6 |
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| 5. |  | Design a flexural member of size 300 x 450mm to carry a maximum hogging moment of 220kN.m and sagging moment of 115kN.m. The total dead load and live load on the beam is 150kN. The span of the beam is 4.6m and storey height is 4m. Use M20 concrete and Fe415 steel. Assume any data required. | 16 |
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| 6. | a. | Differentiate passive and active control systems. | 4 |
| b. | Explain with a case study the concept of tuned mass damper. | 12 |
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| 7. | a. | Discuss the provisions to be made for shear strength in the design of shear wall. | 10 |
| b. | Justify the statement “Distribution of lateral forces in the masonry building depends on the flexibility of the horizontal diaphragm”. | 6 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | |
| 8. | a. | Differentiate repairing, retrofitting and strengthening. | 4 |
| b. | Discuss the seismic evaluation process for beam column joint. | 4 |
| c. | Explain the jacketing method for retrofitting of columns. | 12 |