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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14CE3007** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SESISMIC DESIGN OF STRUCTURES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Briefly explain the following with neat sketches |  |  |
|  | i. Seismic Zone | CO2 | 5 |
|  | ii. Plate tectonics | CO2 | 5 |
|  | iii. Seismic loading | CO2 | 5 |
|  | iv. Soil Structure Interaction | CO2 | 5 |
| (OR) | | | | |
| 2. | a. | Discuss the design philosophy and methodology of earthquake resistant design | CO1 | 10 |
| b. | Briefly explain the effect of different types of Irregularity in seismic design | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Compute the base shear of building frame situated in Delhi for the following data  Size of the building 30X36 m  Total height of the building – 25m  Bay width in X-dir – 5m  Bay width in Y-dir – 6m  Bay width in Z-dir – 5m (height)  Assume the masonry construction in periphery of the building  Thickness of brick work – 230 mm  Thickness of slab – 125 mm  Size of beam - 230x300mm  Size of column - 230x450mm  Live load - 2.5kN/m2  Assume the missing data suitably | CO1 | 20 |
| (OR) | | | | |
| 4. |  | A three story steel building is located in seismic zone IV on medium soil. The framing system of the building is ordinary moment-resisting frame without brick masonry infill panels. Determine the base shear and its distribution along the height of the building. Column sections: ISHB 450 @872N/m, Beam sections: ISMB 400 @616 N/m Slab: 100mm thick RCC slab on all floors. Size of building 25x25m, Height of each floor - 4m, Live load - 3kN/m2. Assume the relevant data | CO1 | 20 |
|  |  |  |  |  |
| 5. | a. | Write the ductile design and detailing considerations of beam column joints as per IS 13920? | CO2 | 15 |
|  | b. | Describe the term Confining reinforcement | CO2 | 5 |
| (OR) | | | | |
| 6. |  | Design the reinforcement for a column of size 450x450mm, subjected to the following forces. Length of column – 4.5m, M20 concrete and Fe415 steel, as per IS 13920.   |  |  |  |  | | --- | --- | --- | --- | |  | DL | LL | SL | | Axial load (kN) | 1000 | 500 | 700 | | Moment (kNm) | 120 | 45 | 180 | | CO2 | 20 |
| 7. | a. | Examine the seismic behaviour of steel structures with neat sketches | CO2 | 10 |
|  | b. | Explain the seismic behaviour of masonary structures with neat sketches | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Design the shear wall for the following data, height of the wall 4m  M25 concrete, Fe415 steel. Thickness of the wall - 200mm, Size of the boundary element - 300x600mm   |  |  |  |  | | --- | --- | --- | --- | |  | Axial load (kN) | Moment  (kNm) | Shear (kN) | | DL+LL | 1200 | 300 | 75 | | Seismic load | 150 | 2200 | 550 | | CO1 | 20 |
|  |  |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss the concepts of pushover analysis and its procedure | CO2 | 10 |
|  | b. | Briefly explain different types of base isolation techniques | CO2 | 10 |

ALL THE BEST