**18CED61**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Civil Engineering** | | |
| **Eighth Semester** | **Earthquake Resistant Design of Structures** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | Define SMR and OMR frame. | CO1(BL1) | | **1M** |
|  | b) | What is earthquake ground motion? | CO1(BL1) | | **1M** |
|  | c) | Differentiate underdamped and over damped. | CO2(BL1) | | **1M** |
|  | d) | Write a short note on settlement by liquefaction phenomenon. | CO2(BL1) | | **1M** |
|  | e) | Define seismic slope stability. | CO2(BL1) | | **1M** |
|  | f) | Define base shear. | CO1(BL1) | | **1M** |
|  | g) | What is lumped mass? | CO3(BL1) | | **1M** |
|  | h) | What are masonry structures? | CO3(BL1) | | **1M** |
|  | i) | Differentiate retrofitting and repair. | CO4(BL1) | | **1M** |
|  | j) | What is confinement with steel elements in masonry structures? | CO4(BL1) | | **1M** |
| **Unit - I** | | | | | |
| 2. |  | Explain in brief different types of vibrations in a structural dynamic problem. | CO1(BL1) | **10M** | |
|  |  | **(OR)** |  |  | |
| 3. |  | Derive the equation of motion of a single degree undamped system. | CO1(BL1) | **10M** | |
| **Unit - II** | | | | | |
| 4. |  | Classify local sites in accordance with the type of soil and their effect on earthquakes. | CO2(BL1) | **10M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Explain the flow liquefaction and cyclic mobility liquefaction. | CO2(BL1) | **5M** | |
|  | b) | Discuss the effects of liquefaction on loss of bearing strength, lateral spreading, sand boils, flow failures, and ground oscillation. | CO2(BL1) | **5M** | |

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| **Unit - III** | | | | |
| 6. |  | A three storeyed symmetrical RC school building situated at Bhuj with the following data:  Plan dimensions = 7 m.  Storey height = 3.5 m.  Total weight of beams in a storey = 130 kN.  Total weight of slab in a storey = 250 kN.  Total weight of column in a storey = 50 kN.  Total weight of walls in a storey = 530 kN.  Live load = 130 kN.  Weight of terrace floor = 655 kN.  The structure is resting on hard rock. Determine the total base shear. | CO3(BL1) | **10M** |
| **(OR)** | | | | |
| 7. |  | A four-storey reinforced concrete frame building as shown in figure is situated at Delhi. The height between the floors is 3 m and total height of the building is 12 m. The dead load and normal live load is lumped at the respective floor. The soil below the foundation is assumed to be hard rock. Assume the building is intended to be used as a commercial building. Determine the total base shear as per IS: 1893 and draw the base shear diagram along the height of the building. | CO3(BL1) | **10M** |
| **Unit - IV** | | | | |
| 8. |  | Design a exterior column as per IS: 13920 for the following data:  Size of column = 300 mm x 530 mm.  Concrete mix = M20  Vertical reinforcement = Fe 415.  Axial load = 475.6 kN  Moment = 203.3 kN.  Draw a neat sketch of the column for ductility as per IS: 13920. | CO4(BL2) | **10M** |
|  |  | **(OR)** |  |  |
| 9. |  | Explain in detail about the recommendations for masonry structures in improving the housing design aspects. | CO4(BL1) | **10M** |

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