**20CE702**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Civil Engineering** | | |
| **Seventh Semester** | **Advance Design of Structure** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Following code books are allowed into examination halls***  ***IS 456-2019, IS 800-2007, IS 875 PART-3&Steel Table***  ***Answer one question from each unit.*** | | | **(5X14=70 Marks)** |
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|  |  | **Unit-I** | CO | BL | M |
| 1 |  | Design a cantilever type retaining wall of 5m tall stem. The soil weights 20kN/m3 and has an angle of repose of 30ᵒ. The bearing capacity of the soil is 200kN/m2. Use M20 grade concrete. The coefficient of friction between soil and concrete is 0.6 | CO1 | L2 | 14M |
| **(OR)** | | | | | |
| 2 |  | What are the forces acting on the retaining wall? Write the stability requirements of a cantilever type retaining wall in detail. | CO1 | L2 | 14M |
| **Unit-II** | | | | | |
| 3 |  | Design a circular pile of size 300mm carrying an axial load of 600Kn. The depth of the pile is 6m. Take M30 concrete and Fe415 steel. | CO2 | L2 | 14M |
| **(OR)** | | | | | |
| 4 |  | A raft foundation is proposed for eight columns carrying loads as shown in figure. Design the foundation. The safe bearing capacity of the soil is 100kN/m2. All columns are 3cmx30cm. | CO2 | L3 | 14M |
| **Unit-III** | | | | | |
| 5 |  | The following data refers to a gantry girder on which an electrically operated crane of capacity 200Kn moves. Span of gantry girder = 6m, Span of crane girder = 18m, Crane capacity = 200Kn, Self-weight of crane girder = 180Kn, Self-weight of trolley = 75Kn, Minimum hook approach = 1m, Distance between wheels = 3.5m, Self-weight of rails = 0.3Kn/m. Design a simply supported gantry girder. | CO3 | L4 | 14M |
| **(OR)** | | | | | |
| 6 |  | Explain in detail the procedure of design of gantry girder. | CO3 | L2 | 14M |
| **Unit-IV** | | | | | |
| 7 |  | A plate girder with Fe415 steel plates is having 12 mm X 1500 mm web plates and 56 mm X 500 mm flange plates. Determine the  a) Design flexural strength, if the compression flange is supported laterally  b) Design strength in shear, if no intermediate stiffeners are used. | CO4 | L2 | 14M |
| **(OR)** | | | | | |
| 8 |  | Write the design procedure of plate girder in detail and mention all the relevant formulae | CO4 | L2 | 14M |
| **Unit-V** | | | | | |
| 9 |  | Design an I-section purlin for the following data.  Spacing of the trusses is 4.5m, Spacing of purlins is 1.5m, Weight of A.C. Sheets is 0.171Kn/m2 , Live load is 0.56Kn/m2 ,Wind load is 1.2Kn/m2 (suction), Span of truss is 12m. | CO5 | L4 | 14M |
| **(OR)** | | | | | |
| 10 |  | Determine the various loads to be considered for designing a truss near Vijayawada, for the following data.  Class of building: General life with 50 years, Terrain category: 2, Size of building: 18mx40m, Height of eve board: 12m, Topography: plain area (slope<30), Permeability: Medium, Span of truss: 18m, Pitch: ¼, Sheeting: A.C. Sheets Spacing of purlins: 1.4m, Spacing of trusses: 5m | CO5 | L3 | 14M |

