**18CED21**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/supplementary) DEGREE EXAMINATION** | | | |
| **June, 2022** | **Civil Engineering** | | |
| **Sixth Semester** | **ADVANCE DESIGN OF STRUCTURES** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
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| ***IS:456,IS:800,IS:875 PART 3, IS:3370 and STEEL TABLES are allowed to the examination.*** | | |  |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (5X10=50 Marks) |

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| **Unit - I** | | | | | |
| 1. | A cantilever type retaining wall has a 5.5m tall stem. It retains earth level with its top. The soil weights 19kN/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 | **10M** |
|  |  | | **(OR)** |  |  |
| 2. | Design a square pile of size 350 mm carrying an axial load of 200 kN. The depth of the pile is 6m. Take M30 concrete and Fe415 steel. | | | CO1 | **10M** |
| **Unit - II** | | | | | |
| 3. | Design a rectangular elevated water tank of storage capacity is 70,000 liters. Use M25 grade concrete and Fe415 steel. Assume any suitable data. | | | CO2 | **10M** |
|  |  | | **(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 98kN/m2. All columns are 40cm x 40cm. | | | CO2 | **10M** |
| **Unit - III** | | | | | |
| 5. | A 50kN hand operated crane is provided in a building and has the following data:  a. Center – to – center distance of the gantry beam = 16m  b. Longitudinal spacing of columns = 7.5m  c. Weight of the crane = 40Kn  d. Wheel spacing = 3m  e. Weight of the crab = 10kN  f. Minimum hook approach = 1m  Design a simply supported gantry girder assuming lateral support to it.  **P.T.O** | | | CO3 | **10M** |
|  |  | | **18CED21**  **(OR)** |  |  |
| 6. | Write in detail about the design procedure of gantry girder with necessary figures. | | | CO3 | **10M** |
| **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 | **10M** |
|  |  | | **(OR)** |  |  |
| 8. | Design a simply supported plate girder of span 15m carrying a factored udl of 48kN/m. Use tension field action method to determine strength of the web. Assume compression flange is laterally supported. | | | CO4 | **10M** |
| **Unit - V** | | | | | |
| 9. | | Determine the Live load and Wind load for a truss used for an industrial building near Jabalpur, for the following data.  Class of building: General with life of 50 years.  Terrain category: 2.  Size of building: 18m X 40m.  Column height: 12m.  Topography: Plain area.  Permeability: Medium.  Span of truss: 18m.  Pitch :1/4.  Sheeting: A.C.Sheets.  Spacing of trusses:5m | | CO5 | **10M** |
|  | |  | **(OR)** |  |  |
| 10. | | Design an I-section purlin for an industrial building for the following data:  Spacing of trusses: 4.5m  Spacing of purlins:1.5m  Weight of A.C.Sheets: 0.171 kN/m2  Live load: 0.56 kN/m2  Wind load: 1.2 kN/m2 (suction)  Angle of inclination: 25ᵒ | | CO5 | **10M** |

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