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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech IV Year II Semester Supplementary Examinations May-2022

ADVANCED STRUCTURAL DESIGN

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 Design an interior panel of a flat slab with panel size 5x5 m supported by size of column is 500mm x 500mm. Without Provide suitable drop. Take live load as 4 KN/m². Take floor finishing load as 1KN/m² Use M20 steel and Fe415 steel. **L4 12M**

OR

- 2 Design an interior panel of a flat slab floor system for a warehouse 24mx24 m divided into panels of 6 m x 6 m for a live load of 5 KN/m² and column size is 500mm. Use M25 grade concrete and Fe415 steel respectively. **L4 12M**

UNIT-II

- 3 Design a circular water tank with rigid base resting on the ground to store 5 lakhs litres of water. The depth of tank may be kept 4m. Use M20 concrete and Fe 415 steel. **L4 12M**

OR

- 4 Design a rectangular tank resting on ground with internal dimensions 7.0x5.5x2.75 m high. Take the free board as 300 mm. Use M25 grade concrete and HYSD steel of grade Fe415. **L4 12M**

UNIT-III

- 5 Design the stem of a cantilever retaining wall to retain an earth embankment with a horizontal top 3.75 m above ground level. Density of earth = 19 KN/m³. Angle of internal friction $\phi = 30^\circ$. SBC of soil = 180 KN/m². Coefficient of internal friction between soil and concrete = 0.5. Design of toe and heel not required Adopt M20 grade concrete and Fe 415 grade steel. **L4 12M**

OR

- 6 Design and detail the various elements of counter fort retaining wall if the height of the wall above the ground level is 5.5. Safe bearing capacity of soil (q_0) is 180KN/m². and angle of friction is 30. keep spacing of counter fort is 3m. The coefficient of friction between concrete and soil as 0.5. Unit weight of the back fill is 18 KN/m³. Design of stem and toe not required. Use M20 and Fe415. **L4 12M**

UNIT-IV

- 7 Design a welded plate girder of span 18 m to carry a super imposed load of 30 KN/m. Avoid end stiffeners and intermediate stiffeners Use Fe – 415 (f_y 250) grade steel. **L4 12M**

OR

- 8 Plate girder simply supported at a span of 24m consists of a web plate 1500 mm x 8 mm and a flange plate 400 mm x 32 mm for each flange. The girder carries an super imposed load of 35KN/m. using end stiffeners but avoid intermediate stiffeners. Use Fe - 415 & (F_y 250) grade steel.. **L4 12M**

UNIT-V

- 9 Design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane, for the following data: **L4 12M**
- Crane capacity 250 KN.
 - Self -weight of the crane girder excluding trolley 200 KN.
 - Self -weight of the trolley, electric motor, hook, etc. 50 KN
 - Approximate minimum approach of the crane hook to the gantry girder 1.0m.
 - Wheel base 3.5 m. (vi) c/c distance between gantry rails 16 m.
 - c/c distance between columns (span of gantry girder) 6.5 m.
 - Self -weight of rail section 300 N/m.
 - Diameter of crane wheels 150 mm.
 - Steel is of grade Fe410. The support bracket connection need not be designed.

OR

- 10 Design a simply supported gantry girder to carry an electric over head travelling crane, given: **L4 12M**
- Crane capacity 250 KN.
 - Self -weight of the crane girder excluding trolley 200 KN.
 - Self -weight of the trolley, electric motor, hook, etc. 50 KN
 - Approximate minimum approach of the crane hook to the gantry girder 1.0 m.
 - Wheel base 3.5 m.
 - span of ctane girder 16 m.
 - c/c distance between columns (span of gantry girder) 6.5 m.
 - Self -weight of rail section 300 N/m.
- Checks for buckling and deflections are not required.

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