R19

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Regular Examinations November/December-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 5 X 5 m supported by   L4   12M
    size of column is 500mm X 500mm.Without Provide suitable drop. Take
    live load as 4 kN/m^2. Take floor finishing load as 1kN/m2 Use M20 steel
    and Fe415 steel. Draw the reinforcement details by showing cross section at
    column strip

OR

2   Design an interior panel of a flat slab floor system for a warehouse 24 m X   L4   12M
    24 m divided into panels of 6 m x 6 m for a live load of 5 kN/m^2 And column
    size is 500mm. Use M25 grade concrete and Fe415 steel respectively. Draw
    the reinforcement details.

UNIT-II

3   Design a circular water tank with flexible base for a capacity of 4 lakhs   L4   12M
    litres of water. The depth of tank may be kept 4m including a free board of
    200mm. Use M20 concrete and Fe 415 steel. Draw plan and sectional
    elevation.

OR

4   Design a circular water tank flexible base resting on the ground to store   L4   12M
    50,000 litres of water. The depth of tank may be kept 4m. Use M20
    concrete and Fe 415 steel

UNIT-III

5   A counterfort-type retaining wall is to be designed to support a soil   L4   12M
    embankment with sloping discharge. Height of fill retained by wall = 9 m,
    surcharge angle = 10, density of soil 16 kN/m^3, angle of internal friction is
    30°, coefficient of friction between soil and base slab = 0.5, SBC of soil=
    200 kN/m^2. Use M20 grade concrete and Fe415 grade HYSD bars.

OR

6   Design a cantilever retaining wall to retain earth for a height of 3m. The   L4   12M
    density of soil is 18 kN/m^3. Safe bearing capacity of soil is (qo) = 250kN/m^2.
    Take the coefficient of friction between concrete and soil as 0.5. The angle of
    repose is 15degrees. Use M20 concrete and Fe415 steel.

UNIT-IV

7   Design a welded plate girder of span 24 m to carry a super imposed load of   L4   12M
    35 kN/m. avoid end stiffers and intermediate stiffers. Use Fe – 415 & (Fy
    250) grade steel.

OR

8   Design a welded plate girder of span 24 m to carry a super imposed load of   L4   12M
    35 kN/m. fu = 415 MPa. using end stiffers, but avoid intermediate stiffers.
    Use Fe - 415 & (Fy250) grade steel.

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**
(i) Crane capacity 250 kN.
(ii) Self -weight of the crane girder excluding trolley 200 kN.
(iii) Self -weight of the trolley, electric motor, hook, etc. 50 kN
(iv) Approximate minimum approach of the crane hook to the gantry girder 1.0 m.
(v) Wheel base 3.5 m.
(vi) c/c distance between gantry rails 16 m.
(vii) c/c distance between columns (span of gantry girder) 6.5 m.
(viii) Self -weight of rail section 300 N/m.
(ix) Diameter of crane wheels 150 mm.
(x) Steel is of grade Fe410. The support bracket connection need not be designed.

OR

10 Determine the moment and forces due to the vertical and horizontal loads acting a simply supported gantry girder given the following data **L4** **12M**
(i)Simply supported span =6m
(ii)Cranes wheel centres=3.6
(iii)Self-weight of the girder=1.6kN/m
(iv)Maximum crane wheel load=220kN/m
(v)Weight of crab/trolley=60kN
(vi)Maximum hook load=200kN
Calculate also the serviceability deflection(working load)

*** END ***