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B. Tech 8th Semester Examination

Advanced Structural Design (NS)

CE-422

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal marks.

SECTION - A

1. Design the staging for a RCC Intze tank of 900 kilo litre capacity, supported over bottom ring beam of 10 m diameter. The height of staging is 16 m and has 8 columns. The weight of tank may be taken as 50% of weight of water. Assume a wind load of 150 kN acting on the container at a height of 6m from the bottom of lower ring beam. Neglecting the wind load on braces and columns, design the columns and braces using M 20 grade of concrete and Fe 415 grade of steel. (20)

2. Design an underground tank of internal dimensions 6m×3m×3m. The soil surrounding the tank always remains dry. The tank shall be provided with a roof slab. The soil weighs 16 kN/m^3 and is having an angle of repose of 30°. Use M 20 Grade of concrete and Fe 415 grade of steel. (20)

SECTION - B

3. Design an interior panel of a flat slab for a live load of 6.5 kN/m^2. The panels are 5 m x 5 m. Provide drops. The columns are 450 mm x 450 mm. Use M 20 and HYSD 415 steel. (20)

4. Design a slab for a live load of 3 kN/m^2 and floor finish at 0.6kN/m^2. Size of slab being 5m × 4m. It is restrained on four edges. Adopt M20 concrete and Fe 415 grade steel. Use yield line theory. (20)

SECTION - C

5. Design a riveted plate girder of span 18 m to carry a uniformly distributed load of 80 kN/m exclusive of self-weight in addition to 200 kN concentrated load at 1/3 points of span. Design a suitable section. (20)

6. A welded plate girder is simply supported at the ends and carries a uniformly distributed load of 100 kN/m over a span of 20 m. The section of the plate girder consists of three plates of size 550 × 10 mm each, on each flange and web of size 1800 × 6 mm. Design a suitable intermediate stiffener for the girder and its connection with the web. Sketch all the details. (20)

SECTION - D

7. An industrial building situated at a wide road in Delhi is 28.3 m long. 18.3 m wide and 12 m high up to eaves level. Pitch of trusses is 1/5 and the roof overhangs by 300 mm on horizontal beyond walls. Determine design pressure on various faces of walls and roof for medium permeability. (20)

8. Design an angle iron purlin for a trussed roof from the following data:
   Span of roof truss=12m
   Spacing of roof trusses=5m
   Spacing of purlin along slope of roof truss=2m
   Slope of roof truss=1 V:2H
   Wind load on roof surface normal to roof=1000 N/m^2
   Vertical load from roof sheeting etc.=200 N/m^2 (20)

SECTION - E

9. Write short notes on:
   (a) Selection of Bay width
   (b) Limitations of yield line theory
   (c) Splicing
   (d) Curtailment of flange plates
   (e) End bearings for trusses (5×4=20)