Code: 9A01801

R09

B.Tech IV Year II Semester (R09) Regular & Supplementary Examinations April 2016
ADVANCED STRUCTURAL ENGINEERING
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
Use of IS 456:2000, IS 3370 Part I,II & IV1967 and IS 4995 (Part II) is permitted in the examination hall.
Assume any missing data suitably
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1   Design a counterfort type retaining wall to the following particulars:
     Height of the wall above the general GL = 7 m
     SBC of the soil = 180 kN/m^2
     Angle of repose of the soil = 30°
     Weight of soil = 16 kN/m^3
     Spacing of counterforts = 3 m c/c
     Use M25 grade of concrete and Fe 500 grade of steel. Design the stem, heel slab and counterfort only.

2   Design a cylindrical water tank of capacity 6 lakh liters resting on the ground and having a flexible base. The materials used in construction are M25 grade concrete mix and HYSD steel of grade Fe 415. The overall height of the tank is restricted to 5 m with a free board of 300 mm. The SBC of the soil at the site is 160 kN/m^2.

3   Design a flight between landing to landing of a tread-riser type of staircase, with 10 risers, each 150 mm and with tread of 270 mm. The upper and lower landings are 1200 mm wide each supported on 230 mm thick masonry walls at the edges, parallel to the risers. The stairs are liable to be over crowded. Use M20 grade concrete and Fe 500 grade steel.

4   A flat slab floor system consisting of six panels in each direction supports dead and live loads of 8 kN/m^2 and 7 kN/m^2 respectively. The supporting columns are of 560 mm diameter with storey height of 3.2 m. Design an interior panel of size of 5.7 × 6.5 m using the provisions of IS456 for the direct design method when no column head or drop is provided. Use M25 grade concrete and Fe 500 grade steel.

5   A RC grid floor is to be designed for a hall of size 16 m × 20 m. The ribs are placed at 2 m c/c both ways. The floor carries a live load of 5 kN/m^2. Use any approximate method for analysis and design the slab and ribs.

6   Design an Intz type water tank of 10 lakh liters capacity, supported on an elevated tower comprising of 10 columns. The base of the tank is 16 m above ground level. Adopt M25 concrete and HYSD bars.

7   Design an RCC chimney shell of height 80 m having an outer diameter of 5 m throughout its height. Thickness of lining is 100 mm up to 40 m from ground level. Temperature difference between inside and outside of shell is 80℃ and wind pressure is 4.2 kN/m^2 also check for stresses.

8   Design the side walls and hopper bottom of a circular bunker to store 400 m^3 of coal having a density of 9 kN/m^3 and 30° angle of respose.

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