Code: 9A01801

R09

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations June/July 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 & IV)-1967 and IS 4995 (Part II) are permitted in the examination hall.
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1   Design a cantilever retaining wall to retain an earth embankment with horizontal top 4.5 m above ground level. Density of soil = 19 kN/m^3. Angle of friction = 30°, SBC of soil = 180 kN/m^2, coefficient of friction between soil and concrete = 0.5. Use M25 grade concrete and Fe415 steel. Sketch the reinforcement details.

2   Design a cinema balcony with the general layout shown in figure below. The live load = 45 kN/m^2, inclusive of furniture. The horizontal tread of each step is 1 m and rise is 120 mm. The depth of fulcrum girder is limited to 1 m at the end of the last step, there is a gangway 1.2 m wide and a R.C balustrade 1 m high. Assume any missing data. Use M25 concrete and Fe415 grade steel.
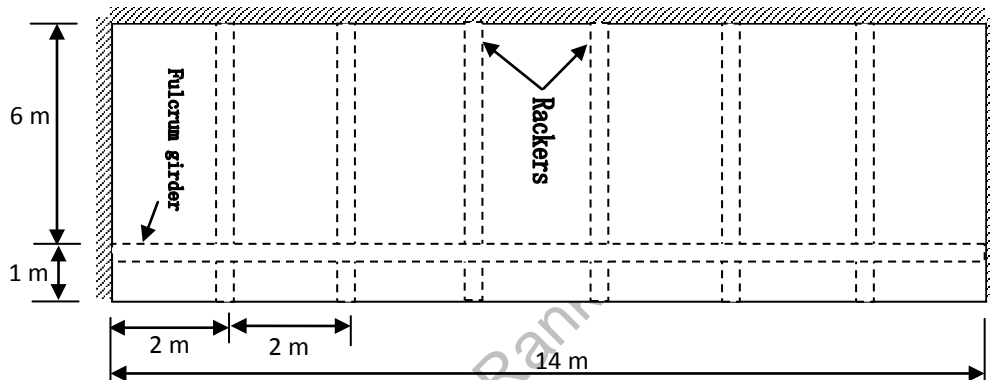
3   Design a rectangular water tank for capacity of 75000 liters. The depth of water is 4.4 m, the free board of 200 mm. Use M30 concrete and Fe415 steel. Sketch the reinforcement details.

4   Design an RC chimney shell of height 40 m, having an outer diameter of 3.5 m throughout its height. Thickness of the refectory brick lining is 100 mm up to 30 m from ground level. Temperature difference between inside and outside of shell is 75℃ and wind pressure is 2 kN/m^2. Also check for stresses.

5   Design an RC grid floor for a hall of size 14 m × 20 m. the spacing between the ribs is 2 m c/c on both spans. The floor carries a live load of 5 kN/m^2. Adopt any approximate method for design.

6   Design an interior panel of a flat slab for a hall of size 21 m × 30 m with panel size 7 × 10 m, carrying a live load of 4.5 kN/m^2. The size of the supporting columns are 650 × 650 mm. Sketch the reinforcement details.

7   Design a tread riser stair case for a residential building of height 3 m. The upper and lower landing are 1000 mm wide each supported on 230 mm thick walls at the edges parallel to the risers. L.L = 2 kN/m^2. Use M25 concrete and HYSD bars. Sketch the reinforcement details.

8   A reinforced concrete circular bunker is 4 m internal diameter. The circular wall is 4.5 m high. It has a 45° conical hopper bottom. The hopper has a concentric circular opening of diameter 0.5 m. The bunker is used for storing material weighing 8.5 kN/m^3, Angle of friction is 30°, coefficient of friction = 0.4. Design the conical hopper bottom. Adopt M20 concrete and Fe500 grade steel.

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