

Code: 9A01801

R09

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations, July 2013

ADVANCED STRUCTURAL ENGINEERING

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Design a bunker to store 300 kN of coal, for the following data: Unit weight of coal = 8340 N/m^3 , angle of repose = 30° . The stored coal is to be surcharged at its angle of repose. Adopt M20 grade of concrete and Fe 415 grade of steel and sketch the details of reinforcement.
- 2 Design a interior panel of a flat slab for a commercial building given the following data: Size of building = $25 \text{ m} \times 32 \text{ m}$, panel size = $5 \text{ m} \times 8 \text{ m}$, live load = 4 kN/m^2 . Provide column drop. Size of supporting columns = $600 \times 600 \text{ mm}$. Sketch the reinforcement for long span only.
- 3 Design a RC chimney shell, given below the following data: Height above ground level = 60 m , outside diameter = 4 m throughout, thickness of brick lining = 100 mm up to 40 m from ground, wind pressure 2 kN/m^2 .
- 4 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 4 m above the ground level. Density of soil = 18 kN/m^3 , angle of repose = 30° , SBC of soil = 200 kN/m^2 , $\mu = 0.5$. Use M25 grade concrete and Fe 415 steel.
- 5 A rectangular water tank is required to store 95,000 liters of water. The inside dimensions of tank may be taken as $6 \text{ m} \times 4 \text{ m}$. The wall is fixed to the base slab. Design the water tank using M25 and Fe 415.
- 6 An RC grid floor is to be designed for a hall of size $12 \text{ m} \times 16 \text{ m}$. The ribs are placed at 2 m c/c both ways. The floor carries a live load of 4 kN/m^2 . Use any approximate method for analysis and design the slab and ribs.
- 7 A reinforced concrete Intz type water tank is required to store 2.0 lakh liters of water. Height of staging 12 m above ground level. The tank is supported on six columns. SBC of the soil = 200 kN/m^2 . Basic wind pressure = 1.5 kN/m^2 . Adopting M20 grade of concrete and Fe 415 grade of steel. Design Intz type water tank. Sketch the details.
- 8 Design a tread riser type stair case flight between the landings 1.5 m long in the direction of span. Adopt 10 treads of 300 mm and risers of 150 mm in the flight. The landings are built into the reinforced concrete walls. Adopt a live load of 5 kN/m^2 . Use M20 grade concrete and Fe 415 grade steel. Sketch the details.
