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Question Paper Code : 50351

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Seventh Semester

Civil Engineering

CE 8703 – STRUCTURAL DESIGN AND DRAWING

(Regulations – 2017)

Time : Three hours

Maximum : 100 marks

IS 456, IS 3370, SP 16, SP 6, IRC 6, IRC 21, and IRC 112 are Permitted

Assume any data required suitably

Answer ALL questions

(5 × 20 = 100)

1. (a) Design a cantilever retaining wall required to support a bank of earth 4.0 m high above the ground level on the toe side of the wall. The backfill surface is inclined at an angle of 15 degrees with the horizontal. Assume good soil for foundation at a depth of 1.25 meters below the ground level with a safe bearing capacity of 160 kN/m². Angle of shearing resistance of soil is 30 degrees. Assume the coefficient of friction between soil and concrete is 0.5.

Or

- (b) Discuss the steps involved in the design of counterfort retaining walls.

2. (a) Design a RC solid slab bridge for the following data.

Clear span = 5 meters.

Clear width of roadway is 6.8 meters.

Live load is Class A loading.

Adopt M20 grade concrete.

Average thickness of wearing coat is 8 cm.

Or

- (b) Design the interior panel of a flat slab floor for a Ware house of dimensions 20 m × 30 m. Provide isolated drops. Maintain equal column and middle strips. Assume loading class 750. Adopt M20 grade concrete and Fe 415 steel.

3. (a) Design a closed Underground Rectangular tank in wet soil with a capacity of 3,50,000 Litres. Provide a free board of 20cm. Adopt M20 grade concrete. and Fe 415 steel. Weight of soil, 16 kN/m^3 , angle of internal friction of soil is 30 degrees. Bearing capacity of soil is 200 kN/m^2 .

Or

- (b) Design a small overhead circular tank of capacity 25,000 litres. Height of the tank to the bottom above the ground level is 5m. Bearing capacity of soil is 200 kN/m^2 . Wind load is 1.5 kn/m^2 . Shape factor 0.7. Free board 20 cm. Adopt M20 grade concrete. and Fe 415 steel.

4. (a) Explain the steps involved in the design on roof trusses.

Or

- (b) Explain various types of steel roof trusses with sketches. Also explain their applications.

5. (a) Design the connection between flange and web of a welded plate girder for a multi-storey building, with the following data. Span = 20 metres, thickness of roof slab is 10 cm. Take BM on the Girder as 5250 kNm as SF on the girder as 800 kN.

Or

- (b) Discuss the applications and advantages of the following.

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|--------------------------------|-----|
| (i) Pin connections. | (5) |
| (ii) Bolted connections. | (5) |
| (iii) Rivetted connections. | (5) |
| (iv) Direct shear connections. | (5) |