C 28952 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2012

CE 04 701—STRUCTURAL DESIGN—III

Time : Three Hours Maximum : 100 Marks

Assume any missing data suitably.
Use of IS 456, IS 3370, IRC 5, IRC 6, IRC 21, IS 1343, IS 800, IS 875, SP 6, SP 16 are permitted
Answer **all** *questions.*

Part A

1. (a) Explain the steps involved in the design of combined footing.
   (b) Explain the design of counter fort in the counter fort retaining wall design.
   (c) Discuss different type of IRC live load.
   (d) Explain the different type of construction joints in water tanks.
   (e) Discuss different losses of prestressing.
   (f) Explain the grades of concrete and steel used in prestressing. Justify.
   (g) Explain the components of a self supporting chimney.
   (h) Explain the different types of bearings used in plate girders.

(8 × 5 = 40 marks)

Part B

2. (a) Design a rectangular column of effective height of 5 m. subjected to an axial load of 800 kN and bending moment of 180 kNm about major axis and 120 kNm about minor axis. Use M-30 grade concrete and Fe-500 grade steel.

Or

(b) Design a cantilever retaining wall for the following data :—

Height of wall above the ground = 5 m.;
Density of earth = 17 kN/m.^{3}
Angle of internal friction = 30°
Safe bearing capacity of soil = 160 kN/m.^{2}
Coefficient of friction at base between soil and concrete = 0.55
Backfill is horizontal.

Use M-20 concrete and Fe-415 grade steel.

(15 marks)

Turn over

3. (a) Design a RC solid slab bridge for the following data :—

Clear span = 5.5 m. ; Width of support = 400 mm. ; Live load = Class A loading ; Carriageway width = 7.5 m. ; Thickness of wearing coat = 80 mm.

Use M-20 concrete and Fe-415 grade steel.

Or

(b) Design a circular water tank for a capacity of 4,00,000 litres. The joint between base and wall is fixed. Use IS method of design. Use M-20 concrete and Fe-415 grade steel.

(15 marks)

4. (a) Explain the diffeernt methods of pre-tensioning and post-tensioning.

Or

(b) Design a suitable midspan section of a built up plate girder, supporting an uniformly distributed live load of 90 kN/m. inclusive of its self-weight. The beam is simply supported with a span of 25 m. Use 22 mm. diameter power driven rivets.

(15 marks)

5. (a) Design a suitable mid span section of a built up plate girder, supporting an uniformly distributed live load of 90 kN/m. inclusive of its self-weight. The beam is simply supported with a span of 25 m. Use 22 mm. diameter power driven rivets.

Or

(b) A simply supported plate girder has a span of 30 m. and carried a total uniformly distributed load of 6000 kN inclusive of its own weight. The plate girder consists of 2400 mm. deep × 16 mm. thick web plate, 2 ISA 200 mm. × 150 mm. × 18 mm. angles and 750 mm. × 16 mm. cover plates in each flange. Design the riveted connection of flange angles to web and flange angle to flange plates.

(15 marks)

[4 × 15 = 60 marks]