



B.E/ B.Tech/B.Arch (Full Time) DEGREE END SEMESTER EXAMINATIONS - Apr/May 2019

CIVIL ENGINEERING

SIXTH SEMESTER – (REGULATIONS 2012)

CE 8604 – STRUCTURAL DESIGN AND DRAWING

Time : 3 hours

Max Marks : 100

Instructions: 1. Use of IS 456 – 2000, IS 800-2007, IS 875 (Part 3) – 2003, IS 3370 (Part 2) – 2009, IS 3370 (Part 4) – 2008, IS 4998 – 2003, IS 6533 (Part 1) – 2010, IS 6533 (Part 2) - 2003, IRC 6 -2014, IRC 21- 2000, and steel tables is permitted.

2. Relevant data may be suitably assumed if found necessary.

Answer ALL Questions

PART A – (10 × 2 = 20 marks)

1. Draw a neat sketch of a double bolted double cover butt joint.
2. List out any two advantages of welded connections.
3. How are the preliminary dimensions for a hemispherical bottomed steel tank fixed?
4. List any two factors considered in the design of a RCC water tank.
5. How are temperature variations accounted for in the design of RCC bridges?
6. List the main components of a steel foot over bridge.
7. What is the most economical spacing of counterforts in a counterfort retaining wall?
8. What are the factors that influence the spacing of expansion joints in retaining walls?
9. How are angle purlins designed?
10. How are trusses classified according to the pitch?

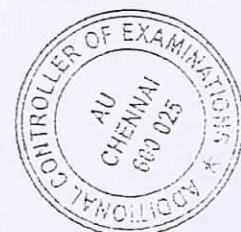
PART B – (5 × 16 = 80 marks)

(Q. No. 11 is Compulsory)

11. Discuss in detail the salient features of
 - (i) Allowable Stress Design and
 - (ii) Limit State Design
12. (a) Design a circular tank 12m diameter and 3.5m height of wall. Free board = 0.3m. The tank rests on a firm ground. The walls are fixed at the base and free at the top. Use M30 and Fe415 rebars.

Or

- (b) Design a rectangular tank resting on the ground for a capacity of 50 kilo litres. Use M25 and Fe415 rebars.



13. (a) A steel foot bridge of span 21m is designed using a N-type lattice girder shown in Figure Q13(a) laterally supported by rakers. Width of walkway is 4m. The flooring consists of 130mm thick RCC slab with floor finish 0.75 kN/m^2 . Live load = 4 kN/m^2 . Design the member MN.

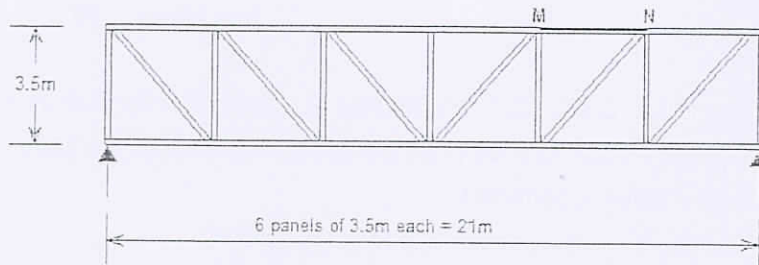


Figure Q13(a).

Or

- (b) Design a slab bridge using M25 grade concrete and Fe415 steel for IRC 70 loading. Consider the following data

Clear span - 6m

Carriageway - 12m

Thickness of wearing coat - 80mm

Draw to a suitable scale the cross-section showing the reinforcement details

14. (a) Find the preliminary dimensions of a cantilever retaining wall to retain earth of 4m height. The backfill is horizontal. The unit weight of soil is 16 kN/m^3 . Coefficient of friction between soil and concrete is 0.6. Safe bearing capacity of soil is 200 kN/m^2 . The angle of repose is 30° . Use M25 grade concrete and Fe 415 grade steel. Design the stem.

Or

- (b) Find the dimensions of a counterfort retaining wall to retain earth of 6.5m height. The unit weight of soil to be retained is 18 kN/m^3 . Coefficient of friction between soil and concrete is 0.5. Safe bearing capacity of soil is 180 kN/m^2 . The angle of repose is 30° . Use M25 grade concrete and Fe 415 grade steel. Check the stability of the wall.

15. (a) Design a foundation for a RCC chimney for the following data

Height of the chimney = 90m

External diameter = 5m at the bottom and 4m at the top

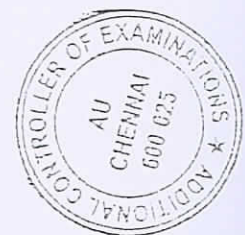
Wall thickness = 300mm

Total vertical load on the base = 9500 kN

Bending moment = 15000kNm

Allowable bearing pressure = 180 kN/m^2

Use M30 concrete and Fe415 steel.



Use M30 concrete and Fe415 steel.

Or

(b) Design a purlin for a roof truss having the following data:

Span of the truss = 8.0m

Spacing of truss = 4m c/c.

Inclination of roof = 30°

Spacing of Purlin = 2m c/c

Wind pressure = 1.5 kN/m^2

Roof coverage = A.C Sheetting weighing 200 N/m^2

Provide a channel section Purlin.

