KUMARAGURU
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Register Number: …….

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Seventh Semester

CIVIL ENGINEERING

CEE122: Design Of Reinforced Concrete Structures

(Use of IS 456, IS 3370 and IRC codes are permitted)

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The minimum thickness of stem at the top of cantilever retaining wall is
   a) 100 mm b) 150 mm
   c) 200 mm d) 250 mm
2. The spacing of counterforts depends upon the
   a) Height of the wall b) Relative cost of steel and concret
   c) Allowable unit pressure on soil d) All of the above
3. The minimum grade of concrete used for water tank is
   a) M15 b) M25
   c) M20 d) M30
4. The minimum cover for reinforcement in liquid storage structure is ……mm
   a) 20 b) 25
   c) 30 d) 40
5. In the case of RCC water tanks, the reinforcing bars provided in domes surrounding an opening are called
   a) Meridional bars b) Anchor bars
   c) Distribution bars d) Trimming bars
6. The permissible stress under direct tension for Fe415 in water storage structures

is …… N/mm^2

a) 115 b) 125

c) 130 d) 140

7. The negative yield lines are formed at the …….. of the slab

a) Free edge b) Simply supported edge

c) Continuous edge d) Hinged edge

8. The yield lines are normally……..

a) Straight b) diagonal

c) Curved d) cross

9. The most common type of loading adopted for prominent bridges and culverts is

a) IRC class AA loading b) IRC Class A loading

c) IRC class B loading d) IRC Class C loading

10. The maximum size of reinforcement shall be ……..unless a bigger size is permitted by the competent authority.

a) 25 mm b) 45 mm

c) 32mm d) 40mm

PART B (10 x 2 = 20 Marks)

11. What is the necessity of shear key in retaining walls?
12. What is a culvert?
13. Draw any two types of staging provided for overhead water tanks.
14. What are the forces considered for the design of underground water tanks?
15. What is meant by meridional thrust and hoop stress in domes?
16. What are the different types of foundations provided for overhead water tank?
17. Write down the characteristic features of yield lines.
18. What is an orthotropic slab?
19. Sketch the types of loading for box culverts.
20. What are the different types of bridges?

PART C (5 x 14 = 70 Marks)

21. a) Design a cantilever retaining wall to retain earth fill to 4m above GL. The surcharge on the earth fill is 15 kN/m^2. Angle of repose = 30^o. Unit weight of earth = 18 kN/m^3. Coefficient of friction = 0.6. Safe bearing capacity of soil = 150 kN/m^2. Use M20 concrete and Fe415 steel.

(OR)

b) Design the heel and stem of counterfort retaining wall to retain earth fill to 6.0m above G.L. Angle of repose = 30^o. Unit weight of earth = 18 kN/m^3. Coefficient of friction = 0.6. Safe bearing capacity of soil = 150 kN/m^2. Use M20 concrete and Fe415 steel.

22. a) Design a circular tank for a capacity of 300 KL with flexible base. Use M25 concrete and Fe415 steel.

(OR)

b) Design a rectangular tank for capacity of 250 KL with fixed base and free at top. Use M25 concrete and Fe415 steel.

23. a) Design the walls of a rectangular elevated water tank of size 10m x 4m x 3m height excluding the free board of 0.2m the tank is supported on RC columns.

(OR)

b) Design suitable staging to support the tank given in question No 23.a) . Assume necessary data.

24. a) Derive the ultimate moment capacity of orthotropically reinforced rectangular slab simply supported all round and subjected to uniformly distributed load of intensity w/m^2.

(OR)

b) Design a RC slab 6m x 4m simply supported with live load of $4kN/m^2$ and coefficient of orthotrophy as 0.7. Use yield line analysis.

25. a) Design the slab bridge for the following requirements:
Clear span: 8m Clear width of carriage way =7.5m Live load: Class A loading Use M20 concrete and Fe415 steel.

(OR)

b) Design top wall of a culvert of size 3m x 3m. Assume suitable data. Take live load as 25 kN/m^2. Use M25 concrete and Fe415 steel

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