KUMARAGURU college of technology
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Register Number: ……..

**B.E DEGREE EXAMINATIONS: APRIL 2015**

(Regulation 2009)

Seventh Semester

**CIVIL ENGINEERING**

CEE122**:** Design of Reinforced Concrete Structures

(IS:456, IS:3370, IRC codes are permitted)

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

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. The expansion joints are provided at an interval of _____ m in retaining walls.

   a) 30 b) 40

   c) 45 d) 50

2. The active earth pressure co-eff for □=35$^o$ is _____.

   a) 0.27 b) 0.24

   c) 0.33 d) 0.36

3. The minimum thickness of dome is _____ mm.

   a) 50 b) 100

   c) 75 d) 125

4. The radius of the dome for a hall of 7m dia and 1.5m rise is _____ m.

   a) 3.8 b) 4.8

   c) 5.8 d) 6.8

5. The depth of foundation for retaining wall with unit weight 18kN/m$^3$ ,SBC 150kN/m$^2$ and active earth pressure co eff = 0.25 is _____ m.

   a) 0.50 b) 1.52

   c) 0.52 d) 1.0

6. The minimum grade of concrete for water tanks is

   a) M20 b) M30

   c) M25 d) M15

7. The permissible stress under direct tension for plain rods in water storage structures is------ N/mm$^2$

   a) 115 b) 130

   c) 125 d) 140

8. The maximum tension developed in a tank of height 2.8m and 12 m dia is ---------- kN

a) 155 b) 165

c) 160 d) 170

9. The negative yield lines are formed at the

a) free edge b) Continuous edge

c) Simply supported edge d) hinged edge

10. IRC class A loading is adopted for

a) temporary bridges b) heavy loading

c) culverts d) timber bridges

**PART B (10 x 2 = 20 Marks)**

11. How to design the various components of counter-fort cantilever retaining wall?
12. Write down any five design requirements for retaining wall.
13. What is dome and write the formula to calculate meridinal thrust and hoop stress.
14. Write down the basic assumptions in yield line theory.
15. Write down the characteristic features of yield lines.
16. How to design the rectangular tank wall which has ratio of length to breath is greater than 2?
17. What is a culvert?
18. Classify IRC loadings.
19. Draw the approximate bending moment diagram for a circular tank with restraint at base and roof.
20. Draw a typical expansion joint in water tanks.

**PART C (5 x 14 = 70 Marks)**

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

**(OR)**

b) Design a circular tank for a capacity of 300 KL with fixed base and free at top. Use M25 and Fe415.

22. a) Derive the ultimate moment capacity of orthotropically reinforced rectangular slab simply supported all round subjected to UDL

**(OR)**

b) Derive the ultimate moment capacity of isotropically reinforced square slab fixed all round and circular slab fixed all round subjected to UDL.

23. a) Design the stem of counterfort retaining wall to retain earth fill to 5.5 m above GL. Angle of repose=30. unit weight 16 kN/$m^3$.SBC = 150 kN/$m^2$. Use M20 and Fe500. Assume suitable data.

**(OR)**

b) Design the heel of cantilever retaining wall with level fill to retain earth fill to 4.50 m above GL. The surcharge on the earth fill is 15 kN/$m^2$. Angle of repose=30. Unit weight 16 kN/$m^3$.co-eff of friction=0.6. SBC = 140 kN/$m^2$. Use M20 and Fe500.

24. a) An over head tank of 12 m x 4 m x 2.5 m is 9 m above GL. It is covered at the top. Using M25 and Fe 500 and assuming suitable data design cross middle beam at the base

**(OR)**

b) An over head tank of 12 m x 4 m x 2.5 m is 9 m above GL. It is covered at the top. Using M25 and Fe 500 and assuming suitable data design the side continuous beam

25. a) A box culvert having inside dimension of 3 m x 3m and subjected to a UDL of 35 kN/$m^2$ and dead load of 12 kN/$m^2$.Unit weight of the soil is 18kN/$m^3$ and angle of repose =30. Use M25 and Fe 415. Calculate the net BM for DL, LL and earth pressure combination.

**(OR)**

b) A box culvert having inside dimension of 3 m x 3m and subjected to a UDL of 35 kN/$m^2$ and dead load of 12 kN/$m^2$.Unit weight of the soil is 18kN/$m^3$ and angle of repose =30.Use M25 and Fe 415. Calculate the net BM for DL,LL, earth pressure and water pressure combination.

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