Register Number: ……………………..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Seventh Semester

CIVIL ENGINEERING

CEE122:Design of Reinforced Concrete Structures

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. 1.The active earth pressure co-efficient of angle of repose of soil 25^0 is
   a) 0.41   b) 2.46
   c) 0.45   d) 2.49

2. The passive earth pressure co-efficient of angle of repose of soil 15^0 is
   a) 0.59   b) 2.88
   c) 1.70   d) 0.35

3. The permissible tensile stress in Fe250 near water face is
   a) 125 N/mm2   b) 115 N/mm2
   c) 140 N/mm2   d) 150 N/mm2

4. The permissible direct tensile stress in M25 concrete is
   a) 1.1 N/mm2   b) 1.2N/mm2
   c) 1.3N/mm2   d) 1.50 N/mm2

5. The Moment of resistance coefficient for M20 and Fe415 is
   a) 1.171   b) 1.33
   c) 1.42   d) 1.28

6. Compressive stress in columns subjected to direct load for Fe 415 is
   a) 125 N/mm2   b) 150 N/mm2
   c) 115 N/mm2   d) 175 N/mm2

7. In a simply supported one way slab the yield line is ----------- to the direction of reinforcement
   a) Parallel   b) inclined
   c) perpendicular   d) skew

8. The yield lines are always------------
   a) curved   b) crimped
   c) Straight   d) parabolic

9. IRC class A loading is adopted for

a) temporary bridges   b) heavy loading
c) Culverts   d) timber bridges

10. As per IRC class A loading ,the maximum single axle load is
    a) 2000kN   b) 150 kN
    c) 250 kN   d) 400 kN

PART B (10 x 2 = 20 Marks)

11. With suitable diagram, specify how you can find the earth pressure on a sloping backfill.

12. What is a shear key?

13. In what ways, circular water tank is preferred over rectangular water tanks?

14. Draw neat sketch of any two joints in a water tank.

15. Draw the approximate Bending moment diagram for circular tanks with restrained base.

16. Specify the conditions under which, Courbon's method is applicable for design of bridges.

17. What is the need for providing cross girders in T beam Slab Bridge?

18. Specify the notation for
    (i) Negative yield line
    (ii) Positive yield line
    (iii) SS edge
    (iv) Continuous edge.

19. How many positive yield lines will be formed in a circular slab?

20. What are the characteristic features of yield line?

PART C (5 x 14 = 70 Marks)

21. a) A cantilever retaining wall retains earth 4m high above ground level of density 18 kN/m^3 and angle of repose 30°. The SBC of soil is 200 kN/m^2 and coefficient of friction is 0.5. It is proportioned in such a way that the top width of stem is 200 mm and bottom width 450 mm, Base slab of 3m wide and 450 mm deep is provided at 1.2 m depth below ground level with 1m toe projection. Check the pressure distribution at the base of slab. Draw the pressure distribution diagram.

(OR)

    b) (i) Suggest suitable dimensions and draw the pressure distribution diagram for a counter fort retaining wall of height 6m above GL. Also design the stem portion. The soil is having SBC 160kN/m^2 with internal friction angle 30^0; Density of soil is 16kN/m^3. Spacing of counter fort is 3m c/c.   (7)
       (ii) Design a rectangular slab, 6m x 4m, simply supported and subjected to a live load of 4 kN/m^2, with 0.7 as coefficient of orthotrophy, using yield line analysis.   (7)

22. a) Design an RCC circular water tank resting on ground with flexible base for storing 5 lakh liter of water; Depth of storage is 4m; free board is 200mm.

(OR)

b)   A rectangular water tank placed on ground is of size 6m x 2m and a maximum depth of 2.5 m. Design the side walls of the tank using M-20 grade concrete and Fe-415 HYSD bars. Sketch the details of reinforcement neatly.

23.   a)   Calculate the collapse load for an orthotropically reinforced circular slab, fixed all round.

(OR)

b)   (i)   An orthotropically reinforced rectangular slab is simply supported along its   (7) edges and subjected to a udl of w/unit area. Analyse the slab by virtual work method.

    (ii)   Design the rectangular slab by yield line theory given the following data: (7)
Long span- 7m,Short span-5m,Imposed load- 3 kN/m^2
The ratio of long span reinforcement to that of short span is 0.75

24.   a)   Design the long wall and short wall of an over head tank of size 9.9m x 3m x 3m. The bottom of the tank is 9m above GL. The tank is covered at the top. SBC=150kN/m^2. Use M25 and FE 415 steel.

(OR)

b)   Design the long edge continuous beam at the bottom for the above tank.

25.   a)   Design the top slab of a 3.5m x3.5m box culvert subjected to a dead load of 13 kN/m^2 and live load of 40 kN/m^2. Unit weight of the soil is 18 kN/m^3. Angle of repose 30^0. Use M25 and Fe415.

(OR)

b)   A single span T beam bridge consists of 4 beams 2m apart. The clear span of the bridge is 11 m and end bearing is 500 mm. Live load=17 kN/m^2 including impact. The carriage way width is 7m and foot path on either side is 1.5m.The loading on the foot path is 4 kN/m^2. Design the bridge. Use M20 and Fe 415

****