Register Number: ……………………..

B.E. DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

CIVIL ENGINEERING

CEE121:Design of Reinforced Concrete Elements

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. In singly reinforced beams, steel reinforcements is provided in

    a) Tension zone   b) Compression zone

    c) Both Tension and Compression zone   d) Neutral zone

2. Analysis of reinforced concrete can be done by

    a) Straight line theory   b) Elastic theory

    c) Ultimate load theory   d) All of these

3. The section in which concrete is not fully stressed to its permissible value when stress in steel reaches its maximum value is called

    a) Under reinforced section   b) Over reinforced section

    c) Critical section   d) Balanced section

4. The length of stair case situated between two landings is called

    a) Rise   b) Flights

    c) Tread   d) Waist slab

5. The diagonal tension in concrete can be resisted by providing

    a) Diagonal tension reinforcements   b) Shear reinforcements

    c) Inclined tension reinforcements   d) All of these

6. The torsion resisting capacity of a given reinforced concrete section

    a) Decreases with decrease in stirrups spacing   b) Decreases with increase in longitudinal bars

    c) Does not depend upon stirrups and longitudinal steels   d) Increase with increase in stirrups and longitudinal steels

7. The RC column, having helical reinforcement, should have at least …… bars of longitudinal reinforcements with in this helical reinforcements

a) Two   b) Four

c) Six   d) Eight

8. For a longitudinal reinforcing bar in a column, the cover should not be less than

a) 10mm   b) 20mm

c) 30mm   d) 40mm

9. A footing which supports two or more column is termed as,

a) Combined footing   b) Raft footing

c) Strap footing   d) None of these

10. The weight of the footing is assumed as…. Of the weight transferred to the column

a) 5%   b) 10%

c) 15%   d) 20%

PART B (10 x 2 = 20 Marks)

11. State the assumptions made in working stress method

12. Compare the advantages of limit state method over working stress and ultimate load methods?

13. Distinguish between one way and two way slabs

14. Write down the different types of stair cases?

15. What are the types of reinforcements used to resist shear in beams?

16. Mention few types of shear failure in reinforced concrete beams?

17. Define slenderness ratio of column

18. What is the minimum and maximum percentage of steel allowed in R.C.Column?

19. What are the situations in which combined footings are preferred over isolated footings?

20. How do you classify one-way shear and two-way shear in foundation?

PART C (5 x 14 = 70 Marks)

21. a) The cross section of a singly reinforced beam is 300mm wide and 400mm deep to the centre of the reinforcement which consist of 4 bars of 16mm diameter. If the stress in concrete and steel are not exceed 7 N/mm^2 and 140 N/mm^2 respectively. Determine the moment of resistance of the section.

(OR)

b) A reinforced concrete beam is supported on two walls 250 mm thick, spaced at clear distance of 6m. The beam carries a superimposed load of 9.8 kN/m. Using M20 grade concrete, design the beam. Take permissible tensile and shear stress in steel as 140 N/mm^2 for mild steel bars.

22. a) A reinforced concrete beam is supported on two walls 300 mm thick placed at a clear distance of 5m. The beam carries a super imposed load of 2 kN/m. Use M20 grade concrete and Fe415 steel. Use limit state design method.

(OR)

b) Design a Dog- legged stair for a building in which the vertical distance between floors is 3.6m. The stair hall measures 2.5m x 5m (Internal dimensions). The live load may be taken as 25kn/m^2. Use M20 grade and Fe415.

23. a) A simply supported rectangular beam 250mm x 450mm effective size carries an udl of 12.5 kN/m over an effective span of 5.5m. It is reinforced with 3 nos of 20mm diameter bars. Use M20 grade concrete and Fe415 steel. Design the shear reinforcement in the form of vertical stirrups.

(OR)

b) Determine the reinforcement required for rectangular beam section with the following data. Width of the section 300mm, effective depth of the section 500mm, Factored bending moment 80kNm, Factored torsion moment 40kNm, Factored shear force 70 kN. Use M20 grade concrete and Fe415 steel.

24. a) Design a short axially loaded square column 500mm x 500mm for a service load of 2000kN. Use M20 grade concrete and Fe415 steel.

(OR)

b) Design a rectangular column 5m long, restrained in position and direction at both ends to carries an axial load of 1200 kN. Use M20 grade concrete and Fe415 steel.

25. a) Design a footing of uniform thickness to carry an axial load of 1200 kN. Size of column is 400mm x 400mm. Safe bearing capacity of soil is 150 kN/m^2. Use M20 grade concrete and Fe415 steel.

(OR)

b) A masonry wall 250mm thick carries a load of 150kN/m length. Design a R.C footing for this wall if the bearing capacity of the soil is 100 kN/m^2. Use M20 concrete and Fe415 steel.

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