Register Number: ……..

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Sixth Semester

CIVIL ENGINEERING

U07CE605: Design of Reinforced Concrete Elements

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The allowable pending stress of M_{20} in WSD is

   a) 5 N/mm^2 b) 7N/mm^2 c) 8 N/mm^2 d) 9N/mm^2

2. WSD is suitable in

   a) elastic design b) plastic design c) rigid design d) both a & b

3. In case of two way slab, the L/b ratio should be greater than

   a) 1 b) 2 c) 3 d) 4

4. The side face reinforcement should be provided, if the beam depth is more than

   a) 600mm b) 750 mm c) 700 mm d) 800mm

5. The purpose of providing stirrups in Beam is to take care of

   a) shear b) bond c) flexure d) torsion

6. Side wall, Intermediate columns are subjected to

   a) axial load b) uni axial bending c) Biaxial bending d) both a and b

7. Eccentric footings are used

   a) at the boundaries b) inside buildings c) two columns are closer d) none of the above

8. What is the self weight of RCC?

   a) 25 KN/m^3 b) 24 kN/m^3 c) 22 kN/m^3 d) 18 kN/m^3

9. To be slender column, Le/b> _____?

   a) 10 b) 12 c) 20 d) 24

10. What is the effective length of column having one end fixed and other hinged?

    a) 0.60L b) 0.8L c) 1.2L d) 1.4L

PART B (10 x 2 = 20 Marks)

11. What is meant by working stress design?
12. What is nominal cover?
13. Draw the diagram showing the total loads that act on the support beams for two way slab.
14. How singly reinforced beam is different from doubly reinforced beam?
15. Sketch the pattern of cracking in a beam under torsional moment.
16. What is splicing of bars?
17. What are columns? And differentiate its types?
18. What are different end conditions for column?

19. What are the different types of footing?
20. What is steel detailing?

PART C (5 x 14 = 70 Marks)

21. (a) What are limit states? Explain the types in detail.

(OR)

(b) Compare merits and demerits of different types of design methods.

22. (a) A Beam continuous over several supports has to carry a factored negative support moment of 1000kNm. Determine the area of steel at supports if b_w=400mm, b_f=1600mm, D_f=100mm, D=610mm, d'=60mm, f_{ck}=30N/mm^2, Fe 415 Steel.

(OR)

(b) Design a simply supported R.C.C. slab for a roof of a hall 4mx10m (inside dimension) with 230 mm walls all around. Assume a live load of 4 kN/m^2 and finish load of 1kN/m^2. Use M20 concrete and Fe 415 Steel.

23. (a) The T-beam having D_f=120mm, b_f=700mm, D=800mm and b_w=350 mm is subjected to the following factored loads. Bending moment of 215kNm, Shear of 150kN, and torsion of 105kNm. Assuming f_{ck}=30 N/mm^2 and f_y=415N/mm^2, design the reinforcements according to IS 456. Cover to centre of steel is 50mm.

(OR)

(b) A beam is size 300 x 500 mm is subjected to a shear force of 100 kN with 2 bars of 16mm φ. Design the beam for shear. Use M20 and Fe415.

24. (a) Design an axially loaded tied column 400X400 mm pinned at both ends with an unsupported length of 3 m for carrying a factored load of 2300 kN. Use grade M20 and Fe 415.

(OR)

(b) An unbraced column 400 mm square is subjected to the following: Factored loads P = 3200 kN. At the top, M_x = 76 kNm and M_y = 68 kNm. At the bottom, M_x = 8 kNm and M_y = 34 kNm, L_0 = 5; L_e = 6.0m at both the axis. Assuming M40 and Fe 415, design the longitudinal steel.

25. (a) A solid footing has to transfer a dead load of 1000 kN and an imposed load of 400 kN from a square column 400X400 mm (with 16 mmdia bars). Assuming M20 and Fe 415 and SBC of soil to be 200kN/m^2, design the footing.

(OR)

(b) Explain standard method of detailing of R.C. Beams and Slabs.

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