Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No. ....

CE–504(O)

B. E. (Fifth Semester) EXAMINATION Nov./Dec., 2009

(Old Scheme)

(Civil Engineering Branch)

STRUCTURAL DESIGN AND DRAWING – I (R. C. C.)

[CE–504(O)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note :   (i)   Attempt *five* questions only; taking *one* question from each Unit.

(ii)   Use M-20 grade concrete and Fe-415 steel.

(iii)   Sketch the details of reinforcement.

(iv)   Use of IS-456 and other relevant IS codes is permitted.

(v)   Assume required data suitably and state it clearly.

Unit – I

1. (a) Discuss in detail balanced, under-reinforced and over-reinforced sections. 10

(b) Describe the various assumptions made for structural design of R. C. sections. Explain stress block and neural axis for R. C. sections. 10

P. T. O.

Or

2. (a) A reinforced concrete beam of rectangular section 300 mm × 600 mm is reinforced with 4 bars of 25 mm dia. at an effective depth of 560 mm. Estimate the moment of resistance of the section.   10

   (b) Differentiate between the philosophies of working stress and limit state methods of design of R. C. sections.   10

Unit – II

3. A reinforced concrete beam is to be designed over an effective span of 5 m to support a service load of 7·5 kN/m. Design the beam to satisfy the collapse and serviceability limit states.   20

Or

4. Design a continuous reinforced concrete beam of rectangular section to support a dead load 8 kN/m and service load of 12 kN/m over three continuous spans of 6 m each.   20

Unit – III

5. Design a slab for room of internal dimensions 3·5 m × 5·5 m supported on walls of 200 mm thickness with corners held down. Two adjacent edges of the slab are continuous and other two discontinuous.

   Live load on the slab is 3 kN/m^2.

   Load due to floor finish 1 kN/m^2.   20

Or

6. Write short notes on the following :   5 each
   (i)   Circular slabs
   (ii) Waffle slabs
   (iii) Flat slabs
   (iv) Yield line theory

Unit – IV

7. Design a rectangular column 300 m × 500 mm carrying an axial load of 1200 kN. If the safe bearing capacity of soil is 180 kN/m^2 design a suitable footing for the column. 20

Or

8. Design a combined rectangular footing for two columns 3·0 m apart. Size of the columns are 300 mm × 300 mm and 400 mm × 400 mm and are carrying loads of 400 kN and 600 kN respectively. The safe bearing capacity of soil is 150 kN/m^2. 20

Unit – V

9. Design a stair with waist slab for a building with stair hall measurements 2·3 m × 5 m. The vertical distance between two floors is 3·20 metres. The live load is 2·80 kN/m^2. 20

Or

10. Design a stair without waist slab (tread-riser stair) for a building having vertical distance between floors 3·5 m. The stair room measures 2·5 m × 5·0 m. The live load may be taken as 3·0 kN/m^2. 20