Roll No .....

CE - 504

B.E. V Semester

Examination, December 2013

Structural Design and Drawing-I (RCC)

Time : Three Hours

Maximum Marks : 70

Note: 1. Attempt any five questions. All questions carry equal marks.
2. Use of IS: 456-2000 is permitted.
3. Draw reinforcement details wherever required.
4. Missing data if any, may be suitably assumed.

1. a) Discuss in details various assumptions of limit state method. 6

   b) What do you mean by balanced section? Explain its significance. 4

   c) What is factor of safety? Why the value of factor of safety different for concrete and steel. 4

   OR

   Find the moment of resistance of a RC beam 200mm wide and 450mm deep. The beam is reinforced with 3-12mm diameter bars in tension zone. The effective cover to the reinforcement is 35mm, grade of concrete is M20 and grade of steel is Fe250. 14

2. Effective span of the beam is 5.0 m and the beam is subjected to a uniformly distributed load of 20KN/m acting over its span. Design a reinforced beam with cross section of 200mm×300mm. Exposure condition is moderate. 14

OR

Calculate the moment of resistance of a doubly reinforced T beam shown in Fig. 1. Take M20 grade concrete and Fe415 grade steel. Take effective cover of 40mm. 14

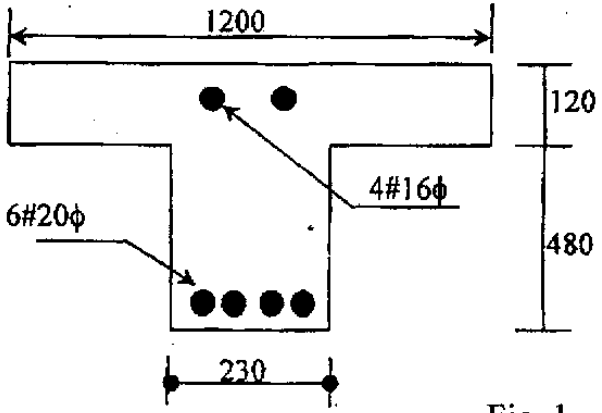

Fig. 1

3. Design a simply supported roof slab for a room 7.0 m×3.0 m clear in size if the live load is 2KN/m². The slab is simply supported on all the four edges. Exposure condition is mild. 14

OR

Design a slab for a room 5.0m×5.0m clear in size if the live load is 4KN/m² and the slab is continuous over two adjacent edges only. Exposure condition is mild. 14

4. Design a column with square section for an axial load of 1200 KN. Also design the isolated footing for the column if safe bearing capacity of soil is 150 KN/m². Exposure condition is mild. 14

OR

Design a combined trapezoidal footing for two columns A and B; carrying axial loads of 1200 KN and 1000 KN respectively. Column A is of size 400mm×400mm and column B is of size 375mm×375mm. The columns are spaced 3.0 m center to center. The bearing capacity of soil is 100 KN/m². Sketch the details. 14

5. Design the waist slab type staircase comprising a straight flight of steps, supported between two stringer beams along the two sides. *Given:* riser = 150mm; tread = 300mm; width of staircase = 2.0m; width of beams = 300mm. Assume a live load of 5.0 KN/m² and moderate exposure condition. 14

OR

Design a dog-legged staircase to be provided in a residential multistoreyed building. Clear space available is 3.0m×4.8m. Floor to floor height is 3.6m. Length of landing on either side along the direction of flight is 1.2m. Exposure condition is moderate. 14

******