TA-201

B.Arch. Sem. IV, (BArch, ID and BCT) Examination
May-2013

Structure IV (AR-403)

Time : 2 Hours]   **[Max. Marks : 50**

Instructions : (1) Figures to right indicate full marks.

(2) Answer must be precise and up to the point.

(3) Use M20 grade of Concrete and Fe415 Steel.

(4) Use of IS456 is permitted.

1. Answer the following :

   (a) Define cover and effective depth. **2**

   (b) What is the minimum percentage steel and no. of bars in square and circular columns ? **1**

   (c) Explain partial safety factors. **1**

   (d) Explain the failure pattern of over reinforced beams. **1**

   (e) What is the slenderness criteria for columns ? **1**

   (f) Define characteristic strength of material. **1**

   (g) What does M and 25 stand for in notation M25 ? **1**

   (h) Difference between one way slab and two way slab. **2**

   (i) What is the minimum percentage of distribution steel in case of slab ? **1**

   (j) Mention the criteria's to be satisfied in Limit State Design. **1**

   (k) Mention the permissible deflection values of Cantilever, simply supported and continuous beams and slabs and for two way slabs with high strength deformed bars. **2**

2. A singly reinforced rectangular beam 300 mm wide and 450 mm effective depth is reinforced with 4 nos. of 12 mm dia bars. Find out the ultimate moment of resistance of the section. Use M20 concrete and Fe415 grade of steel. Also find out moment of resistance if it is reinforced with 5 nos 20 mm diameter bars. **6**

3. Find moment of resistance of beam 300 mm × 450 mm effective depth reinforced with 2-16 mm dia bars as compression reinforcement at an effective cover of 30 mm and 4-20 mm dia bars as tension reinforcement. **5**

4. A rectangular beam of size 330 mm wide × 450 mm effective depth is subjected to factored moment of 150 kNm. Find the reinforcement for flexure. **5**

5. Design a short column carrying an axial load of 800 kN. **12**

    Also design an isolated pad foundation to carry the load of column as per above and draw a neat reinforcement sketch for column and foundation.

6. Design a simply supported roof slab 120 mm thick for a room 7 m × 2 m clear in size. If the super imposed load is 5 kN/sqm. Also draw neat sketch of reinforcement. **8**

OR

    A Drawing room of residential building measures 3 m × 5m. It is supported on 230 mm thick walls on all the four sides. The slab thickness is 150 mm, LL = 5 kN/sqm. The slab is simply supported on edges with no provision to resist tension at the corners. Also draw a neat sketch of reinforcement.

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