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ET-521(C)

B.Tech. Civil (Construction Management)

Term-End Examination

December, 2018

00553

ET-521(C) : DESIGN DETAILING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Use of IS : 456 and 800, steel tables and scientific calculator is permitted.*

1. A doubly reinforced beam whose size is limited to 300 mm × 600 mm overall is reinforced with 2 – 14 mm diameter bars in compression zone and 4 – 25 mm diameter bars in tension zone, each at an effective cover of 40 mm. The effective span of beam is 6 m. M 15 mix and Fe 250 grade steel has been used in the design of this beam. Draw the plan and section of the above beam showing the reinforcement details. *14*

2. A reinforced concrete square column of size 600 mm × 600 mm is reinforced with 8 bars of 20 mm diameter at a clear cover of 40 mm. The lateral reinforcement consists of 6 mm diameter lateral ties at 300 mm c/c. M 20 mix and Fe 415 grade steel has been used in designing the above column. Draw the plan and section of the column showing the longitudinal and transverse reinforcements with details of their spacing. *14*

3. An ISMB 250 beam transfers a reaction of 125 kN and a moment of 25 kNm to its welded connection with a flange of an ISHB 200 column. Draw neat sketches showing the details of the welded beam-column connection as per your experience. *14*

4. Draw the plan and section of a square foundation of size 3·5 m × 3·5 m. The overall depth of the foundation is 600 mm. 10 mm diameter bars @ 100 mm c/c have been provided as reinforcement in both the directions. The column is 400 mm square containing 20 mm bars as the longitudinal steel. You can use 8 nos 16 mm diameter bars as dowels. *14*

5. Define the following : *7×2=14*

(a) Actual power

(b) Apparent power

(c) Reactive power

(d) Power factor

(e) Diversity factor

(f) Tariff

(g) Connected load

6. (a) Detail a compound steel column consisting of two ISMC 200 (2 nos.) joined by single lacing by means of flats 75 mm × 8 mm at 1·50 m spacing. The connections are riveted and effective length of the column is 4·50 m. *7*

(b) Draw a neat sketch to show a column and beam joint. Also sketch the detailing of reinforcement conceptually. *7*

7. (a) Explain the basic principles of air conditioning with the help of a simple block diagram. *7*

(b) Draw the schematic diagram for a shell and tube condenser. Also explain its working. *7*

8. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) Rising Mains

(b) Design Concept of RC Frames

(c) Reinforcement Detailing of Overhead Water Tanks

(d) Voltage Regulation