

No. of Printed Pages : 4

ET-521(C)

B.Tech. Civil (Construction Management)

Term-End Examination

June, 2017

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ET-521(C) : DESIGN DETAILING

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. Use of IS 456 & 800, steel tables and scientific calculator is permitted. Any missing data may be assumed suitably.*

1. A doubly reinforced beam whose size is limited to 300 mm × 600 mm overall is reinforced with 5 – 18 ϕ bars in tension and 5 – 16 ϕ bars in compression. The effective span of the beam is 5 m. M 20 mix and Fe 415 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 column 6 m long (effective length) and 550 mm in diameter is reinforced with 8 bars of 24 mm diameter. The column carries the spiral (helical) reinforcement of 10 mm - ϕ bar wound around 24 mm diameter bars at a pitch of 50 mm. The 24 mm diameter longitudinal bars are placed with an effective cover of 40 mm. 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 300 beam transfers a reaction of 150 kN and a moment of 30 kNm to its welded connection with a flange of an ISHB 250 column. Draw neat sketches showing the details of the welded beam-column connection as proposed by you as per your experience. 14
4. A cantilever RC retaining wall retains earth up to a height of 5 m above ground level. The foundation is 1.0 m below GL. The retained earth has a density of 12 kN/m³ and an angle of internal friction $\phi = 30^\circ$. Draw suitable dimensioned sketches showing the reinforcement provided in the wall and base slab, as may be proposed by you as per your experience. 14

5. (a) Detail a compound steel column consisting of two ISMC 250 (2 nos.) joined by single lacings by means of flats 75 mm × 8 mm at 1.60 m spacing. The connections are riveted and the effective length of the column is 5.0 m. 7
- (b) Draw a typical steel roof truss with ends resting on RC columns. 7
6. (a) What are the causes of voltage fluctuations? Briefly explain the methods for correcting voltage fluctuations with respect to different causes. 7
- (b) Describe various sources of heat gain in a building. How are they quantitatively estimated? 7
7. (a) Explain the basic principles of air conditioning with the help of a simple block diagram. 7
- (b) Discuss the different factors influencing the ventilation requirements of a conditioned space. 7

8. Write short notes on the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Lighting Design
 - (b) Earthing
 - (c) Monolithic Construction
 - (d) Earthquake Loads on a Building
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