

B.Tech. Civil (Construction Management)**Term-End Examination****June, 2012**

00625

ET-521(C) : DESIGN DETAILING*Time : 3 hours**Maximum Marks : 70*

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

1. (a) An RCC framed structure has an overall plan dimension 20x45 m and a height of 66 m above the ground level. It is used for residential purpose at Mumbai. The storey height in the building is 3 m. Considering wind pressure as 1.2 kN/m^2 , determine the total wind force in X and Y directions. 7
- (b) A doubly reinforced beam whose size is limited to $350 \times 700 \text{ mm}$ overall is reinforced with 6-20 ϕ bars in tension and 5-18 ϕ bars in compression. The effective span of the beam is 6 m. M20 mix and Fe 415 grade steel has been used in the design of the beam. Draw the plan and section of above beam showing the reinforcement details. 7

2. (a) Draw to a suitable scale, a layout plan of continuous beam of size 400×800 mm over three spans. The two end spans are 8 m in length while the central one is 4 m. It is constructed monolithically with an RCC slab, 140 mm thick, which is one way continuous in direction perpendicular to the beam. The slab 20×12 m is spanning over four beams equispaced at 3 m c/c and overhanging by 0.75 m on either side. The slab is subjected to an imposed live load of 5 kN/m^2 . Assuming the slab to be 150 mm thick, draw a neat detailed sketch of the continuous slab. 10
- (b) What do you understand by a limit state? Discuss different 'limit states' to be considered in reinforced concrete design. 4
3. An ISMB 300 beam transfers a reaction of 120 kN and a moment of 25 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. 14
4. Draw a neat sketch of a dog - legged staircase for an office building, given the following data : 14
 Height between floor = 3.2 m, riser = 160 mm, tread = 270 mm, width of flight = landing width = 1.25 m, Assume slab thickness as 200 mm. Consider main reinforcement $16 \phi @ 220 \text{ c/c}$ and distributors $10 \phi @ 250 \text{ c/c}$.

5. (a) Explain different materials which can be used for form - work. 4
- (b) Draw a neat sketch of form-work for a concrete beam 1000x2500 mm. Consider floor to floor height as 10.25 m. 10
6. (a) Draw a typical sketch of a purlin supporting A.C sheets. 7
- (b) Detail a compound steel column consisting of ISMC 250 (2 Nos) joined by single lacings by means of flats 75mmx8mm at 1.50 m spacing. The connections are riveted and effective length of column is 5.0 m. 7
7. (a) Explain various sources of heat gain in a building. How are they quantitatively estimated ? 7
- (b) What are the factors that contribute to human comfort ? Explain effective temperature with respect to human comfort. 7
8. Write a short notes on *any four* of the following :
- (a) Function of duct systems 3½x4=14
- (b) Principles of air conditioning
- (c) UPS systems
- (d) Physical requirements for lifts
- (e) Allowable stress in weld
- (f) Serviceability design model
- (g) Mechanisms of bond resistance