No. of Printed Pages : **2 + Drawing Sheet**

BICE-013

B.TECH CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2013

BICE-013: STRUCTURAL DESIGN AND DRAWING - I

Time : 3 hours *Maximum Marks : **70***

Note : *Answer **any five** questions. IS 456 - 2000 and IS 800 - 2007 are allowed use of calculator is **permitted.***

1. Draw the stress-strain curve for concrete and explain how it is used in the design of an RCC beam with the help of an example. **14**

2. A One-way slab of a dining room is estimated to have a thickness of 125 mm along with thickness of finishing 75 mm. The slab is to carry a line load of 4 kN/m^2. Determine the factored load. For the slab and describe how such a slab is designed shouting reinforcement detailing. **14**

3. Design a combined footing for two square columns of size 450 and 500 mm, which are 4m apart and carry axial loads of 1000 kN and 1200 kN respectively. The Maximum Projection beyond the face of each column is restricted to 500 mm. The safe bearing capacity of soil is 200 kN/m^2. Consider steel of Fe 415 and concrete of M20 grade. **14**

4. (a) For a T - beam section of 300 mm, web width, 1500 mm flange width, 100 mm flange thickness and 500 mm effective depth, which is reinforced, with a tension reinforcement of 4-25mm Φ bars. Determine the ultimate moment of resistence. Consider concrete of M20 and steel of Fe 415 grade. 7

(b) If the tension reinforcement, in the above case, is replaced by 6 - 28 mm Φ bars, then the section will act as over reinforced or exactly balanced section ? 7

5. An I.S. angle 100x100x6 mm (fy = 250 N/mm^2) is used as a strut in a truss. The length of the strut between the intersections at each end is 3m. Calculate the strength of the strut, when 14

(a) it is connected by 2 rivets at each end.
(b) it is connected by one rivet at each end.
(c) it is welded at each end.

6. (a) Explain the design steps involved in the Plate Girder design in a sequential manner. 7

(b) Make a comparative study between welded and riveted Plate Girders. 7

7. Design the slab base for a column consisting of ISHB 300 @ 58.8 kg/m and carrying an axial load of 1000 kN. Take allowable bearing pressure on concrete as $4N/mm^2$. 14