

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2016

00776

**BICE-013 : STRUCTURAL DESIGN AND
DRAWING – I**

Time : 3 hours

Maximum Marks : 70

Note : Answer any **five** questions. IS : 456 and IS : 800 codes and steel tables are allowed. Use of scientific calculator is permitted. Assume any missing data suitably.

1. (a) Calculate the ultimate moment carrying capacity of a reinforced concrete beam section with width 250 mm, effective depth 400 mm and provided with 3600 mm² tensile reinforcement. Take M 20 grade concrete and Fe 415 steel. 7
- (b) Discuss how curing of concrete affects the quality of concrete. 7

2. (a) Design a reinforced concrete column, with spiral transverse reinforced, of 390 mm diameter subjected to an axial factored load of 1750 kN. The column is braced against sidesway and has an unsupported length of 3.3 m. The concrete mix and steel to be used in construction are of grade M 25 and Fe 415, respectively. 7
- (b) Draw a neat labelled sketch of the stress – strain curve of mild steel. 7
3. Design a simply supported R.C.C. roof slab for a hall 4 m × 10 m (inside dimensions) with 230 mm walls around. Assume a live load of 4 kN/m² and finish 1 kN/m². Use M 25 concrete and Fe 415 steel. Provide reinforcement detailing for the slab. 14
4. (a) Discuss the use and design of Lug angles. 7
- (b) Compare the merits and demerits of welded and riveted joints in steel construction. 7
5. Design a built-up column of an effective length of 5 m to carry an axial load of 900 kN using lacing flats. Use any steel section for the column. 14

6. (a) Write the classification of welded joints. 7
- (b) Discuss the nature of shear forces acting on rivets in a double cover butt joint. 7
7. Write short notes on any *two* of the following topics : $2 \times 7 = 14$
- (a) Design philosophy of limit state method
- (b) Development Length
- (c) Shear Lag
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