# Diploma in Civil Engineering / Diploma in Electrical & Mechanical Engineering

## Term-End Examination

## June, 2006

## BCE-045 : CONSTRUCTION DRAWING

*Time : 2 hours* *Maximum Marks : 70*

***Note :*** *Part A is to be attempted on answer scripts and Part B on drawing sheet. Use of calculator is allowed. Assume suitable data wherever necessary.*

## PART A

*Attempt any **five** questions only.*

**1.** Describe and show the standard layout of a drawing sheet for complete visualization of the drawing. 7

**2.** Show five symbols each for electric and sanitary installation commonly used in drawings. 7

**3.** Explain the principles of how the print of drawing is folded for easy handling and filing. 7

4. (i) What are the different combination of loads which are transmitted through the foundation to the soil below ? $3\frac{1}{2}$

(ii) Which type of drawings are required for construction of a structure ? $3\frac{1}{2}$

5. What are the methods of protection of reinforced cement concrete structure against sulphate and chloride attack ? 7

6. How is a mat or raft footing designed ? Show by a sketch the reinforcement details of a mat footing. 7

7. Mention the specifications for the reinforcement of under-reamed piles. 7

8. Show by the line diagrams the various members of a King post and Queen post wooden trusses and mention upto what spans each one can be used. 7

9. Sketch a Quarter Turn Staircase. 7

## PART B

*Attempt Question No. 1 which is* ***compulsory*** *and attempt any* ***one*** *question from the remaining.*

**1.** Prepare the working drawing for the foundation of a brick masonry external wall with lime concrete base. The design data is given below :

Thickness of wall = 250 mm

Width of footing = 1·500 m

Depth of footing below G.L. = 1·250 m

Plinth level above G.L. = 0·50 m *10*

**2.** The size of an office floor is 3·5 m × 5·25 m effective. The floor is designed as a two-way reinforced R.C.C. slab simply supported on all its four edges with corners prevented from lifting up. The design data is given below :

Overall depth of slab = 165 mm

Reinforcement along short span = 10 $\phi$ HYSD bars @ 250 c/c

Reinforcement along long span = 10 $\phi$ HYSD bars @ 300 c/c

Prepare the structural working drawing for the floor in the following manner :

(i) A section of floor along short span. *8*

(ii) A section of floor along long span. *8*

(iii) A plan of the floor showing reinforcement in plan for torsion at the corners. *9*

**3.** A combined rectangular footing with strap beam for two R.C.C. columns spaced 5 m centres apart is designed. Column A is 350 mm square, carries a load of 750 kN and is located on the property line. Column B is 400 mm square, carries a load of 1200 kN. The design data is given below :

Width of footing = 1·5 m

Length of footing beyond the centre of column B = 1·2 m

Overall depth of footing = 250 mm

Main tensile reinforcement of footing = 16 $\phi$ HYSD bars @ 180 c/c

Distribution reinforcement of footing = 10 $\phi$ HYSD bars @ 200 c/c

Size of Strap Beam

Width of beam — 500 mm

Overall depth of beam — 1000 mm

Main tensile reinforcement of beam — 6 No. — 22 $\phi$ HYSD

Main tensile reinforcement in the cantilever part of the beam 3 No. — 22 $\phi$ HYSD

Shear reinforcement in the beam —

10 $\phi$ four legged stirrups @ 180 c/c upto 1·8 m at each end and in the cantilever position. In the remaining length of the beam nominal shear reinforcement.

Prepare the structural working drawing for the combined rectangular footing in the following manner :

(i) Plan of the rectangular combined footing 5

(ii) Longitudinal section of the strap beam 10

(iii) Cross-section of the footing 10