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BCE-045

DIPLOMA IN CIVIL ENGINEERING
DCLE(G) / DCLEVI
Term-End Examination
June, 2015

00551

BCE-045 : CONSTRUCTION DRAWING

Time : 2 hours *Maximum Marks : 70*

Note : *Part A is to be attempted on the answer script and Part B on the drawing sheet. Use of calculator is allowed.*

PART A

*Attempt any **five** questions from the following :*

1. What is the purpose of using standard abbreviations in drawings ? Give the standard abbreviations for the following : *2+5=7*

(a) Approximate

(b) Left Hand Side

(c) Right Hand Side

(d) Window

(e) Mild Steel

2. (a) What are the standard categories of scale ? Explain briefly. $3\frac{1}{2}$

(b) Explain which types of drawings are required for the construction of a structure. $3\frac{1}{2}$

3. Design the foundation for a 250 mm thick brick masonry wall carrying a load of 120 kN/m with cement concrete base. 7

Given :

Safe bearing capacity of the soil = 100 kN/m^2

Angle of repose of the soil = 30°

Unit weight of the soil = 20 kN/m^3

4. (a) Under what circumstances are the following foundations provided : 3

(i) A combined footing

(ii) A raft foundation without beams

(iii) A raft foundation with beams

(b) Show by means of neat sketches the plan of a raft foundation without beams and the typical reinforcement details in section. 4

5. Mention the various types of wooden lengthening joints. Where are they used ? Explain any one such type of joint by means of neat sketches. 7

6. (a) Why is a steel roof truss preferred to a wooden truss ? $3\frac{1}{2}$

(b) Mention the differences between a Howe truss and a Pratt truss. $3\frac{1}{2}$

7. What are the methods of protection of reinforced cement concrete structures against chloride attack ? 7

PART B

*Attempt question number 8 which is **compulsory** and any **one** question from the remaining. Adopt suitable scale and any missing data wherever required.*

8. Prepare a spread foundation for a brick masonry internal wall with lime concrete base for the following data : *12*

The thickness of the masonry 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

9. A combined rectangular footing with strap beam connects two RCC columns of size 300 mm square which carry equal loads. Design data is as under :

- Size of the footing – 1·5 × 6·0 m
- Overall depth of the footing – 300 mm
- Main tensile reinforcement – 10 ϕ HYSD bars @ 200 c/c
- Distribution reinforcement – 8 ϕ HYSD bars @ 250 c/c
- Overall depth of the beam – 600 mm
- Width of the beam – 400 mm
- Tension reinforcement of the beam – 4 bars 22 ϕ HYSD
- Tension reinforcement in the cantilever portion of the beam – 3 bars 22 ϕ HYSD
- Shear reinforcement of the beam throughout – 8 ϕ HYSD Four legged stirrups @ 250 c/c

Prepare the following structural drawing for the footing : 23

(a) L-section of the strap beam

(b) Cross-section of the footing

10. A T-Beam floor in an office building consists of an RCC slab spanning between ribs spaced at 2·5 m c/c. The effective size of the floor is 5 m × 10 m and the effective size of the T-beam is 5·0 m. The design data is given below :

- Overall thickness of the floor slab : 110 mm
- Tensile reinforcement of the slab : 8 ϕ HYSD bars @ 150 mm c/c
- Distribution reinforcement of the slab : 6 ϕ bars @ 300 c/c
- Overall depth of the beam : 400 mm
- Width of the beam : 250 mm
- Tensile reinforcement of the beam : 4 – 16 ϕ HYSD bars
- Shear reinforcement of the beam : 8 ϕ HYSD two-legged vertical stirrups @ 170 mm c/c, 5 Nos. at each end and nominal shear reinforcement in the rest.

Prepare the following working structural drawing of the T-beam floor : 23

(a) L-section of the T-Beam

(b) Section of the floor so that the X-section of the beams is also seen