

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019**

STRUCTURAL AND IRRIGATION ENGINEERING DRAWING

[Time : 3 hours

(Maximum marks : 100)

- [Note :—1. Missing data may be suitably assumed.
2. Steel tables are permitted.
3. A2 size drawing sheet to be supplied.
4. Drawings shall be neat and fully dimensioned.
5. Answer one full question from each unit.]

Marks

UNIT — I

- I An RCC square column footing has the following details :

Column — 350 × 350 mm Clear cover to Column Reinforcement — 40mm

Column reinforcement 8 Nos. — 16mm Dia. Lateral ties — 8mmΦ @ 150mm C/C

Column footing : Lean concrete — PCC 2100 × 2100 × 120 mm

Square footing — RCC 1800 × 1800 × 250 mm.

Pyramidal footing — 600 mm Thickness has Top dimension — 500 × 500mm and

Bottom dimension — 1800 × 1800 mm

Footing reinforcement : 12 mm Φ — 12 Nos. in each direction.

Draw : (a) Plan of footing with reinforcement and column reinforcement. 10

(b) Sectional elevation showing reinforcements. 15

OR

- II A doubly reinforced beam has the following particulars :

Clear span of beam — 4.8 m. End bearing = 250mm on each end

Wall thickness — 300mm

Cross section of beam — 300 × 400 mm.

Clear cover to Stirrups — 25mm. Beam — tension reinforcement : 3 Nos. of 22 mmΦ
with central bar bend up at 0.15 × effective span. Compression reinforcement
2 Nos. — 16mmΦ

Stirrups 8mmΦ @ 100mm C/C up to 0.15 × effective span and remaining
@ 125mm C/C.

Draw : (a) Cross section of the beam at centre and support. 10

(b) Longitudinal section. 15

III A retaining wall with earth face vertical has the following details :

Stem : Top width — 250mm Bottom width — 600mm Natural G L — + 10.00
 Top level of Retaining wall — + 14.500 Top level of base slab — + 9.50.
 Thickness of base slab — 600mm. Toe projection — 1000mm Heel projection — 1800mm
 Reinforcements Stem — Main steel — 16mm Φ @ 100mm C/C. Alternate bars curtailed
 at 1/3 height from top. Distributors 12mm Φ @ 150mm C/C. Temperature steel :
 10 mm Φ @ 150 mm C/C in both direction. Toe and Heel steel: 16mm Φ @ 120mm C/C.
 Distributors : 10mm Φ @ 150mm C/C.

Draw : (a) Longitudinal elevation of stem reinforcement with curtailment. 10
 (b) Cross Sectional elevation of retaining wall and base slab. 15

OR

IV An elevated open circular water tank at 12m height from GL has these details :

RCC Columns — 6 Nos. 450mm Diameter. Water tank inside diameter — 4.6m.
 Water Tank wall thickness = 200mm. Height of tank = 2.5m. Bottom slab
 thickness = 200mm. Projection beyond ring beam 1.00m all round. Provide a hand
 rail of 1m height at the outer edge. Ring beams and Brace beams — 6 Nos. —
 300 × 300mm is provided equally Spaced from ground level to bottom of slab.
 Inlet = 100mm Φ and outlet = 150mm.

Draw : Cross sectional elevation from G L of elevated water tank. 25

UNIT — III

V A beam of ISLB 400 @ 56.9 Kg is connected to the flange of a column of
 ISHB 250 @ 51Kg/m. Seat and flange angles are 75 × 75 × 8mm.
 Cleat angles 90 × 90 × 8mm on each side of the web of beam and flange of column
 for a length of 240mm. Rivets of 16 mm Φ are used to connect all members.

Draw : (a) Elevation 15
 (b) End view (beam in section). 10

OR

VI A gusset column base with welded connection has the details as follows :

Concrete pedestal — 900 × 900 × 900 mm.
 Base plate — 700 × 700 × 20mm
 Column — ISWB 400 @ 82.2Kg/m. Flange plates — 300 × 12 mm on each flange.
 Gusset plate — 425mm height and 12mm thick with 125 mm vertical and there after
 Slopped to the edge of flange plate. Gusset angle — 125 × 100 × 10 mm on each
 gusset. Cleat angles — 90 × 90 × 6 mm on either sides of web for a length of 120 mm.

Draw : (a) Sectional plan. 10
 (b) Elevation from the side of flange. 15

UNIT — IV

- VII Draw to suitable scale — Longitudinal Section of canal drop with water cushion U/S
 Bed level + 12.00, FSL + 13.50. Bank top level +15.00. Width of canal —7m
 Drop Wall : Top level + 12.00, bottom Level + 8.600
 Top width 1.2m and bottom width 3m. Thickness of solid apron 60cm,
 Length of solid apron = 6m and length of sloping grouted apron = 5m with 60cm thickness.
 Bed level of D/S + 9m Top of D/S bank level + 12.50
 Assume suitable abutment and wing walls.

25

OR

- VIII (a) Draw : The Plan of the septic tank for given dimensions :
 Size of tank — 3600 × 1000 × 2000 mm. PCC 1:4:8, 150mm thick
 Brick masonry — 200mm thick in CM 1:5 Water depth — 1400mm
 Inlet and out let — 100mm Φ with inspection chambers of 500 × 500mm at both ends.
 Plastering over walls — 15mm thick in CM 1:4. Cover slab — 100mm thick at GL.
 Suspended Baffle wall — 50mm thick at 1.2m from inlet.
 Soak pit 1200 × 1200 × 1500 mm.
- (b) The hydraulic particulars of a surplus escape (core will type) are as given below :
 Top of bund level — + 100.50
 Top width of bund — 200cm
 Side slope U/S and D/S — 2:1
 Maximum water level : — + 99.00
 Full tank level — + 98.00
 Top apron level — + 97.00
 Thickness of solid and grouted apron — 60cm
 Top width of body wall — 750mm
 Bottom width of body wall — 900mm
 Width of foundation — 150cm.
 Thickness of foundation — 100cm
 Length of solid apron — 300cm
 Size of cut off wall — 60 × 90cm
 Length of grouted apron — 3600mm including cut off wall
 Draw the Sectional elevation of the surplus escape across the body wall.

10

15