

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

**STRUCTURAL & 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 Following are the details of a simply supported one way slab.

Clear short span = 2.8m. Clear long span = 6.00m.

Wall thickness = 200 mm. Over all depth of slab = 120 mm

Reinforcement details :

Main steel-10mm  $\Phi$  HYSD bars @ 150mm C/C alternate bars bent up.

Distributors - 8mm  $\Phi$  HYSD bars @ 220 mm C/C.

Provide extra rods 3 Nos. of 10mm  $\Phi$  HYSD bars over cranked portion.

Provide clear covers of 20mm at bottom, top and sides.

Draw : (a) Section along shorter span. 10

(b) Plan showing bottom reinforcements. 15

OR

II Following are the specifications of a lintel with sunshade.

LINTEL Clear span — 2000mm. End bearings = 200mm on each end

Size 300 × 175mm. Projection of shade beyond outer wall = 600 mm.

Thickness of shade at free end - 50mm and at fixed end - 100mm.

Reinforcement : Lintel Main steel 3 Nos. of 12 mm  $\Phi$  bars one of them bent up and 2 Nos. of 8mm stirrup holder and Stirrups - 6mm  $\Phi$  @ 120mm C/C.

Shade main Reinforcement - 8mm  $\Phi$  @ 100mm C/C and 4 Nos. of 6mm dia. distributors.

Draw : (a) Cross section of lintel with sunshade 10

(b) Longitudinal section of lintel. 15

## UNIT — II

III An RCC dog legged stair case has the following details.

Stair room clear size  $4.25 \times 2.2 \times 3$  m Landing and flight width 1.00m

Support at G L 900mm wide and 450mm depth, Wall thickness = 230mm

Tread - 250mm -9 Nos. in each flight. Rise - 155 mm. Thickness of waist slab and Landing slab - 100mm.

Reinforcements : Waist slab – Main steel -12mm  $\Phi$  @ 100 mm C/C.

Distributors 8mm  $\Phi$  @ 120mm C/C

Draw : (a) Plan and layout of steps. 10

(b) Longitudinal sectional elevation of first flight with Rft details. 15

OR

IV The details of a R C C T - beam and slab bridge are given below.

Clear width of roadway 6.7m, footpath on either side 1.5 m wide are provided.

Number of beams 3 Nos. Size of rib of beam  $1800 \times 450$  mm. Thickness of slab 200 mm.

Reinforcement : In slab 20 mm diameter rods at 170 mm C/C continuous over beams.  
Distributors 16 mm dia rods at 220 mm C/C.

Beam Reinforcement details - 6 Nos. of 38 mm dia rods provided in 2 rows.

Stirrups : 4 legged vertical stirrups 8mm dia at 200mm C/C.

Bed blocks : R. C. C. bed blocks 7.3 m long, 60 cm width and 30 cm thick.

Footpath slab : R. C. C. slab of 75 mm thick. Bed level of stream 6.4 m below top of roadway.

Hand rails assume suitable section. Kerb : Width of kerb 300 mm and it projects above the top of the road surface by 220 mm.

Draw : The cross section of the T beam and slab bridge. 25

## UNIT — III

V A plate girder for a bridge with 15m span has following structural steel sections.

Web plate -  $1500 \times 8$  mm. Flange angles - 2 Nos. back to back with  $150 \times 115 \times 10$ mm at top and bottom. Flange plates 2 Nos. -  $450 \times 10$  mm on each flange.

Stiffeners -  $100 \times 75 \times 10$  mm spaced @ 1 m C/C. Rivets - 18mm  $\Phi$  at 150mm pitch.

Draw : The cross section at centre of the plate girder. 25

OR

VI The details of a compound column with batten are as given.

Column – 2 Channels ISLC 250-28Kg/m placed back to back at 150mm clear spacing.  
End battens – at top and bottom  $350 \times 250 \times 10$ mm with 3 Nos. of 20mm dia. rivets on each side.

Intermediate battens -  $350 \times 225 \times 10$ mm with 2 Nos. of rivets on each side.

Intermediate battens are provided at a clear spacing of 650mm from end battens and at 700mm between intermediate battens.

Draw : (a) Sectional plan 10

(b) Sectional elevation 15

## UNIT — IV

VII Draw the longitudinal section of a tank sluice with tower head for following details.

TANK Bund top width = 2m and level- + 100.00m Side slopes 2:1

MWL + 99.00m. FTL + 98.250m.

Good foundation is available at + 94.00m. Bed level of sluice barrel + 94.60m.

Sluice barrel : 600 × 750mm with cover slab of 120mm thickness.

Side walls of 450mm top width and 600mm bottom width. Inside Diameter of tower head 1.00m.

Thickness of Well steining - 450mm at top and 600mm below.

CHANNEL Bed width - 1.2m side slope 1 : 1

Top of channel bund- + 96.10m.

D/S cistern - 2 × 2m with side walls of 450mm.

25

OR

VIII (a) Draw (1) The Plan of the septictank for given conditions

Size of tank - 4000 × 1200 × 2100 mm. Bottom PCC 1:4:8 150mm thick.

Brick masonry - 230mm thick in CM 1:5 Water depth 1500mm.

Inlet and out let pipes -100mm dia with 600mm square inspection chambers 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 for a water depth of 0.70m.

Soak pit 1200 dia and 1500 mm depth.

10

(b) Draw to suitable scale - (1) Long. Section of canal drop with water cushion

U/S Bed level + 9.00, FSL + 10.50. Bank top level +12.00. Width of canal - 7 m

Drop Wall : Top length of drop - 5m, Top level + 9.00, bottom Level + 5.600

Top width 1m and bottom width 2.7m. Thickness of solid apron 60cm,

Length of solid apron = 6m

Length of sloping grouted apron = 5m with 60cm thickness.

Bed level of D/S + 6.40m, Top of D/S bank level + 9.50

Assume suitable Abutment and wing walls.

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