

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/
COMMERCIAL PRACTICE - NOVEMBER-2021**
STRUCTURAL AND IRRIGATION DRAWING

[Maximum marks: 75]

(Time: 2.15 Hours)

[Note:- 1. Use of steel tables are permitted.

2. Missing data if any may be suitably assumed.
3. A2 size drawing sheet to be provided.
4. Drawing shall be neat and fully dimensioned.
5. Answer **any one** from **Unit - I**
6. Answer **any one** from **Unit - II**
7. Answer **any one** from **Unit – III or IV]**

Marks

UNIT – I

I. Simply supported one way slab has the following specification.

Clear short span = 3 m. Clear longer span = 6.6 m

Wall thickness = 35 cm. Over all depth of slab = 12cm

Reinforcement details:- Main steel: 10mm Φ HYSD bars @ 120mm C/C alternate bars bent up,Distributors : 8 mm Φ HYSD bars @250 mm C/CProvide extra rods 4 Nos of 10mm Φ HYSD bars over cranked portion.

Provide clear covers of 15 mm at bottom, top and at sides 20mm.

Draw:- i) Cross section along shorter span. (15)

ii) Plan showing bottom reinforcement. (10)

OR

II. Draw the plan and sectional elevation of a rectangular RCC column footing showing the reinforcement in the footing and in column.

P.C.C 2.0 x 1.8 m, 1:4:8, 200 mm depth Base slab – 1.8 x 1.6 m, depth 400 mm.

Column size – 300 x 299 mm. Column main bar – 6 Nos. 16 mm dia.

Base slab – 1:1.5:3, 12mm dia bars @ 100 mm c/c along shorter side and 150 mm along longer side. Lateral ties 10 mm dia @ 200 mm c/c (25)

UNIT - II

III. An RCC Dog legged Stair case has the following details,

Stair room clear size 4.25 x 2.2 x 3m. Landing and flight width 1.00 m

Support at GL – 900 mm wide and 450 mm depth, Wall thickness : 230 mm

Tread – 300 mm – 9 Nos. In each flight. Rise – 150 mm.

Thickness of waist slab and landing slab – 100 mm.

Reinforcements: Waist slab – Main steel – 12 mm Φ 100 mm C /C

Distributors 8 mm Φ @ 120 mm C/C

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

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

OR

IV. A Keyed cantilever retaining wall has the following details:

Size of base slab – 330 x 50 cm

Stem 70 cm thick at the bottom and 40 cm at top. Height of stem-400 cm

Earth face vertical, key 100 x 40 cm

Stem reinforcement: Main 16 mm bar @ 20 cm c/c

Alternate bars are curtailed at 150 cm and 300 cm from top of base slab

Distribution bars: 12mm dia @ 250 mm c/c

Expose face reinforcement : main bars 12mm dia @ 25 cm c/c

Distribution bars: 10 mm dia @ 30 cm c/c

Heel reinforcement : 16 mm dia @ 18 cm c/c both ways. Tow reinforcement main bars 16 mm dia @ 15 cm c/c. Distribution bars 12 mm dia @ 20 cm c/c

Draw the section across the stem showing all details. (25)

UNIT – III

V. A build up column with lacing bars with the following particulars:

Column two channel section ISLC 225-24 kg placed back to back with a clear distance of 130 mm, lacing bars – single lacing system-size 63 x 10mm, inclination 45 degree lacing bar will be connected to the channel by means of two rivets 20mm dia at each side. The plates each of size 310 x 200 x 10 mm is provided at the two ends of the column

Draw: (a) Sectional plan (10)

(b) Elevation (15)

OR

VI. The details of a plate girder is given below:-

Flange plate – 2 Nos. of 480 mm x 10 mm plates on each flange

Flange angles – 150 x 115 x 10mm

Web plate – 1600 x 8 mm. Rivets – 18mm dia rivets at 16 cm pitch

Stiffeners – 100 mm x 75 x 10 mm

Draw the cross section of the plate girder showing the connection of stiffeners of web plates. (25)

UNIT – IV

VII. A septic tank have the following details:-

Size of tank – 4500 x 1500 x 2000 mm. Bottom PCC 1:4:8 150 mm thick

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

Inlet and outlet pipes – 100 mm dia

Plastering over walls – 15mm thick in CM 1:4, Cover slab – 100 mm thick at GL.

Suspended Baffle wall 50 mm thick RCC 45 cm depth at 1300 mm from inlet.

Base concrete having 20cm thick at inlet and 30cm thick at outlet (Projecting 15cm around the wall). Free board : 50 cm. Roof slab 12 cm thick precast slab.

Draw:- (a) Sectional plan (15)
(b) Longitudinal section (10)

OR

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

Tank Bund:- Top width = 2 m and level + 100 m. Side slope 2:1

MWL +99.0 m. FTL +98.25m

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

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

Side walls of 450 mm top width and 600 mm bottom width.

Inside walls of 450 mm top width and 600 mm bottom width.

Inside diameter of the tower head 1.00 m.

Thickness of well staining – 450 mm at top and 600 mm below

Channel bed width :- 1.2 m side slope 1:1

Top of channel bed - +96.10 m

D/s cistern x 2x2 m with side wall of 450 mm. (25)
