

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2024**

STRUCTURAL & IRRIGATION ENGINEERING DRAWING

[Maximum marks: 100]

(Time: 3 Hours)

- Note: -1. Missing data if any, maybe suitably assumed.
2. Use of Steel tables are permitted.
3. A2 size drawing sheet to be supplied.
4. Drawing shall be neat and fully dimensioned.
5. Answer one full question from each unit.

UNIT-I

- I. A R.C.C. Beam is reinforced with 7nos of 16mm Fe 450 bars in which 3 nos are in compression zone. It is provided with 10mm diameter stirrups at 200mm c/c, the depth of the beam is 350mm and clear span is 3 meters. Thickness of wall and beam are 250mm. Shear reinforcement with 2 nos of extra bars 12mm dia at both ends.

- Draw: (a) Longitudinal section. (15)
(b) Cross section at support and mid-span. (10)

OR

- II. An isolated column with footing has the following details:

Column size: 300 x 300mm.

Column main reinforcement consists of 4 nos 16mm dia bars and ties 8mm dia bars at 150mm c/c.

Size of footing: 160 cm x 160 cm.

The depth of the base concrete levelling course is 10 cm.

The depth of footing at the column face is 40 cm and at the edge is 20 cm.

The reinforcement in the footing consists of 14 nos. of 10mm diameter bars in two directions.

- Draw: (a) Sectional elevation at center (15)
(b) Plan showing reinforcement details of footing (10)

UNIT-II

III. A dog legged stair case has the following details:

Room size 5m x 2.5m. Floor height 3m.

Wall thickness 300mm. Slab thickness 125mm.

Landing 1m wide. Rise 125mm and tread 250mm.

Main reinforcement: 10mm ϕ @ 150mm c/c alternate bars bent up.

Distributors: 8mm ϕ @ 180mm c/c.

Provide suitable footing at ground floor and extra reinforcement at joints.

Draw (a) Sectional elevation.

(15)

(b) Plan.

(10)

OR

IV. An R.C.C. elevated water tank has following specifications:

Height of tank above ground level to the bottom of water 9.8 m

Inner dimensions of the tank: 4500 x 4500 x 1500 mm

Thickness of side walls and bottom slab 200 mm.

Size of column: 400 x 400 mm

Size of beams: 400 x 300mm

Spacing of beams: 3000 mm

Depth of R.C.C. footing below ground level: 1000 mm

Size of footing: 1500 x 1500 mm

Thickness of footing at column face: 450 mm

Thickness of footing at end: 150 mm

Draw: (a) The sectional elevation showing all the details.

(15)

(b) Plan

(10)

UNIT-III

V. A single laced built-up column has the following details:-

Column - ISLC 150 x30 at 125 mm back-to-back

Lacing - 60 x 10mm @140mm c/c

Tie plate - 80 x 12mm

Rivets - 20mm dia. (3nos)

Draw (a) Elevation.

(15)

(b) Plan

(10)

OR

VI. Detail of a plate girder of effective span of 18m are given below:

Over all depth: 1850mm. Web plate 1800 x 8mm. Flanges: 2 plates 480 x 10mm.

Flange angles: 2 angles ISA 150mm x 115mm x 10mm.

All connections are made with 18mm dia. rivets. Concrete bed 20cm thick

Base plate 500 x 500 x 25mm.

Top flange plate is curtailed at 2m from both ends.

Intermediate stiffeners: 2 angles ISA 100 x 75 x 10mm.

Bearing stiffeners: 4 angles ISA 130 x 130 x 12mm

Draw: (a) Cross section of plate girder at center.

(15)

(b) Cross section of plate girder at support.

(10)

UNIT-IV

VII. A masonry dam has the following particulars:

Bed level: + 0.00m

Bottom level of c.c.foundation : (-) 4.0m

Full reservoir level: + 10.00m

Maximum Water level: + 11.50m

Road level : +14.5m

D/S apron level: (-) 2.00m

Width and thickness of c.c foundation: 22m and 2m

Width of road: 6.00m

Parapet: 0.5 x 1.5 masonry

Thickness of apron: 0.50m

Provide other details suitably

Draw the cross section showing all details.

(25)

OR

VIII. A tank sluice with tower head has the following details:

Thickness of foundation 400mm

Full tank level +37.00m

Maximum water level +38.00m

Revetment level +38.50m

Bund top level +40.00m

Tail channel level +34.00m

Branch bund top level +35.00m

Still basin top level +35.5m

Main bund top width 2.50m

Side slope 1 in 2 on both faces

Tower head well: Masonry wall 0.40m thick diameter 1.20m

Rectangular barrel 1.00 x 0.60m

Barrel foundation PCC 1:4:8 0.40 m thick

Still basin 2.50 x 4.50m

Length of bed 25.50m

All missing data assume suitably

Draw : (a) Longitudinal section (15)

(b) Sectional plan through barrel (10)
