

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

**STRUCTURAL AND IRRIGATION ENGINEERING DRAWING**

(Maximum Marks:100)

(Time: 3 Hours)

- Note:-
1. Missing data may be suitably assumed.
  2. 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.

**Marks**

**UNIT – I**

- I. An RCC cantilever beam resting in RCC column of size 0.30 x 0.5 m of reinforcement of 4 nos. of 16 mm diameter bars. The bearing in column is 0.5m. The size of beam is 0.30 x 0.50 m at fixed end and 0.30 x 0.25 m at free end. Main reinforcement 16 mm diameter 4 nos. and compression reinforcement 12 mm diameter 2 nos. two legged stirrups 8 mm diameter @ 250mm c/c are provided.
- Draw: (a) Longitudinal section of the beam. (15)
- (b) Cross section at fixed end and free end (10)

**OR**

- II. An RCC simply supported beam is reinforced with 8 nos. of 16mm diameter bars in which 4 nos. are in compression zone and 4 nos. are in tension zone. It is provided with 6 mm diameter stirrups at 220 mm c/c. the size of the beam is 300 x 400 mm and clear span is 4500 mm. the thickness of wall is 300mm
- Draw: (a) Longitudinal section. (15)
- (b) Cross section of the beam at centre and support. (10)

## UNIT – II

- III. An RCC Dog legged stair case has the following details.  
Stair room size 5.50 x 3.3 x 3 m.  
Landing and flight width 1.00m.  
Wall thickness 250 mm, tread – 300mm, Rise – 150 mm  
Thickness of waist slab and landing slab – 100 mm  
Reinforcement : Main bars 16 mm  $\phi$  @ 150 mm c/c  
Distributors 8 mm  $\phi$  @ 180 mm c/c  
Draw : (a) Plan and layout of steps (10)  
(b) Longitudinal section showing the reinforcement details (15)

### OR

- IV. A Keyed cantilever retaining wall has the following details:  
Size of base slab-540 x 75 cm  
Stem 80 cm thick at the bottom and 30 cm at top. Height of stem-690 cm  
Earth face vertical, key 90 x 30 cm  
Stem reinforcement: Main bar 12 mm @ 15 cm c/c  
Alternate bars are curtailed at 140 cm and 280 cm from top of base slab  
Distribution bars: 10mm dia @ 25 cm c/c  
Expose face reinforcement: main bars 12mm dia @ 24 cm c/c  
Distribution bars : 10 mm dia @ 28 cm c/c  
Heel reinforcement : 16 mm dia @ 18 cm c/c both ways. Toe reinforcement main bars  
16 mm dia @ 16 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 double laced built up column has the following details  
Column – ISLC 150 x 30, at 125 mm back to back  
Lacing – 60mm x 10mm  
Tie plate – 80mm x 12mm  
Rivets – 3 Nos of 20mm diameter  
Draw (a) Plan (10)  
(b) Elevation of column for 3 lacings from bottom (15)

### OR

- VI. Draw the plan and elevation of the gusseted column base to a suitable scale with the following details. (25)

Steel Column	ISHB 300 @ 58.8 Kg/m
Base Plate	800 x 500 x 20
Gusset Plate	15mm thick
Web cleat	ISA 90 x 90 x 10
Base plate	ISA 100 x 100 x 10
Rivets connecting column Flange and gusset Plate	16mm dia @ 200 c/c
Rivet connecting each gusset angles and base plate	16mm dia 8 No. each
Rivet connecting gusset and gusset angle	16mm dia 8 No. each

#### UNIT – IV

- VII. Draw the sectional plan and longitudinal section of a septic tank 4.50 x 2.20(internal dimension) of the following particulars. (25)

Wall thickness	30 cm
Inlet and Outlet pipe	10 cm dia
Baffle wall provided 160m from inlet	5cm thick, 1.80 m height
Depth of tank	2.50 m
Base Concrete	Slope 1 in 20
Free board	50 cm
Roof slab	15cm thick

**OR**

- VIII. Draw the longitudinal section elevation of tank sluice with tower head. The details are follows:

Top bund level : +75.00

Maximum water level : +73.00

Full tank level : 72.00

Bed level : +70.00

Ground : 68.50

Bund details:

Top width: 2m, Side slope up stream side: 2:1, Side slope downstream side: 2:1

Tower details:

Well diameter: 1.3m, Well thickness: 40cm and 60cm and Top level + 73.50,

Sluice barrel: 50 x 85 cm (side wall top 40 cm, bottom 95 cm)

Thickness of concrete foundation under sluice barrel : 60cm

Downstream side

Rectangular basin dimension : 5.75m x 2.7m and depth 1.7 m

Tank bund level : 71.50 m

Rough stone pitching may be provided for the earth work

wherever necessary

(25)

\*\*\*\*\*