

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

STRUCTURAL AND IRRIGATION ENGINEERING DRAWING

[Time : 3 hours

(Maximum marks : 100)

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

UNIT — I

Marks

- I An R.C.C beam is reinforced with 7 Nos. of 16mm diameter bars in which 3 Nos. are in compression zone and 4 Nos. are in tension zone it is provided with 10mm diameter stirrups at 200mm c/c. The size of the beam is 300 × 500 mm and clear span is 5000 mm. The thickness of wall is 300mm.

Draw : (a) Longitudinal sectional elevation.

15

(b) Cross section of the beam at centre and support.

10

OR

- II An R.C.C. cantilever beam resting in R.C.C. column of size 0.30 × 0.45 m of reinforcement of 6 nos. of 16 mm diameter bars. The bearing in column is 0.45m. The size of the beam is 0.30 × 0.60 m at fixed end and 0.30 × 0.30m at free end. Main reinforcement 16mm diameter 4 nos. and compression reinforcement 12mm diameter 2 nos. Two legged stirrups 8mm diameter @ 200mm c/c are provided.

Draw : (a) Longitudinal section of the beam.

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(b) Cross section at free end and fixed end.

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UNIT — II

- III (a) 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 × 4500 × 1500 mm
Thickness of side walls and bottom slab 200 mm
Size of column: 400 × 400 mm
Size of beams : 400 × 300mm
Spacing of beams : 3000 mm
Depth of R.C.C. footing below ground level: 1000 mm
Size of footing: 1500 × 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

OR

IV The details of dog legged stair are given below :

Room Size : 5000 × 2200 mm

Height of room: 2900 mm

Wall thickness: 230 mm

R.C.C. Landing slab thickness: 125 mm

R.C.C. Waist slab thickness: 150 mm

Clear width of landing: 1000 mm

Provide necessary tread, rise, footing and reinforcement.

Draw : (a) The longitudinal sectional elevation

15

(b) Plan

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UNIT — III

V A Battered column has the following details.

Column : ISLC 150 × 30 mm placed back to back keeping a clear distance of 125 mm between the webs. The column is provided with batten system. The sizes of end battens are 180 × 12 mm and intermediate battens are 150 × 12 mm spacing between the consecutive battens 450mm c/c.

Draw : (a) Elevation

15

(b) Plan

10

OR

VI Two steel beams mutually intersects the details given below :

Main beam ISLB 500 @ 750N/m (or 500 × 200 × 10mm)

Secondary beam ISLB 300 @ 372N/m (or 300 × 120 × 8mm)

Cleat (web) angle 2 × ISA 90 × 90 × 8 mm

Flange angle 2 × ISA 100 × 75 × 8 mm

Main beam cover plate 250 × 10mm

16mm diameter rivets provided suitably.

Draw : (a) Connection showing main beam in section.

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(b) Connection section showing secondary beam in section.

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UNIT — IV

VII A masonry dam having the following particulars :

Foundation bottom level + 75.00m

Foundation level + 75.00

River bed level + 87.50m

Maximum water level + 138.00m

Full reservoir level + 137.00m

Top level of dam + 139.00

Width of top crest 6.00m, depth of PCC 0.30m

Bottom width of dam 185.36m

Upstream side

- Vertical between levels + 125.00m and 139.40m.
- Tapering 1 in 9 between levels + 101.00m and + 125m
- Tapering 1 in 6 between levels + 75.00 and + 101.00m

Downstream side

- Curved portion between levels + 125.00m and 139.40m
- Tapering 1 in 1.4 between levels + 101.00m and + 125.00m
- Tapering 1 in 1 between levels + 75.00m and + 101.00m

Irrigation sluice

- Low level sluice 2.10 × 4.20m, sill level + 101.00m
- Upper level of sluice 3.15 × 4.80m, sill level + 116.00m
- Drainage gallery size 1.50 × 2.25m
- Drainage gutter 300 × 300mm
- The main portion of the dam is built with stone masonry in cement mortar 1:4 and Impervious facing is with cement concrete 1:2:4 thickness 0.30m.
- All missing data assume 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 1.20 m
- Rectangular barrel 1.00 × 0.60m
- Barrel foundation PCC 1:4:8 0.40 m thick
- Still basin 2.50 × 4.50 m
- Length of bed 25.50m
- All missing data assume suitably

Draw : (a) Longitudinal section.

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(b) Sectional plan through barrel.

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