

SIXTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—OCTOBER, 2014

STRUCTURAL AND IRRIGATION ENGINEERING – DRAWING

(Common to CE, EN and WR)

[Time : 3 hours

(Maximum marks : 100)

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

Marks

UNIT—I

- I A beam of 300 mm × 450 mm is supported on walls of 300 mm thick is provided over a 3 meter opening. The reinforcement details are given below :

Main reinforcement	:	3 nos. 16 mm ϕ (1 no. bent up)
Stirrup holder	:	2 nos. 12 mm ϕ
Stirrups	:	8 mm ϕ @ 200 mm c/c

Draw the following views of the beam to suitable scale.

- (a) The longitudinal section.
(b) The cross section at middle span and at support.

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OR

- II Draw the plan and cross section of a square footing for an RCC column showing the reinforcement details :

Footing	:	1.5 m × 1.5 m size. Depth 200 mm, 8 numbers 12 mm ϕ bars in each direction. Clear bottom and side cover 50 mm.
Column	:	Size 200 mm × 200 mm. Main bars 4 numbers 16 mm ϕ lateral ties 6 mm ϕ @ 180 mm c/c. Clear cover 25 mm.

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UNIT—II

- III Draw the half sectional elevation of a T-beam slab bridge having following details :

Clear span	:	10 m
Road width	:	4 m
Bed level	:	0.00
Road level	:	+ 6.00
Foundation	:	PCC 60 cm thick and 120 cm width
Beam depth	:	50 cm (including slab)
Slab thickness	:	150 mm
Parapets	:	40 cm thick and 100 cm high
Slope of embankment	:	1 in 1
Abutment	:	RR masonry 90 cm, 70 cm and 60 cm thick for 2.5 m, 2 m and 1.5 m with water face vertical

Dry rubble footing for :
vent way 45 cm thick.

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OR

IV The details of an open well stair case are follows :

Room size	:	5 × 3 m
Head room	:	2.9 m
Wall thickness	:	30 cm
RCC landing slab thick	:	10 cm
RCC waist slab thickness	:	10 cm
Landing with	:	1 m

Provide necessary footing and hand rails.

Draw the longitudinal section and plan of the stair showing reinforcement arrangement.

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UNIT—III

V Draw the junction details at the apex of a steel roof truss with the following details :

Principal rafter angles	:	55 × 55 × 6 mm, 2 nos.
Main tie	:	55 × 55 × 6 mm, 2 nos.
Sag tie	:	50 × 50 × 6 mm
Cleat	:	100 × 75 × 8 mm
Purlin	:	100 × 75 × 8 mm

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OR

VI Two secondary beam ISLB 350-49.5 kg/m are connected to the web of a main beam ISMB 500-86.9 kg/m. Two cleat angles 150 × 115 × 10 mm, 27.5 cm long are used with 8 nos. of 22 mm ϕ rivets in each connection. Pitch of the rivets 65 mm with edge distance 40 mm.

Draw to suitable scale of the elevations :

- Showing the main beam in section.
- The secondary beam in section.

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UNIT—IV

VII Draw the cross section of a masonry dam with the following details :

Foundation bottom level	:	+ 75.00
River bed level	:	+ 87.50
Maximum water level	:	+ 138.80
Full reservoir level	:	+ 137.00
Top level of dam	:	+ 139.40
Upstream side slope	:	Vertical between level +125.00 to + 139.40 Tapering 1 in 9 between levels +101.00 to + 125.00 Tapering 1 in 6 between levels +75 to + 101.00
Down streamside	:	Curved portion between levels +125.00 and + 139.40 Tapering 1 in 1.4 between levels +101.00 and + 125.00 Tapering 1 in 1 between levels +75.00 and + 101.00

Low level sluice sill level + 101.00 and upper sluice + 116.00.

The upstream portion of the dam provide impervious facing with cement concrete. Assume all other data required.

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OR

VIII Draw the cross section across body wall of a surplus escape for the following details :

Top bund level	:	+ 102.50
Maximum water level	:	+ 101.00
Full tank level	:	+ 100.00
GL and top level of concrete	:	+ 99.00
Bottom level of concrete	:	+ 98.00 (below the body wall)
Bottom width of concrete	:	150 cm (below body wall)
Top width of body wall	:	75 cm
Bottom width of body wall	:	90 cm
Top width of bund	:	2.00 m
Length of solid apron	:	3.00 m, 60 cm thick
Grouted apron	:	60 cm thick
Side slope upstream	:	1 : 1.5
Side slope downstream	:	1 : 2
Cut-off wall (between solid and grouted apron) 50 cm × 100 cm.		
Body wall divided 3 vertical offsets each 0.50 m.		