

SIXTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY— MARCH, 2015

STRUCTURAL AND IRRIGATION ENGINEERING – DRAWING

(Common to CE, EN and WR)

[Time : 3 hours

(Maximum marks : 100)

[Note :—1. Answer one full question from each unit. Each question carries 25 marks.

2. Missing data can be suitably assumed.
3. Drawing shall be neat and fully dimensioned.
4. A2 size drawing sheet should be supplied.
5. Use of steel table is permitted.]

Marks

UNIT – I

- I The dining room of a residence has size 4.2m × 6.10m. The roof slab of the room is designed as a two way slab with corners prevented from lifting. The design yields the following results.

Thickness of slab : 130mm

Shorter span reinforcement : 10mm dia @ 140mm c/c, alternate bent up

Longer span reinforcement : 8mm dia 180mm c/c, alternate bent up

Draw the following views.

- (a) Cross section along the width.
- (b) Cross section along the length.

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OR

- II Draw the (a) longitudinal section (b) Cross section at free end (c) Cross section at fixed end of R.C.C. cantilever beam resting over brickwall. The beam is 2.2m long, width 300mm, depth at fixed end is 350mm end at free end 180mm. It is provided with 5 Nos. 20mm dia bars in tensile zone in which two of them are curtailed at 1m from free end. 2 Nos. of 12mm dia and one No. 16mm dia bars in compressive zone. Stirrups are 8mm dia at 150mm c/c.

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UNIT – II

III A cantilever retaining wall with key and earthface vertical has the following details :

Level of earth filling	: +76.00m
Natural ground level	: +70.00m
Top of the base slab	: 69.50m
Stem of retaining wall	: 250mm at top and 500mm at bottom
Base slab	: 450mm thick, toe projection - 900mm and heel projection -1450mm
Key	: 500mm thick, 730mm deep

Reinforcement :

Stem earthface	: 12mm dia @ 120mm c/c, alternate curtailed at 1/3 and 2/3 height from base
Distribution	: 10mm dia @ 150mm c/c
Toe slab main bars	: 10mm dia @ 180mm c/c
Distribution	: 10mm dia @ 200mm c/c
Heel slab main bars	: 10mm dia @ 150mm c/c
Distribution	: 10mm dia @ 180mm c/c

Draw the cross section of the retaining wall.

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OR

IV A circular water tank has the following details :

Diameter of the tank	: 6m (inside)
Wall thickness (RCC)	: 150mm
Floor slab (RCC)	: 200mm thick
R.L. of floor of the tank	: +68.00m
R.L. of top of cover slab	: +76.00m
R.L. of ground	: +56.00m
R.C.C. columns	: 6 Nos., 300 × 300mm
Ring beams	: 300 × 400mm
Brace beams	: 3 Nos., 250 × 250mm
Slab projection from ring beam	: 1000mm
Hand rail height	: 1000mm
Maximum water level	: +75.20
Inlet	: 300mm dia
Outlet	: 250mm dia

Draw the sectional elevation of the tank showing all details.

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UNIT – III

V A steel stanchion ISHB 350 × 250 @ 67.4 kg/m is strengthened by a cover plate 300 × 12mm on each flange. It is fixed to foundation bearing plate of 700 × 500 × 16mm with flange and web cleat angles of ISA 150 × 150 × 12mm. Anchor bolts 4 Nos. of 20mm dia, 400mm long. Foundation concrete 1 : 2 : 4, of size 1200 × 1000 × 750mm. All joints are welded. Draw (a) the front view and (b) top view.

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OR

VI Draw the front and side views of a column - beam connection with the following details.

Column	:	ISHB 350 @ 67.4 kg/m
Beams	:	ISMB 250 @ 37.30 kg/m
Cleats	:	ISA 100 × 100 × 8mm

All joints are welded.

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UNIT - IV

VII Draw the cross section of a masonry dam with details of drainage gallery with the following particulars.

Foundation bottom level	:	+85.00m
River bed level	:	+97.50m
Maximum water level	:	+149.00m
Full reservoir level	:	+148.00m
Top level of the dam	:	+150.00m

Upstream side :

Vertical between levels + 135 and +150
Tapering 1 in 9 between levels +111.00 and +135.00
Tapering 1 in 6 between levels +85.00 and +111.00

Downstream side

Curved portion between levels +135.00 and +150.00
Tapering 1 in 1.5 between levels +111.00 and +135.00
Tapering 1 in 1 between levels + 85.00 and +111.00

Irrigation sluices

Low level sluice 2.20 × 4.10m, sill level +111.00		
Upper level sluice 3.10 × 4.60m, sill level +126.00		
Drainage gallery size	:	1.60m × 2.30m
Drainage gutter	:	350 × 300mm

The main portion of the dam is built with stone masonry in cm 1: 4 and impervious facing is with cement concrete 1:2:4.

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OR

VIII Draw the plan and sectional elevation of septic tank of internal size 4.50 × 1.50m with the details given below :

Masonry wall thickness	:	30cm
Base concrete	:	Plain cement concrete 1:3:6 5.30 × 2.30m and 200mm thick
Average liquid depth	:	1.60m
Free board	:	0.50m.

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