

Code : 15CE55D

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V Semester Diploma Examination, April/May-2019

IRRIGATION & BRIDGE DRAWING

Time : 4 Hours]

[Max. Marks : 100

- Instructions :**
- (i) Assume the missing data suitably.
 - (ii) Drawing should be neat and fully dimensioned.
 - (iii) Answer any **one** from Question 1 & Question 2
 - (iv) Question No. 3 is compulsory.

1. (a) Draw to a suitable scale the cross-section of an earthen bund with core wall for the following data :

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Bed level – 200.00

Hard rock level – 198.50

TBL – 205.00

MWL – 204.00

FTL – 203.50

Top width of Bund – 2.5 m

U/s Slope – 1.5 : 1

D/s slope – 2 : 1

Top width of core wall – 1.2 m

Bottom width of core wall – 2.20 m

Bottom width of core wall at Hard rock level – 1.50 m

Rivetment on U/s is 0.45 m with gravel backing of 0.1 m

Provide rock toe on D/s taking height of rock toe as 1.5 m

Foundation for the rivetment is 1.3 m wide and 1.5 m deep including 0.20 m thick stone spalls.

- (b) Following are the details of a masonry sluice with Head and Gibbet Wall :

Top width of bund = 2.5 m

Front slope of bund = $1\frac{1}{2} : 1$

Rear slope of bund = 2 : 1

TBL – 106.00

MWL – 105.00

FTL – 104.50

Sill level at sluice – 100.00

Ground level – 101.00

Width of head wall – 0.60 m

Length of gibbet wall – 0.60 m

Barrel :

Size of barrel = (0.6×0.80) m

Slab thickness = 0.12 m

Wall thickness at top = 0.45 m

Wall thickness at bottom = 0.60 m

Citizen wall thickness = 0.45 m

Top width of head & gibbet wall = 0.45 m

Bottom width of head & gibbet wall = 0.90 m

Clear bell mouth entry = 1.5 m

Provide splayed wind walls, C.C. Bed below barrel, head & gibbet wall; cistern & wind wall is 0.60 m

Size of plug chamber = $(0.6 \times 0.6 \times 0.6)$ m

RCC slab over plug chamber = 0.12 m

Thickness of plug chamber wall = 0.12 m

Provide an opening of (0.3×0.3) m in the plug chamber wall facing the water side.

Top width of wing wall = 0.45 m

Provide 0.4 m thick stone rivetment over 0.1 m thick gravel backing on U/s of tank.

Provide 0.12 m thick C.C. lining for distributory canal.

Bed width of distributory canal – 1.00 m

FSL of distributory canal – 100.50 m

Draw the (i) Longitudinal section

(ii) Half plan at top and Half plan at bottom
to a suitable scale.

2. Following are the details of a Tank weir with stepped apron.

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Top width of bund – 3.00 m

Top bund level – 102.50

Maximum water level – 101.50

Full tank level – 101.00

Bed level at waste weir site – 100.00

U/s slope of bund – $1\frac{1}{2} : 1$

D/s slope of bund – $2 : 1$

Length of body wall – 15 m

Top width of body wall – 1.00 m

Bottom width of body wall – 2.00 m

Top level of foundation concrete – 98.60

Bottom level of foundation concrete – 98.00

Top level of U/s return wall – 101.80

Top level of D/s return wall and channel bund level – 100.50

Provide 0.6 m thick stepped apron for a length of 3.0 m at RL + 100.00 and 3.5 m at RL + 99.00

Provide 0.15 thick c.c. lining for D/s channel.

Provide dam stones ($0.15 \times 0.15 \times 0.8$) m in the body wall @ 0.9 m c/c

Top width of wing wall, abutment and return wall is 0.450 m and vertical water face, Bottom width of these walls may be taken as 0.35 h. (Where 'h' is the height of wall)

Length of return wall on U/s and D/s is 2.20 m

Draw to a suitable scale the following views.

- | | |
|---|----|
| (i) Cross-section across body wall | 20 |
| (ii) Half plan at foundation and Half plan at top | 30 |

3. Following are the details of slab culvert with return wing walls.

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- (i) Hydraulic particulars :

Catchment area = 4.00 km²

Ryves constant = 8.00

Velocity of flow through vent = 1.75 m/sec

Average bed width of stream = 8m

Assume afflux = 0.15 m

(ii) Constructional details

No. of span = 2

Slope of cutting = 1 : 1

Slope of embankment = $1\frac{1}{2}$: 1

Ground level at site = 201.50

Bed level of stream = 200.00

High flood level = 202.50

Road formation level = 203.50

Hard rock level = 198.00

Width of road = 7.50 m (Width between kerbs)

Width of foot path = 1.0 m

RCC parapet wall of 0.10 m thick and 0.9 m height.

Guard stones (0.2 × 0.2 × 0.8) m at 1.0 m c/c

Thickness of RCC slab = 0.25 m

Thickness of wearing course = 0.10 m

Bearing slab on abutment & Pier = 0.30 m

Top and bottom width of pier = 0.9 m

Top width of abutment = 0.9 m

Bottom width of abutment = 1.3 m

Front face of abutment, Return wind wall is vertical

Top width of return wing wall = 0.50 m

Return wall should embed into the embankment with 1.00 m

Berm at ground level = 1.00 m

Provide cut & ease water.

Protection works for stream and embankment is to be provided.

Calculate the linear waterway and span

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Draw the following views to a suitable scale ?

(i) Half longitudinal elevation and Half sectional elevation

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(ii) Half plan at foundation and Half plan at top

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