

R15

Code: 15A01705

B.Tech IV Year I Semester (R15) Regular Examinations November/December 2018

DESIGN & DRAWING OF IRRIGATION STRUCTURES

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any ONE question
All questions carry equal marks

- 1 Design a cross drainage work to suit the following hydraulic particulars:

Canal:

Discharge: 35 cubic meters per second

Bed width: 20.00 meters

Bed level: +38.00

Full supply level: 40.00

Ultimate bed level: +37.75(U.B.L)

Ultimate full supply level: +40.50 (U.F.S.L)

Average velocity in the canal: 0.83 meters per second

Left bank top width: 5.00 meters

Right bank top width: 2.00 meters

Canal side slopes both inside and outside are 2:1 in embankment with a minimum cover of one meter over the hydraulic gradient.

Top of canal bank: +41.50

Average ground level on flanks of drain: +36.00 and the bed level of the drain may also be taken as +36.00 at the point of crossing.

Drain:Catchment area = 8.0 square kilometers. The maximum computed discharge is worked out a 60 cubic meters per second using a coefficient of $C=15$ in Ryve's formula.

Maximum flood level of the drain at the site of crossing is +37.75 (observed)

Average bed level of the drain at the site of crossing is +36.00. Hard soil suitable for the foundation is met +35.00. Also draw the plan and longitudinal section.

- 2 Design a regulator-cum-load bridge with the following data:

Hydraulic particulars of canal upstream:

Full supply discharge: $20\text{ m}^3/\text{s}$

Bed width: 15 m, Bed level +20.00

F.S depth: 2.00 m, F.S.L.: +22.00

Top level of bank: +23.00

The right bank is 5 m wide and left bank is 2 m wide.

Hydraulic particulars of canal downstream:

Full supply discharge: $16\text{ m}^3/\text{s}$

Bed width: 15 m, Bed level +20.00

F.S. depth: 1.75 m, F.S.L.: +21.75

Top level of bank: +22.75

Top width of banks are the same as those on the upstream side. The regulator carries a road way single lane designed for I.R.C loading class 'A'. Provide clear freeboard of one meter above F.S.L. for the road bridge.

Good foundation soil is available at +19.00

Assume the ground level site as +22.00

Also draw the plan and longitudinal section.