

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

DESIGN & DRAWING OF IRRIGATION STRUCTURES

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any ONE question

All questions carry equal marks

- 1 Design the surplus work of a tank forming part of a chain of tanks. The combined catchment area of the group of tanks is 25.89 sq. kilometers and the area of the catchment intercepted by the upper tanks is 20.71 sq. kilometers.

It is decided to store water in the tank to a level of +16.00 meters above M.S.L (Mean Sea Level) limiting the submersion of foreshore lands up to a level of +16.75 meters above M.S.L. The general ground level at the proposed site of work is +15.00 meters and the ground level below the proposed surplus slopes off till it reaches +14.00 meters in about 6 meters distance.

The tank bund has a top width of 2 meters at level +18.50 with 2.1 side slopes on either side. The tank bunds are designed for a saturation gradient of 4: 1 with 1 meter clear cover.

Provision may be made to make Kutcha regulating arrangements to store water up to M.W.L at time of necessity. The foundations are of hard gravel at a level of 13.50 meters near the site of work. Also draw the plan and longitudinal section.

- 2 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: +40.00

Full supply level: +42.00

Ultimate bed level: +39.75 (U.B.L.)

Ultimate full supply level: +42.50 (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 at 2: 1 in embankment with a minimum cover of one meter over the hydraulic gradient.

Top of canal bank: 43.50

Average ground level on flanks of drain: +38.00 and the bed level of the drain may also be taken as + 38.00 at the point of crossing.

Drain:

Catchment area = 8.0 square kilometers. The maximum computed discharge is worked out at 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 + 39.75 (observed).

Average bed level of the drain at the site of crossing is + 38.00.

Head soil suitable for the foundation is met + 37.00.

Also draw the plan and longitudinal section.
