

**B. Tech. DEGREE EXAMINATION, MAY - 2015**

**(Examination at the end of Final Year)**

**CIVIL ENGINEERING**

**Paper - III : Water Resources Engineering-III : Design & Drawing**

**Time : 3 Hours**

**Maximum Marks : 75**

*All questions carry equal marks*

**Unit - I**

- 1) Design and draw a lined canal carrying  $230 \text{ m}^3/\text{sec}$  has to be flumed through a ridge 1700m long where rock has been met with. The canal in the normal reach has the following hydraulic particulars.

Discharge :  $222 \text{ m}^3/\text{sec}$

Bed width : 25.5 m

Depth : 5.5 m

Velocity of flow : 1.3 m/sec

Side slopes  $1\frac{1}{2} : 1$  and coefficient of rugosity 0.018 for lined canal.

Longitudinal bed slope :  $1/10,000$ .

The flume portion is assumed to be in hard rock where a side slope of  $\frac{1}{4}$  to 1 is permissible. The maximum velocity assumed in the flume may be taken as  $2.5 \text{ m}^3/\text{sec}$ . Assume the whole flume also to be lined ( $n = 0.018$ ).

OR

- 2) Design the canal regulator with road way with the following data :

Particulars of canal	U/S of Regulator	D/S of Regulator
Fully supply discharge :	$25 \text{ m}^3/\text{sec}$	$20 \text{ m}^3/\text{sec}$
Bed width :	16m	16m
Full supply level :	24.3m	23.9m
Top of bank level :	25.3m	24.9m
Top width of right bank :	5m	5m
Top width of left bank :	2.5m	2.5m

Bed level : 22m 22m

The regulator carries roadway single lane. Design for IRC loading class-A. Provide a free board of 1m above FSL for load bridge. Good foundation is available at 20m. The general GL is 24.5m. Assume any other data suitably. Draw the longitudinal section of the regulator (not ot scale).

### Unit - II

- 3) Design and draw the surplus work of a tank forming part of a chain of tanks. The combined catchment area of the group of tanks is 30.45 sq. km and the area of the catchment intercepted by the upper tank is 24.85 sq.km.

It is decided to store water in the tank to a level of +12.00m above M.S.L, limiting the submersion of fore share lands up to a level of 12.75m above M.S.L, the ground level at the proposed site of work is +11.00m, and ground level below the proposed surplus slopes 1:4 till it reaches +10.00m in about 6m distance.

The tank bund has a top width of 2m at level +14.50 with 2:1 side slopes on either side. The tank bunds are designed for a saturation gradient of 4:1 with one meter clear over. The foundations are hard gravel at a level of 9.5 meters near the site of work.

(Assume Ryve's coefficient as 9 and modified coefficient as 1.50).

OR

- 4) Design a syphon aquaduct (Type IV) for the following data :

Discharge of canal = 60 cumecs

Bed width of canal = 35m

Bed level of canal = + 150.0m

Full supply level of canal = +152.0m

Top width of bund = 5m

Side slopers of canal = 1V : 2H

Bed level of drain = +148m

High flood level of drain = 150.5 m

General level of ground is at +150.0m

Hard soil is available at +147m

Assume any other data suitably

Draw to a suitable scale the longitudinal sectional elevation along the barrel.

κβκβ