

Code No: R41012

**R10**

**Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, March - 2017**  
**DESIGN AND DRAWING OF IRRIGATION STRUCTURES**  
(Civil Engineering)

**Time: 3 hours**

**Max. Marks: 75**

**Note: Answer any ONE of the following Two Questions**  
**Assume any of the data if required**  
**Khosla curves are allowed**

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1 Design a sluice (tank sluice with tower head) taking off from a tank with a following data:

Discharge : 0.40m<sup>3</sup>/sec  
Top width of the bund : 2.0 m  
Side slopes : 2: 1  
Top level of the bank : +68.00  
Ground level at the site : +62.50  
Sill of the sluice at off-take is : +62.00  
Maximum water level in the tank : +66.00  
Full tank level is : +65.00  
Average low water level is : +63.00  
Good hard soil for foundation is available at : + 61.50

Details of canal below the sluice

Bed level : +62.00  
F.S.L : +62.50  
Bed width : 1.50m  
Side slopes : 1.5:1 with top bank at + 63.50m

Draw the longitudinal section. Assume any suitable data.

2 Design a siphon aqueduct (type-III) for forming the canal through an RCC trough with the following data:

Discharge of the canal : 35 cumecs  
Bed width of the canal : 20 m  
Depth of water in the canal : 1.5 m  
Bed level of the canal : +260.50m  
High flood discharge of the drainage : 300 cumecs  
High flood level of the drainage : +261.00 m  
Bed level of the drainage : +258.50 m  
General ground level : +260.50 m  
Canal free board : 1.0 m

Canal side slopes both inside and outside are 2: 1 in embankment

Top width of the bank on left side is 5m carries a road way while the top width on the right bank is 3m.

The foundations of abutments and respective wing-wall and returns both on the u/s and d/s side are taken to the respective scour depth levels assuming silt factor as 1.0. Hard soil fit for foundation is available below at +256.50m.

Limiting velocity in the drainage not to exceed 2.5 m/sec.

The velocity in the canal trough is not to exceed twice the normal velocity in the canal. Find out the loss of head in the canal due to the crossing by total energy line method. Similarly find out the H.F.L of the drain u/s of the structure, keeping the normal H.F.L of the drain at the d/s side returns of the drainage barrel

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