

Code No: **R41012**

R10

Set No. 1

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2014
DESIGN AND DRAWING OF IRRIGATION STRUCTURES

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Note: Answer any ONE of the following two questions

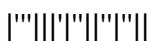
Assume any other data if require

Khosla curves are allowed

1. Design and draw plan and elevation to a suitable scale of 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 + 12.00 m above M.S.L. limiting the submersion of fore share lands upto a level of 12.75 m above M.S.L. The ground level at the proposed site of work is +11.00m, and ground level below the proposed surplus slopes off 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 cover. The foundations are of hard gravel at a level of 9.50 meters near the site of work. (Assume Ryve's coefficient C as 9 and modified coefficient c as 1.50)

(OR)

2. Design a canal regulator-cum-road bridge with the data given below.
- a) Hydraulic particular of canal upstream:
- Full supply discharge: 20.0 m³ / sec
Bed width = 15m, Bed level = +20.00m
F.S depth = 2m, F.S.L = +22.00m
Top level of bank = 23.00m
The right bank of the canal is 5m. wide and left bank of the canal is 2m wide.
- b) Hydraulic particulars of canal downstream:
- Full supply discharge = 16.0 m³ / sec
Bed width = 15, Bed level = +20.00m
F.S Depth = 1.75m, F.S.L = +21.75m
Top level of bank = +22.75m
Top widths of banks, on the downstream side of the regulator, are the same as those on the upstream side. The regulator carries a roadway single lane designed for I.R.C. loading class A. Provide clear free board of 1M. above F.S.L for the road bridge.
Good foundation ground level at site at +19.00,
Assume the ground level at site as +22.00m
Draw the plan of the canal regulator (half at top and half at foundation level) and half sectional elevation, to a suitable scale.



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Max. Marks: 75

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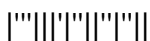
Assume any other data if require

Khosla curves are allowed

1. Design and draw plan and elevation to a suitable scale of a sluice taking off from a tank irrigating 250 hectares at 1150 duty. The tank bund through which the sluice is taking off has a top width of 2 meters with 2:1 side slopes. The top level of bank is +90.00 and ground level at site is +84.50. Good hard soil for foundation is available at +83.50. The sill of the sluice at off take is +84.00. The maximum water level in tank is 88.00. The full tank level is +87.00. Average low water level of the tank is +85.00. The details of the channel below the sluice are as under.
- Bed Level = +84.00
F.S.L = +84.50
Bed width = 1.25 meters
Side slopes = 1 ½ to 1 with top of bank at +85.50

(OR)

2. Design and draw plan and elevation to a suitable scale of syphon aqueduct type III for the following data.
- i). Discharge of the canal = 40 cumec
 - ii). Bed width of the canal = 28 m
 - iii). Full supply depth of canal = 1.6m
 - iv). Bed level of the canal = 106.4 m
 - v). Side slopes of canal = 1½H : 1 V
 - vi). High flood discharge of the drain = 460 cumecs
 - vii). High flood level of the drain = 107.00m
 - viii). Bed level of the drain = 104.50m
 - ix). General ground level = 106.50 m
- Silt factor = 1.0



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Time: 3 hours**Max. Marks: 75****Note: Answer any ONE of the following two questions****Assume any other data if require****Khosla curves are allowed***********

1. Design and draw plan and elevation to a suitable scale of a regulator-cum-road bridge with the following data.

a) **Hydraulic particulars of canal upstream**

Full supply discharge: 24 cubic meter/second

Bed width = 15 meters

Bed level = +20.00

F.S. depth = 2.00 meters

F.S.L = + 22.00

Top level of bank = 23.00

The right bank is 5 meters wide and

Left bank is 2m wide.

b) **Hydraulic particulars of canal downstream**

full supply discharge = 20 cubic meters/second.

Bed width = 15 meters

Bed level = +20.00

F.S. depth = 1.75 meters

F.S.L = + 21.75

Top level of bank = +22.75

Top widths of bank 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 free board 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

(OR)

2. Design and draw plan and elevation to a suitable scale of a Trapezoidal notch fall of 2 meters with the following data. Assume coefficient of discharge for trapezoidal notch as 0.70.

a) **Hydraulic particulars of the canal above fall**

Full supply discharge = 4.4 cubic meters/seconds

Bed width is 6.00 meters

Bed level is + 10.00

Full supply depth is 1.50 meters

F.S.L + 11.50

Top of bank 2.00 meters wide at level +12.50

Half supply depth : 1.00 meter

b) **Hydraulic particulars of canal below fall**

Full supply discharge = 4.4 cubic meters/ second

Bed width = 6.00 meters

Bed level = + 8.00

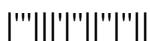
Full supply depth 1.50 meters

F.S.L + 9.50

Top of bank 2.00 meters wide at level + 10.50

The ground level at the site of work is + 10.50

Good soil is available for foundation at + 8.50.



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(Civil Engineering)

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Max. Marks: 75

Note: Answer any ONE of the following two questions

Assume any other data if require

Khosla curves are allowed

1. Design and draw plan and elevation to a suitable scale of 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 + 12.00 m above M.S.L. limiting the submersion of fore share lands upto a level of 12.75 m above M.S.L. The ground level at the proposed site of work is +11.00m, and ground level below the proposed surplus slopes off 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 cover. The foundations are of hard gravel at a level of 9.50 meters near the site of work. (Assume Ryve's coefficient C as 9 and modified coefficient c as 1.50)

(OR)

2. Design and draw plan and elevation to a suitable scale of syphon aqueduct type III for the following data.
 - i). Discharge of the canal = 38 cumec
 - ii). Bed width of the canal = 28 m
 - iii). Full supply depth of canal = 1.6m
 - iv). Bed level of the canal = 106.4 m
 - v). Side slopes of canal = $1\frac{1}{2}H : 1 V$
 - vi). High flood discharge of the drain = 460 cumecs
 - vii). High flood level of the drain = 107.00m
 - viii). Bed level of the drain = 104.50m
 - ix). General ground level = 106.50 m
 - x). Silt factor = 1.0



