

Code No: K0129

R07

Set No. 1

IV B.Tech. II Semester Regular Examinations, April 2011
DESIGN AND DRAWING OF HYDRAULIC STRUCTURES
(Civil Engineering)

Time: 3 Hours

Max Marks: 80

Note: Answer any ONE of the following two questions

Assume any other data if required

Khosla's curves are allowed

1. Design and draw 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 = 5 cubic meters/seconds

Bed width is 7.00 meters

Bed level is + 11.00

Full supply depth is 1.50 meters

F.S.L + 12.50

Top of bank 2.00 meters wide at level +13.50

Half supply depth: 1.00 meter

(b) Hydraulic particulars of canal below fall

Full supply discharge = 5 cubic meters/ second

Bed width = 7.00 meters

Bed level = + 9.00

Full supply depth 1.50 meters

F.S.L + 10.50

Top of bank 2.00 meters wide at level + 11.50

The ground level at the site of work is + 11.50

Good soil is available for foundation at + 9.50

(OR)

2. Design and draw a type III syphon aqueduct for the following data.

(i) Discharge of canal = 40 cumec

(ii) Bed width of canal = 30 m

(iii) Full supply depth of canal = 1.6 m

(iv) Bed level of canal = 206.40 m

(v) Side slopes of canal = 1.5 H : 1 V

(vi) High flood discharge of drainage = 450 cumec

(vii) High flood level of drainage = 207.00 m

(viii) Bed level of drainage = 204.50 m

(ix) General ground level = 206.50 m

(x) Silt factor = 0.9

Code No: K0129

R07

Set No. 2

IV B.Tech. II Semester Regular Examinations, April 2011
DESIGN AND DRAWING OF HYDRAULIC STRUCTURES
(Civil Engineering)

Time: 3 Hours

Max Marks: 80

Note: Answer any ONE of the following two questions

Assume any other data if required

Khosla's curves are allowed

1. Design and draw the surplus weir of a tank forming part of a chain of Tanks.
The combined catchment area of the group of tanks is 30.00 sq.km and the area of the catchment intercepted by the upper tank is 24.00 sq.km.
It is decided to store water in the tank to a level of + 11.00 m above M.S.L. limiting the submersion of fore share lands upto a level of 11.75 m above M.S.L. The ground level at the proposed site of work is +10.00m, and ground level below the proposed surplus slopes off till it reaches +09.00m in about 6m distance.
The tank bund has a top width of 2m at level +13.50 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.
Provision may be made to make *Kutchra* regulating arrangements to store water up to M.W.L at time of necessity.
The foundations are of hard gravel at a level of 8.50 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 a tank sluice with a tower head taking off from a tank Irrigating 225 hectares at 1050 duty. The tank bund through which the sluice is taking off has a top width of 2.2 meters with 2:1 side slopes. The top level of bank is +80.00 and ground level at site is +74.50. Good hard soil for foundation is available at +73.50
The sill of the sluice at off take is +74.00. The maximum water level in tank is 78.00. The full tank level is +77.00. Average low water level of the tank is + 75.00.
The details of the channel below the sluice are as under.
Bed Level = +74.00
F.S.L = +74.50
Bed width = 1.25 meters
Side slopes = 1 ½ to 1 with top of bank at + 75.50

Code No: K0129

R07

Set No. 3

IV B.Tech. II Semester Regular Examinations, April 2011
DESIGN AND DRAWING OF HYDRAULIC STRUCTURES
(Civil Engineering)

Time: 3 Hours

Max Marks: 80

Note: Answer any ONE of the following two questions

Assume any other data if required

Khosla's curves are allowed

1. Design and draw a sloping glacis weir for the following site conditions:
 - (i) Maximum discharge intensity on weir crest = 12 cumecs /m length
 - (ii) H.F.L. before construction of weir = 265.0 m
 - (iii) R.L of river bed = 259.5 m
 - (iv) Pond level = 264.0m
 - (v) Height of crest shutters = 1m
 - (vi) Anticipated downstream water level in the river when the weir is discharging with pond level upstream = 261.5m
 - (vii) Bed retrogression = 0.5m
 - (viii) Lacey's silt factor = 0.9
 - (ix) Permissible exit gradient = 1/7
 - (x) Permissible afflux = 1m

(OR)

2. Design and draw 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 = 5 cubic meters/seconds
 - Bed width is 7.00 meters
 - Bed level is + 11.00
 - Full supply depth is 1.50 meters
 - F.S.L + 12.50
 - Top of bank 2.00 meters wide at level +13.50
 - Half supply depth: 1.00 meter
 - (b) Hydraulic particulars of canal below fall
 - Full supply discharge = 5 cubic meters/ second
 - Bed width = 7.00 meters
 - Bed level = + 9.00
 - Full supply depth 1.50 meters
 - F.S.L + 10.50
 - Top of bank 2.00 meters wide at level + 11.50
 - The ground level at the site of work is + 11.50
 - Good soil is available for foundation at + 9.50

Code No: K0129

R07

Set No. 4

IV B.Tech. II Semester Regular Examinations, April 2011
DESIGN AND DRAWING OF HYDRAULIC STRUCTURES
(Civil Engineering)

Time: 3 Hours

Max Marks: 80

Note: Answer any ONE of the following two questions
Assume any other data if required
Khosla's curves are allowed

1. Design and draw a canal regulator-cum-road bridge with the following data.
 - (a) Hydraulic particulars of canal upstream
 - Full supply discharge: 22 cubic meter/second
 - Bed width = 15 meters
 - Bed level = +40.00
 - F.S. depth = 2.00 meters
 - F.S.L = + 42.00
 - Top level of bank = 43.00
 - The right bank is 4 meters wide and
 - Left bank is 2m wide.
 - (b) Hydraulic particulars of canal downstream full supply discharge = 18 cubic meters/second.
 - Bed width = 15 meters
 - Bed level = +40.00
 - F.S. depth = 1.75 meters
 - F.S.L = + 41.75
 - Top level of bank = +42.75

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 +39.00. Assume the ground level site as +42.00

(OR)

2. Design and draw a type III syphon aqueduct for the following data.
 - (i) Discharge of canal = 40 cumec
 - (ii) Bed width of canal = 30 m
 - (iii) Full supply depth of canal = 1.6 m
 - (iv) Bed level of canal = 206.40 m
 - (v) Side slopes of canal = 1.5 H : 1 V
 - (vi) High flood discharge of drainage = 450 cumec
 - (vii) High flood level of drainage = 207.00 m
 - (viii) Bed level of drainage = 204.50 m
 - (ix) General ground level = 206.50 m
 - (x) Silt factor = 0.9