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10CV65

Sixth Semester B.E. Degree Examination, June/July 2018
Hydraulic Structures and Irrigation-Design Drawing

Time: 4 hrs. Max. Marks:100

Note: ***Answer any TWO full questions from Part-A and ONE question from Part-B.***

PART – A

1 a. Explain the storage zones of a reservoir. **(04 Marks)**

b. Define the terms:
(i) Density current (ii) Trap efficiency **(04 Marks)**

c. The monthly yield of water from a catchment is given below. Assuming uniform rate of flow, estimate the reservoir capacity by mass curve method.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inflow Volume (Mm^3)	1.4	2.1	2.8	8.4	11.9	11.9	7.7	2.8	2.52	2.24	1.91	1.68

(07 Marks)

2 a. Explain the various forces acting on a gravity dam. **(07 Marks)**

b. The stability analysis of a gravity dam gave the following data:
(i) Over turning moment = 10^8 kN-m
(ii) Resisting moment = $2 * 10^8$ kN-m
(iii) Total vertical force above the base = $5 * 10^6$ kN
(iv) Base width = 50 m
(v) D/s side slope (ϕ) = 0.8H : 1V
Calculate the vertical stresses on the foundation and maximum vertical principal stresses at the tow assuming no tail water. **(08 Marks)**

3 a. Explain the design criteria for earthen dams. **(07 Marks)**

b. With a neat sketch, explain Casagrande's method of determining the phreatic line through homogenous earthen dams provided with horizontal filter. **(08 Marks)**

PART – B

4 Design a sluice taking off from a tank irrigating 200 hectares at 1000 duty. The tank bund through which the sluice is talking off has a top width of 2 meter with 2:1 side slopes. The top level of the bank is +40.00 and the ground level at site is +34.50. Good hard soil for foundation is available at +33.50.
The sill of the sluice at off take is +34.00 and the maximum water level is +38.00. The full tank level is at +37.00. Average low water level is +35.00.
Details of the channel below the sluice are:
Bed level = +34.00, FSL = +34.50
Bed width = 1.25 m
Side slope 1.5 : 1 with top of the bank at +35.00 **(25 Marks)**
Draw to suitable scale:
(i) Half plan at top and half plan at foundation. **(20 Marks)**
(ii) Sectional elevation **(15 Marks)**
(iii) Side elevation. **(10 Marks)**

5 Design a canal drop of 2m from the following data:

Hydraulic particulars	Upstream	Down stream
· Full Supply discharge	4 m^3/sec	4 m^3/sec
· Bed width	6 m	6 m
· Bed level	+10.00	+8.00
· Full Supply depth	1.50m	1.50m
· Full Supply level	+11.50	+9.50
· Top of bank	+12.50	+10.50
· Width of Bank	2.00 m	2.00 m

· Half supply depth = 1.00 m
· Ground level at site = +10.50 m
· Hard rock level (HRL) = +8.50 m **(25 Marks)**

Draw :
(i) Half plan at top and half plan at foundation **(20 Marks)**
(ii) Sectional elevation **(15 Marks)**
(iii) Half sectional side elevation **(10 Marks)**

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