10CV65

Sixth Semester B.E. Degree Examination, July/August 2022
Hydraulic Structures and Irrigation Design and Drawing

Time: 4 hrs.　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer any TWO questions from PART-A and ONE from PART-B.*

PART – A

1 a. Explain with neat sketch the different zones of a reservoir. **(07 Marks)**

　b. The monthly yield of water from a catchment is given below. Determine the minimum capacity of reservoir by mass curve method if the flow is drawn at a uniform rate. Values are given in million cubic meters.

Month	1	2	3	4	5	6	7	8	9	10	11	12
Inflow volume Mm³	1.4	2.1	2.8	8.4	11.9	11.9	7.7	2.8	2.52	2.24	1.96	1.68

(08 Marks)

2 a. Name the forces that acts on gravity dam. Explain any two. **(08 Marks)**

　b. Following data were obtained from the stability analysis of a concrete gravity dam.
　　i)　Total overturning moment about toe = 1×10^6 kN-m.
　　ii)　Total resisting moment about base = 2×10^6 kN-m
　　iii)　Total vertical force above base = 50000 kN.
　　iv)　Base width of the dam = 50m.
　　v)　Slope of the D/S face = 0.8[H] : 1[V].
　　Calculate the maximum and minimum vertical stress at foundation level. Also calculate what is the maximum principle stress at toe. Assume there is no tail water. **(07 Marks)**

3 a. What is Earthen dams? Sketch and classify the different types of Earthen dams based on the materials and explain briefly. **(07 Marks)**

　b. Explain the causes for failure of Earthen dam. **(08 Marks)**

PART – B

4 Design the surplus weir with the stepped apron of a tank forming part of a chain of tanks with the following details:
Combined catchment area = 25.89km²
Intercepted catchment area = 20.71km²
Maximum water level = +112.75m
Full tank level = +112.00m
Ground level at proposed site = +111.00m
Ground level below proposed weir up to a reach of 6m [fall] = +110.00m
Top width of tank bund = 2.00m
Tank bund level = +114.50m
Side slope of the bund on either side = 2[H] : 1[V]
Hydraulic gradient = 1:5
Level of hard strata = 109.50m
Ryve's co-efficient of combined catchment area = 9 **(25 Marks)**

Draw to a suitable scale:
　a. Cross section across the weir. **(15 Marks)**
　b. Half plan at top and half plan at foundation. **(20 Marks)**
　c. Half elevation and half sectional elevation. **(10 Marks)**

5 A sluice is an opening by a gate for drawing supplies from a tank reservoir or canal etc. The barrel of the sluice may be masonry or cement concrete (or) R.C.C. pipe.
Design tank sluice for a tank bund with the following particulars:

Maximum Water Level [MWL]	= +50.90m
Full Tank Level [FTL]	= +50.00m
Ground level in u/s	= +47.50m
R.L of the sill level	= +47.00m
Good hard soil available for foundation	= +46.50m
The average water level	= +47.30m
Side slope of the bund on u/s side	= 1.5[H] : 1[V]
Side slope of the bund on D/S side	= 2[H] : 1[V]
Top level of the bund	= +52.15m
Top bund width	= 2.5m
Canal bed width	= 1m
Canal discharge	= 0.1m³/sec
Canal bed level	= +47.00m
Full supply level of canal	= +47.50m
Side slope of canal	= 1:1
Canal bank level	= +48.50m

(25 Marks)

Draw to a suitable scale.
a. Cross-section of the bund along the plug sluice. **(15 Marks)**
b. Half plan at top and half plan at foundation. **(20 Marks)**
c. Half sectional elevation and half front elevation u/s face. **(10 Marks)**

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