



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 Mm ³	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 = 50000kN.
 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	= 0.1m ³ /sec
Canal bed level	= +47.00m
Full supply level of canal	= +47.50m
Side slope of canal	= 1:1
Canal bank level	= +48.50m

Draw to a suitable scale.

- Cross-section of the bund along the plug sluice.
- Half plan at top and half plan at foundation.
- Half sectional elevation and half front elevation u/s face.

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(25 Marks)

(15 Marks)

(20 Marks)

(10 Marks)

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