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10CV65

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Hydraulic Structures and Irrigation Design Drawings

Time: 4 hrs.

Max. Marks:100

Note: Answer any TWO full questions form PART – A and any ONE full question from PART - B.

PART – A

- 1 a. What do you understand by mass inflow curve and demand curve? Explain the method of calculating reservoir capacity for a specified yield from the mass inflow curve (with neat sketches). (08 Marks)
- b. A reservoir has a capacity of 6 Mm^3 and a drainage area of 250 km^2 . The average annual run-off is 400 mm and the sediment yield is 12.5 MN/km^2 . The sediment has an average specific weight of 15 kN/m^3 . Find the time required to reduce the reservoir capacity to 2 Mm^3 . Adopt a uniform volume increment of 1 Mm^3 . The trap efficiency Y may be approximated by the following equation:

$$Y = 100 \left[1 - \frac{1}{100X + 1} \right]^{1.5} \text{ where } X \text{ is capacity inflow ratio.} \quad (07 \text{ Marks})$$

- 2 a. What do you understand by uplift pressure? Explain with neat sketch, various ways to reduce uplift pressure on gravity dams. (07 Marks)
- b. Explain elementary profile of a gravity dam. Derive expressions for base width of an elementary profile for no tension and no sliding criteria. (08 Marks)
- 3 a. Discuss in brief any two causes of failure of earth dams. (08 Marks)
- b. Discuss various seepage control measures necessary in earth dams with neat sketches. (07 Marks)

PART – B

- 4 Design the surplus weir for a tank having the following data:

Combined catchment area = 25.89 sq kms

Intercepted catchment area = 20.71 sq kms

Full tank level = $\text{RL} + 162 \text{ m}$

Maximum water level = $\text{RL} + 162.75 \text{ m}$

General ground level at the proposed site of work = $\text{RL} + 161.00 \text{ m}$

Ground level below the proposed surplus work = $\text{RL} + 160.00 \text{ m}$

Top bund level = $\text{RL} + 164.50 \text{ m}$

Top width of bund = 2 m

Side slope on either side of bund = $2 : 1$

Good soil for foundation = $\text{RL} + 159.50 \text{ m}$

(25 Marks)

Assume Ryve's coefficient as $C = 10$ and $c = \frac{1}{4} C$. Draw to a suitable scale the following

views:

- a. Longitudinal section and longitudinal elevation (15 Marks)
- b. Half plan at bottom and half plan at top (20 Marks)
- c. Section across the weir (10 Marks)

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

	Canal u/s	Canal d/s
Full supply discharge	4 m ³ /s	4 m ³ /s
Bed width	6 m	6 m
Bed level	RL 110.00 m	RL 108 m
Full supply depth	1.50 m	1.50 m
Full supply level	RL 111.50 m	RL 109.50 m
Top width of bank	2m	2 m
TBL	RL 112.50 m	RL 110.50 m

Ground level at the site of work = RL 110.50 m.

Good soil available for foundation = 108.50 m.

(25 Marks)

Draw to a suitable scale the following views:

- Section across drop wall
- Half plan at bottom and Half plan at top
- Longitudinal section along drop wall and end view form d/s side

(15 Marks)

(20 Marks)

(10 Marks)

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