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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:

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

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 = RL + 162 m
   Maximum water level = RL + 162.75 m
   General ground level at the proposed site of work = RL + 161.00 m
   Ground level below the proposed surplus work = RL + 160.00 m
   Top bund level = RL + 164.50 m
   Top width of bund = 2 m
   Side slope on either side of bund = 2 : 1
   Good soil for foundation = RL + 159.50 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 m³/s	4 m³/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:
a. Section across drop wall   **(15 Marks)**
b. Half plan at bottom and Half plan at top   **(20 Marks)**
c. Longitudinal section along drop wall and end view form d/s side   **(10 Marks)**

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