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10CV65

Sixth Semester B.E. Degree Examination, June/July 2019
Hydraulic Structures and Irrigation Design Drawing

Time: 4 hrs. Max. Marks:100

Note: *1. Answer any TWO full questions from Part-A and ONE question from Part-B.*
2. Assume any missing data suitably.

PART – A

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

b. Write methods used for control of silting of reservoir. **(04 Marks)**

c. The following information is available regarding the relationship between trap efficiency and capacity inflow ratio for a reservoir:

Capacity/inflow ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Trap efficiency (%)	83	93	95	95.5	96	96.5	97	97.2	97.3	97.5

Find the probable life of the reservoir with an initial reservoir capacity of 30 million cubic meter. If the annual flood inflow is 60 million cubic metre and the average annual sediment inflow is 3600000kN. The sp. weight of sediment is 12kN/m^3. Assume the usefull life of reservoir will terminate when 80% of initial capacity is filled with sediment. **(07 Marks)**

2 a. Define gravity dam. Explain the various forces acting on gravity dam with the help of neat sketch. **(07 Marks)**

b. Determine the maximum and minimum vertical stresses to which the foundation of the dam will be subjected from the following data:
Total overturning moment about toe $\sum M_O = 1.3 \times 10^6$ kN-m
Total resisting moment about toe $\sum M_R = 2.7 \times 10^6$ kN-m
Total vertical forces $\sum V = 56000$kN
Base width of the dam – 60.0m
Slope of d/s face 1H:1V
Also calculate the maximum principal stress at the toe. Neglect tail water depth. **(08 Marks)**

3 a. Explain different types of earthen dams with neat sketches. **(07 Marks)**

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

PART – B

4 Design a tank surplus weir for a major tank connected with series of tanks.
Field data:
Combined catchment area of group of tanks : 39.0 km^2
Intercepted catchment area : 27.3 km^2
General ground level at proposed site : +35.0m
Level at which good foundation soil is available : +33.0m
Slope at which proposed surplus weir works from its centerline reaches +34.0m in a distance of 10m
Construction details:
Full tank level: +36.50m
Maximum water level : +37.50m
Tank bund level : +39.00m
Top width of bund : 2.5m
Side slopes : 2:1

Other details:

Make provisions to store upto MWL. Design proper abutment, wing walls and return walls. Assume hydraulic gradient of 1 in 5 and Ryves constant = 9, modified Ryves coefficient fn intercepted catchment area = 1.5. **(25 Marks)**

Draw to a suitable scale.

a. Half plan at top and half plan at foundation **(20 Marks)**

b. Half elevation and half sectional elevation **(12 Marks)**

c. Cross section across weir. **(13 Marks)**

5 Design a canal drop (notch type) for the following data: **(25 Marks)**

Particulars	u/s	D/s
Full supply discharge	6 m^3/sec	6 m^3/sec
Bed level	+52.0	+50.0
Full supply level	+53.5	+51.5
Bed width	8m	8m
Top level of embankment	+54.5	+52.5
Average ground level	+53.0	+51.0
Top width of embankment	2.0	2.0

Hard soil available at +50.0

Side slopes – in cutting 1:1

In embankment 1.5:1

Draw to a suitable scale:

a. Half plan at top and half at foundation. **(20 Marks)**

b. Half elevation and half longitudinal section. **(12 Marks)**

c. Cross section along the canal. **(13 Marks)**

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