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10CV65

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Hydraulic Structures & Irrigation Design Drawing

Time: 4 hrs.

Max. Marks:100

Note: 1. Answer any TWO full questions from Part-A and any 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. Define the terms density currents and economic height of a dam. (04 Marks)
 c. A proposed reservoir has capacity of 500 ha-m. The catchment area is 125 km² & the annual stream flow averages 120 mm of runoff. If the annual sediment production is 0.03 ha-m/km², what is the probable life of the reservoir before its capacity is reduced to 10% of its initial capacity by sedimentation? The relationship between trap efficiency ($\eta\%$) and capacity inflow ratio C/I is as follows: (07 Marks)

C/I	0.01	0.02	0.04	0.06	0.1	0.2	0.3	0.5	0.7
$\eta\%$	43	60	74	80	87	93	95	96	97

- 2 a. Define Gravity dam with a neat sketch. Explain the various forces acting on Gravity dam. (08 Marks)
 b. Determine the maximum & minimum vertical stresses to which the foundation of the dam will be subjected from the following data:
 Total over turning moment about toe, $\Sigma M_c = 1.2 \times 10^6$ kN-m
 Total resisting moment about toe, $\Sigma M_p = 2.5 \times 10^6$ kN-m
 Total vertical force about toe $\Sigma V = 6 \times 10^4$ kN
 Base width of the dam = 55 m
 Slope of d/s face = 0.8 : 1
 Also calculate the maximum principal stress at the toe. Neglect tail water depth. (07 Marks)

- 3 a. Explain different types of earthen dams with neat sketches. (06 Marks)
 b. Explain the causes for failure of earthen dam. (09 Marks)

PART - B

- 4 Design a canal drop (Notch type) for the following particulars: (25 Marks)

Particulars	U/s Canal	d/s canal
Full supply discharge	10 m ³ /s	10 m ³ /s
Bed level	+120.0 m	+118.0 m
Full Supply level	+121.5 m	+119.5 m
Bed width	8.0 m	8.0 m
Top level of embankment	+122.5 m	+120.5 m
Top width of embankment	2.0 m	2.0 m
Side slopes	1 : 1 (Cut)	1.5 : 1 (Fill)
Average Ground level	120.5 m	120.5 m

Hard soil is available at 118.5 m.

Draw to a suitable scale:

- (i) Half plan at top & half at foundation. (20 Marks)
 (ii) Half elevation & half longitudinal section (15 Marks)
 (iii) Cross-section along the canal. (10 Marks)

Important Note: 1. On completing your answer, you must sign and submit to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.
 2. Any revealing of identification, app...



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5 Design details of a canal regulator is as follows:

Particulars	U/s	d/s
Full supply discharge	18.0 m ³ /s	15.0 m ³ /s
Bed width	12 m	12 m
Full Supply level	+12.0 m	+12.0 m
Top Bank level	+13.0 m	+13.0 m
Bed level	+10 m	+10.0 m
Top width of bank	2.0 m	2.0 m
Side slopes	2 : 1	2 : 1

Bligh's coefficient = $C = 10$

General Ground Level at the site, +12.0 m

Good soil for foundation is available at + 9.0 m

Splayed wingwalls are to be provided.

Design the Vent way, Gates, Apron & Protection works

(25 Marks)

Draw to suitable scale, the following views:

(i) Half longitudinal section & half longitudinal elevation.

(20 Marks)

(ii) Half plan at top & half at foundation.

(15 Marks)

(iii) Sectional elevation through regulator vent.

(10 Marks)

