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HFL of reservoir = 197.5 m

Width of the top dam = 4.5 m

Upstream slope = 3 : 1

Downstream slope = 2 : 1

Determine the phreatic line for this dam section & the discharge passing through the dam.

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B.Tech. (Civil) 7th Semester (G-Scheme)

Examination, December-2022

DESIGN OF HYDRAULIC STRUCTURES

Paper - PCC-CE-405 G

Time allowed : 3 hours]

[Maximum marks : 75

Note: Question No. 1 is compulsory. Attempt total five questions, selecting one question from each unit.

1. Write short note on the following : 6×2½=15
 - (a) Discharge formula for Ogee Spillway
 - (b) Requirements of spillway
 - (c) Types of cross-drainage work
 - (d) Seepage line and its importance
 - (e) Canal falls
 - (f) Components of guide bank

Unit - I

2. What is the importance of River training works? What are the factors on which meandering of rivers depends? 15

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3. (a) What is flood routing? Discuss the different methods for flood routing. $7\frac{1}{2}$
(b) Explain the graphical method of flood routing. $7\frac{1}{2}$

Unit - II

4. (a) What are the factors which affects the selection of suitable type of cross-drainage works? $7\frac{1}{2}$
(b) Design a syphon aqueduct with the following data: $7\frac{1}{2}$

For canal

Discharge = 55 cumecs

Bed width = 30 m

F.S. depth = 2 m

R.L. of bed = 267.00 m

For drainage

High flood discharge = 400 cumecs

HFL = 266.2 m

General bed level = 263.5 m

General ground level = 26.2 m

5. What is hydraulic design of Weir? Explain the design of the following components of Weir: 15
(i) U/S cutoff
(ii) Floor
(iii) Protection works- Make sketch where necessary.

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6. Design a 1.5 m Sarda type fall for a canal carrying a discharge of 40 cumecs with the following data : 15

Unit - III

- (a) Bed level upstream = 105 m
(b) Bed level downstream = 102 m
(c) Side slopes of channel = 1:1
(d) F.S.L upstream = 106.8 m
(e) F.S.L downstream = 103.3 m
(f) Berm level upstream = 107.5 m
(g) Bed width u/s and d/s = 30 m
(h) Safe Exit gradient for Khosla's theory = 1/5

7. Which are the main types of spillways? Briefly discuss about each spillway with neat sketches where required. 15

Unit - IV

8. Which forces are considered on gravity dam? Discuss different modes of failure in gravity dam. 15
9. An earthen dam made of a homogeneous material have the following data: 15
Coefficient of permeability = $5 * 10^{-4}$ cm/sec
of dam material
Level of top of dam = 200 m
Level of deepest river bed = 178 m

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