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

9. What is meant by gravity dam ? Draw a neat typical cross-section of such a dam mentioning all the components of a dam. 15



Roll No. _____

# 3523

## B. Tech. 7th Semester (Civil) Examination – February, 2022

### DESIGN OF HYDRAULIC STRUCTURES

Paper : PCC-CE-405-G

**Time : Three hours ]** **[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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

1. Write short note on : 2.5 × 6 = 15

(a) Economic height of dam

(b) River Cut-offs

(c) Types of spillways

(d) Stilling basin

(e) Use of flood routing

(f) Factors governing the design of a weir

P. T. O.

## UNIT – I

2. Sketch a suitable cross-section of a guide banks as used in river training works. Explain the process of launching aprons in such works. 15

3. What is the basic equation of flood routing ? Describe step by step procedure that you will adopt for flood routing computations required for reservoirs under trial and error method. 15

## UNIT – II

4. (a) Differentiate between 7.5

(i) Syphon aqueduct and canal syphon

(ii) Aqueduct and super passage

(b) Explain how will you determine the following in design of a Syphon aqueduct 7.5

(i) Waterway of the drain & cross-sectional area of drain

(ii) Head loss through syphon barrel

(iii) Uplift pressure due to seepage flow

5. (a) Distinguish between a weir and a barrage. What are the limitations of Bligh's Theory ? 7.5

(b) What is hydraulic design of a weir ? Explain the design for different components of a weir. 7.5



## UNIT – III

6. (a) What is a canal fall ? Why is it necessary to provide a fall ? 7.5

(b) Discuss the merits and demerits of Notch type fall and Sarda type fall. 7.5

7. Describe an ogee spillway from the following data : 15

Height of spillway crest above bed = 100 m

Design of discharge = 10,000 $m^3$ / sec

Number of spans = 10

Clear distance between piers = 20 m

Thickness of piers = 5m

Slope of d/s for face of overflow section = 1: 1.25

Assume C =2

Draw the cross section of the designed spillway.

## UNIT – IV

8. An earthen dam made of a homogeneous material have the following data : 15

Coefficient of permeability of dam material = $5 * 10^{-4}$ cm/sec

Level of top of dam = 200 m

Level of deepest river bed = 178 m

HFL of reservoir = 197.5 m