

Roll No. ....

**24514**

**B. Tech. 7th Sem. (Civil Engineering) XI  
Examination – December, 2013**

**IRRIGATION ENGINEERING-II**

**'F' Scheme**

**Paper : CE-407-F**

**Time : Three hours ]**

**[ Maximum Marks : 100**

*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 :** Attempt *five* questions in all. Question No. 1 is **compulsory** and hence answer *one* question from each Section. All questions carry equal marks. Draw neat sketches with designs. Assume any design data, if missing.

1. (a) Do you agree that the design of a barrage involves the same procedure as a concrete weir.
- (b) The length of waterway for design of weir is given by .....
- (c) Write down basic flood routing equation.

(d) How syphon aqueducts are classified ?

(e) What is a stilling basin ?

5 × 4 = 20

### SECTION – A

2. Distinguish between a weir and a barrage. Hence design a vertical drop weir on the basis of Bligh's Theory for the following data :

Maximum flood discharge 1500 cumecs

HFL before construction of weir 182.5 m

River Bed Level 178.0 m

FSL of canal 181.5 m

Allowable afflux 1.0 m

Coefficient of Creep 11

Assume any other data, not given. 20

3. Design and sketch a Guide Bank including launching apron for the following data :

Maximum Discharge = 10,000 cumecs

Highest flood level = 250.00 m

River bed level = 242.00 m

River bed material's average size = 0.25 mm 20

### SECTION – B

4. What is flood routing ? Explain the basic flood routing equation and outline its method of solution. 20

5. Explain how will you determine the following in design of a Syphon aqueduct : 20

- (a) Waterway of the drain & cross-sectional area of drain.
- (b) Head loss through syphon barrel.
- (c) Uplift pressure due to seepage flow.

### SECTION - C

6. Design a 1.5 metres Sarda type fall for a canal carrying a discharge of 40 cumecs with the following data : 20

Bed Level upstream = 105.0 m

Bed Level downstream = 102.0 m

Side slopes of channel = 1 : 1

F.S.L. upstream = 106.8 m

F.S.L. downstream = 103.3 m

Berm Level upstream = 107.5 m

Bed Width u/s and d/s = 30.0 m

Safe Exit gradient for Khosla's theory =  $1/5$

7. (a) Describe with neat sketches, how top seepage line is drawn in a homogeneous dam without any arrangement for drainage.

(b) Describe *one* method adopted for controlling seepage through body of the dam and its foundation.

$$10 + 10 = 20$$

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(3)

P. T. O.

## SECTION – D

8. Design an ogee spillway for following data : 20

Ht. of spillway crest above bed = 100 m

Design discharge =  $10000 \text{ m}^3/\text{sec}$

Number of spans = 10

Clear distance between piers = 20 m

Thickness of piers = 5 m

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

Assume

$C = 2.$

Hence draw to a scale the cross-section of above designed spillway.

9. Design a siphon-aqueduct with following data : 20

Canal : Discharge = 30 cumecs, Bed width = 25 m,

Depth of water = 1.5 m, Bed Level = 230.00

Drainage : High flood discharge = 800 cumecs,

HFL = 232.50 m, Bed Level = 228.00 m,

General ground level = 230.00 m.