

Roll No. 3322199

24379

B. Tech. 6th Semester (Civil Engg.)

Examination – May, 2014

IRRIGATION ENGINEERING - I

Paper : CE-304-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 : Answer *five* questions selecting *one* from each section and Q. No.1 is *compulsory*

1. Write short notes on any *four* of the following : 4 × 5

- (i) Canal escapes
- (ii) Causes of failure of a hydraulic structure
- (iii) Drainage galleries
- (iv) Forces acting on a concrete gravity dam

(v) Design of filters in earth dam

(vi) Canal alignment

(vii) Stability criteria of an earth dam

SECTION – A

2. What is a canal fall ? What is the proper location of a canal fall ? Explain different types of falls with neat sketches. 20
3. What are the design principles of Straight Glacis Fall ? 20

SECTION – B

4. (a) What is cross drainage works ? Explain different types of cross drainage work along with neat sketches. 15
- (b) What are the governing criteria for selection of a suitable type of cross drainage work ? 5
5. With the help of a neat sketch explain the working of different components of a diversion head-works. 20

SECTION – C

6. The following data refers to a non-overflow section of a gravity dam : 20

R. L. of the crest of the dam = 315m

R. L. of the bottom of the dam = 260 m

Full reservoir level = 312 m

Tail water level = 265 m

Top width of the dam = 12 m

Upstream face is vertical and downstream slope is 0.7 H: 1 V Drainage holes are located 8 m away from the upstream face. Unit weight of concrete = 23.5 kN/m^3

Allowable stress in concrete may be taken as 2500 kN/m^2

Coefficient of friction between concrete and foundation rocks = 0.7

Calculate :

- (i) The maximum vertical stresses at the heel and toe of the dam.
- (ii) The major principal stress at the toe of the dam.
- (iii) The intensity of shear stress on a horizontal plane near the toe.
- (iv) Factor of safety against overturning
- (v) Factor of safety against sliding.

7. (a) Write different classifications of dam. What are the factors affecting the site selection of a concrete dam ? 10
- (b) What are the design criteria for Earth Dam ? 10

SECTION – D

8. What is spillway ? Explain different types of spillways and their suitability along with neat sketches. 20
9. Explain different types of energy dissipaters with the help of neat sketches. 20