

Roll No.

24514

B. Tech. 7th Semester (Civil Engineering)

Examination – December, 2012

IRRIGATION ENGG.-II

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 complain in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Question No. 1 is *compulsory*. Attempt *one* question from each Section. All questions carries equal marks (20 marks).

1. (a) List the various factors governing design of Weir.
 $2 \times 10 = 20$
- (b) What is the criterion for safe design of earth dam ?
- (c) What is the use of flood routing ?
- (d) If the discharge of canal is 40 cumecs, what shape of crest would you recommend for sarda type of fall ?
- (e) Why are spillways provided in dam ?
- (f) What is the width of launching apron of the guide banks ?

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- (g). What is the relation between discharge & focal distance in determination of phreatic line when dam section is homogenous & provided with horizontal filter.
- (h) Show by rough sketch the type of cross-section work suitable for the following :

	Drain	Canal
Discharge in cumecs	200	20
BL	25.0 m	30.0 m
FSL		31.50 m
HFL	28.0 m	

- (i) What is the top width of earthen dam ?
- (j) Write discharge formula for Ogee spillway.

SECTION - A

2. What is hydraulic design of Weir ? Explain the design of following components of Weir : 20
- U/S cutoff,
 - floor,
 - protection works – Make sketch where necessary.

3. The following hydraulic data pertains to a bridge site of a river. 20

Maximum discharge = 7,000 cumecs

Highest flood level = 105.00 m

River bed level = 101.00 m

Average diameter of river bed material = 0.10 mm

Design Bell's Bunds including launching apron to train the river. Draw a neat sectional view of the bund with necessary dimensions.

SECTION – B

4. The following data at the crossing of a canal & a drainage is given below : 20

(i) Discharge of canal	=	40 cumecs
(ii) Bed width of canal	=	30 m
(iii) Full supply depth of canal	=	1.6 m
(iv) Bed level of canal	=	206.4 m
(v) Side slopes of canal	=	$1\frac{1}{2}$ H : 1 V
(vi) High flood discharge of drainage	=	450 cumecs
(vii) High flood level of drainage	=	207.0 m
(viii) Bed level of drainage	=	204.5 m
(ix) General ground level	=	206.5 m

Design the following components of a syphon aqueduct :

- Drainage waterway,
- Canal waterway,
- Bed levels at different sections.

5. What are the steps involved in trial & error method of flood routing ? 20

SECTION – C

6. Design a 1.5 meters Sarda type fall for a canal having a discharge of 15 cumecs, with the following data : 20

(i) Bed level upstream	=	103.0 m
(ii) Side slopes of channel	=	1 : 1
(iii) Bed level downstream	=	101.5 m
(iv) Full supply level upstream	=	104.5 m
(v) Bed width U/S & D/S	=	10.00 m
(vi) Soil	=	Good Loam
(vii) Assume Bligh's coefficient	=	6

7. An earthen dam made of a homogenous material have the following data : 20

- (i) Coefficient of permeability of dam material = 5×10^{-4} cm/sec
- (ii) Level of top of dam = 200.0 m
- (iii) Level of deepest river bed = 178.0 m
- (iv) HFL of reservoir = 197.5 m
- (v) Width of the top of dam = 4.5 m
- (vi) Upstream slope = 3 : 1
- (vii) Downstream slope = 2 : 1

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

SECTION - D

8. Discuss briefly the design principles that are involved in the design of an Ogee spillway. 20
9. What is meant by gravity dam ? Draw a neat typical cross-section of such a dam mentioning all the components of a dam. 20