FACULTY OF ENGINEERING

B. E. 4/4 (Civil) I – Semester **(Old)** Examination, July 2010

Subject : **Water Resources Engineering - II**

Time : 3 Hours}　　　　　　　　　　　　　　　　　　　　　　{Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.

PART – A (25 Marks)

1. What is a mass curve and state its usefulness ? (2)
2. State the difference between Retarding reservoir and detention reservoir. (2)
3. Draw the practical profile of gravity dam with appropriate equations. (3)
4. What do you understand by middle third rule and state its importance in analysis ? (3)
5. State the equation of D/S profile on ogee spillway and state the terms. (3)
6. State the conditions suitable for providing vertical lift gates and Tainter gates.(2)
7. The flow net analysis of an earthen dam indicates that the number of potential drops are 10 and no. of flow channel are 6. Compute the seepage through earthen dam when permeability of medium is 6×10^{-4} m/day and head action is 6m. (3)
8. State the functions of filters in earthen dams. (2)
9. State the environmental impacts of implementing water resource projects. (2)
10. List out physiographical classification of India. (3)

PART – B (5x10=50 Marks)

11.(a) With the help of neat sketch explain various zones of reservoir. (4)

(b) The mean monthly discharges of a river in a year are given below. Assume 12% losses. (6)

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean flow Cumess	40.7	69	105	71.2	26.4	24.5	54	92.4	86.1	51.2	46	25.2

Compute the storage required to draw entire water uniformly.

12. The following data refer to a Non-overflow section of gravity dam. (10)

(a) R.L. Top of dam　　　=　　315m

(b) R.L. Bottom of dam　　=　　260m

(c) Full reservoir level　　=　　312m

(d) Top width of dam　　　=　　12m

(e) Upstream face is vertical.

Downstream face is vertical upto

RL of 304m, there after it has batter slop with 0.7H : 1V, upto base.

Assume unit weight of concrete 23 KN/m³.

Reduction in uplift at drainage is 50% and coefficient of friction is 0.8

Determine the following :

(i) Factor of safety overtunning

(ii) Factor of safety against sliding

(iii) Maximum pressure on foundation

(iv) Maximum principle stress

13.(a) List out various types of I.S. stilling basins for the horizontal apron. Explain any one with a neat sketch. (5)

(b) Design and draw downstream profile of a Ogee spillway with the following data: (5)

Peak discharge	=	4200 cumecs
Height of Peak flow from river bed	=	50m
Length of spillway consists of 5 spans of 30m clear	=	150m
Coefficient of discharge	=	2.20
Slop of D/S face	=	0.7 : 1
Pier coefficient	=	0.01
Abutmast coefficient	=	0.1

14.(a) Explain various failures of earthen dams with the help of neat sketches. (5)

(b) Derive Casagrande's analytical solution for computation of see page in earthen dam with horizontal filter. (5)

15.(a) Explain the objectives of water Resources development. (6)

(b) Discuss engineering economy of water resources projects. (4)

16.(a) Explain with the help of neat sketches any two types of crest gates popularly adopted. (4)

(b) Explain the design criteria for design of earthen dams. (6)

17. Write note on the following : (10)

(a) Elementary and practical profile of dam.

(b) Jump high curve and Tail water

(c) Seepage control of earthen dams

*****