FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I - Semester **(Main)** Examination, December 2011

Subject : **Surface and Ground Water Management**
(Elective – I)

Time : 3 Hours

Max. Marks: 75

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

PART – A (25 Marks)

1.	What data required for water resources project planning ?	(2)
2.	What do you understand by lagrangian multipliers give examples?	(2)
3.	Define conjunctive use and write its benefits.	(2)
4.	Explain waste water recharge.	(2)
5.	Write the difference between analog model and viscous fluid model.	(2)
6.	What is system analysis? State its characteristics briefly in general for a major water resources project?	(3)
7.	Differentiate between slack, surplus and artificial variables. Write suitable reflecting then.	(3)
8.	State the purpose served by ground water investigations.	(3)
9.	State how dynamic programming can be applied to reservour operation briefly.	(3)
10.	What is induced recharge? Draw a neat sketch.	(3)

PART – B (5x10=50 Marks)

11.(a) Explain the concept of systems engineering and also write the various types of system commonly adopted with relevant examples. (5)

(b) Write physical, economical and environmental consideration which influence whole planning a water major resources project. (5)

12. The following linear programming model is formulated in certain water resources planning

Minimize $Z = 2x_1 + 3x_2 + x_3$

Subject to $= 2x_1 + x_2 - x_3 \geq 3$

$x_1 + x_2 + x_3 \geq 2$

$x_1, x_2, x_3 \geq 0$

Solve the problem using simplex method and obtain solution. (10)

13.(a) Discuss how the basic yield of a ground water basic sin determined. (5)

(b) What is salinity of a soil explain the causes of salinity of a soil. (5)

14.(a) Explain the artificial recharge methods using basic method and stream channel method. (5)

(b) Explain about various methods of recharge moulds with aid of sketches. (5)

15. Formulate a linear programming model for deciding the optimal cropping pattern in an irrigation command area. Explain all the variables in general form consider all the relevant hydrologic and hydraulic constraints. Consider different crops considered and state the number of variables for a monthly formulated model. (10)

16.(a) Briefly explain about sand tank model and porous media models. (6)

(b) Write short notes on different types of simulation models and state their suitability for different water resources problems. (4)

17. Write short notes on any two of the following : (2x5)

(a) Concept of basin management