

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
PART III SECOND SEMESTER EXAM.- JUNE - 2010
IRRIGATION SYSTEMS DESIGN - TCW 3204**

INSTRUCTIONS

Answer any *two* (2) questions from section A and in Section B question *one* (1) is compulsory and answer any one (1) question of your choice.

Time : 2 ½ Hours
Total Marks: 100

QUESTION 1

- (a) Define soil and its importance to crops. **(5 marks)**
- (b) How does soil profile and structure influence irrigation? **(10 marks)**
- (c) Does soil type determine the setting of irrigation system? **(10 marks)**

QUESTION 2

- (a) Describe soil – water – plant relationships. **(10 marks)**
- (b) Soil water exists in different forms.
Briefly name one of them, explain the most important of all and why? **(15 marks)**

QUESTION 3

State and explain fully the concept of nutrient movement in plants. How does irrigation affect the above processes and can they occur without the application water. Explain your reasoning. **(25 marks)**

QUESTION 4

Outline all the processes involved in the hydrological cycle. Explain which ones are harmful to the soil and why? How does the cycle influence the design on any given irrigation system? **(25 marks)**

SECTION B

Question I is compulsory and then answer any one of your choice.

QUESTION 1

- (a) Describe all the stages involved in efficient land preparation for irrigation. **(10marks)**
- (b) Name which stages are vital in the land preparation for irrigation and why? **(5 marks)**
- (c) What are the conditions necessary for all surface irrigation methods? **(5 marks)**
- (d) State the difference between border and sprinkler irrigation **(5 marks)**

QUESTION 2

- (a) Explain the procedures that are required for a proper irrigation project planning **(15 marks)**
- (b) What is involved in Trickle irrigation and Design. **(5 marks)**
- (c) How does the design of sprinkler irrigation differ from trickle Irrigation. **(5 marks)**

QUESTION 3

- (a) Briefly state and describe what is involved in the operation of irrigation Systems. **(10 marks)**
- (b) Outline the proper management of any one irrigation system studied **(10 marks)**
- (c) Can operation and management be separated when considering irrigation system. **(5 marks)**

QUESTION 4

Irrigation application and systems are part of any agricultural enterprises of Size

Shortly state any economic areas to be considered as a guide to

- (a) Selection of irrigation systems, **(10 marks)**
- (b) Selection of crop coefficients **(5 marks)**
- (c) Selection of land size **(5 marks)**
- (d) Section of crop – water requirements **(5 marks)**

END