2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
III B.TECH I SEMESTER REGULAR EXAMINATIONS
WATER RESOURCE ENGINEERING-I
(CIVIL ENGINEERING)

NOVEMBER 2005

TIME: 3 HOUR
MARK: 80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS

1. (a) Compare and contrast surface and sub-surface irrigation.

(b) Explain the furrow method of irrigation. With the help of a neat sketch. What are its advantages.

2. (a) Define soil moisture Deficiency, crop ratio, paleo irrigation and overlap al- lowance.

(b) 10 cumecs of water is delivered to a 32 hectare field, for 4 hours. Soil proving after the irrigation indicates that 0.3 m of water has been stored in root zone. Compute the water application efficiency.

3. (a) What is a rainfall hyetograph. How is it derived from a given rainfall mass curve.

(b) In a certain river basin there are six raingauge stations. The normal annual rainfall depths at the stations being 42.4, 53.6, 67.8, 78.5, 82.7 and 95.5 cm respectively. Determine the optimum number of raingauge stations to be established in the basin, if it is desired to limit the error in the mean value of rain-fall over the catchment to 10% and indicate how you distribute them.

4. Describe in detail how the total precipitation is transformed into the total runoff.

5. (a) Define cone of depression and radius of influence. Explain steady state radial flow in an aquifer.

(b) Calculate the coefficient of permeability from the following data of a 15 cm diameter strainer tube well discharging 50 lps. The length of the strainer is 40 m and the drawdown is 5 m. The radius of influence may be assumed as 300 m. Determine the discharge when

i. the depression head is increased to 6m.

ii. the well diameter is increased to 30 cm.

iii. the strainer length is increased to 60 m.

6. (a) Discuss the classification of canals based on discharge and its relative impor- tance in a given network of canals.

(b) Design an irrigation channel to carry a discharge of 50 cumecs by Kennedy's theory. Assume a slope of 1 in 5000, N = 0.025 and m = 1.0.

7. (a) Explain the different stages of a river. Which stage is suitable for head works. Also explain the criterion for fixing pond level and water way.

(b) State the functions of the following in a head works with illustrate sketches.

i. Silt excluder

ii. Divide wall

iii. Sheet piles.

8. Design a vertical drop weir using Bligh's theory for the following data.

(a) Maximum flood discharge = 1200 cumecs.

(b) HFL before construction of weir = 172.5 m

(c) River Bed Level = 168.0 m

(d) FSL of canal = 171.5 m

(e) Allowable Afflux = 1 m

(f) Coefficient of creep = 11

The weir wall need not be designed and its dimensions may be taken as top width = 3 m; Bottom width = 6 m. Assume any other data not given.