Total No. of Printed Pages:3

SUBJECT CODE NO: H-193
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (Civil)
Water Resource Engineering - I
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Question no. 1 and question no. 6 are compulsory.
ii. Attempt any two questions from remaining questions from each section.
iii. Figures to right indicate the maximum marks.
iv. Assume suitable data, if necessary

Section A

Q.1 Attempt any five. 10

a) Enlist the various practical applications of hydrology.
b) What are the points to be kept in mind for selection of Rain – gauge site?
c) What do you mean by evaporimeter? Enlist various evaporimeters.
d) Define infiltration and percolation.
e) Define rainfall excess and effective rainfall.
f) What is meant by base flow separation?
g) Define stream gauging.
h) What are the objectives of flood frequency analysis?

Q.2 a) Discuss the various methods available to estimate the missing precipitation record. 09

b) The total observed runoff volume during 8h storm with a uniform intensity of $1.8\ cm/h$ is $25 \times 10^6 m^3$. If the area of the basin is $250 km^2$,find the average infiltration rate for the basin. 06

Q.3 a) What do you understand by synthetic unit hydrograph? Explain how it is derived. 06

b) The following are the ordinates of a storm hydrograph of a river draining a catchments area of 500 km^2 due to a 6 – hour isolated storm. Derive the ordinates of a 6 – hour unit hydrograph for the catchment. 09

Time from start of storm	0	6	12	18	24	30	36	42	48	54	60	66	72
Discharge(m^3/s)	0	10	60	90	130	180	220	170	135	100	65	30	10

Assume base flow of $10.0\ m^3/sec$.

Q.4 a) Explain with a neat sketch the method of measuring the velocity at a point in a stream by using a current meter. 07

b) Explain with neat sketch different types of precipitation? 08

Q.5 Write a short note on (<u>any three</u>) 15

a) Hydrologic cycle.
b) Factors affecting evapotranspiration process.
c) Unit hydrograph derivation
d) Gumbel's distribution.

Section B

Q.6 Attempt <u>any five</u> 10

a) State Darcy's law
b) Define porosity and permeability.
c) Differentiate between confined aquifer and unconfined aquifer.
d) What are the functions of irrigation water?
e) Explain the term delta and duty.
f) A crop requires a total depth of 82cm of water for a base period of 110 days. Find the duty of water.
g) What is the necessity of watershed development?
h) Define waterlogging, and what are the ill effects of water logging?

Q.7 a) Derive an expression for discharge from a well in unconfined aquifer the well fully penetrates it. 08

b) A tube well penetrates fully in a 7.0m thick confined aquifer with coefficient of permeability of $0.002m/sec$. The well radius is 15cm and drawdown is 6.0m. Calculate the discharge from the well. What will be the percentage increase in discharge if radius of well is doubled? Take radius of zero drawdown is 400m in each case. 07

Q.8 a) Define the following: 08

i. Root zone depth
ii. Kor depth and kor period
iii. Culturable commanded area
iv. Water conveyance efficiency

b) Find the capacity of a soil for the following data: 07

i. Root zone depth = 3m
ii. Existing water content = 7%
iii. Dry density of soil = 1.7 g/cm^3
iv. Water applied to the soil = $430m^3$
v. Water loss due to evaporation etc. = 12%
vi. Area of plot = 1250sq. meters.

Q.9 a) Explain with neat sketches different watershed structures in drainage line treatment. 08

b) Write a short note on remedial measure of water logging. 07

Q.10 Write a short note on (any three): 15

a) Recuperation test
b) Irrigation water standards
c) Crop rotation and important crops in India.
d) Interference among wells