Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Water Resources Engineering
Subject Code: 4TE05WRE1 Branch: B.Tech (Civil)
Semester: 5 Date: 16/11/2019 Time: 10:30 To 01:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Define watershed.

b) Give two examples for cash crop.

c) What is the application of hydrology?

d) Draw the S- curve unit hydrograph.

e) Write the name of non automatic rain gauge.

f) What is mass rainfall curve?

g) Write formula for Isohyets' method.

h) What is W_{index}?

i) Define: Unit hydrograph.

j) What is meant by Aquiclude?

k) What is the difference between evaporation and transpiration?

l) Write the relationship between delta, duty and base period.

m) Define Runoff.

n) Enlist the types of soil.

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

(a) Describe the process of the hydrologic cycle with a neat sketch. **07**

(b) Give the name of automatic rain gauges and explain any one in detail with figure. **07**

Q-3 Attempt all questions (14)

(a) Enlist various methods of computing average rainfall over a drainage basin and explain Isohyetal method in detail. **07**

(b) Differentiate between hyetograph and hydrograph. **04**

(c) Describe various factors affecting precipitation at a location. **03**

Q-4 **Attempt all questions** **(14)**

(a) Explain: Hydrograph. Sketch a single peak flood hydrograph and discuss different elements of flood hydrograph. What are different uses of hydrograph? **08**

(b) A catchment area has five rain gauge stations. In a year the annual rainfall recorded by the gauges are as follows: **06**

Station	A	B	C	D	E
Rainfall (cm)	99.8	101.9	82.6	110.3	170.3

Calculate the minimum number of rain-gauge stations required in the catchment, to limit 8% error in the estimation of the mean rainfall.

Q-5 **Attempt all questions** **(14)**

(a) The rainfall values at gauging stations and corresponding areas of Thiessen's polygons for a drainage basin are as follows: Compute the average rainfall over the basin. **08**

Station	**A**	**B**	**C**	**D**	**E**
Area of Thiessen's polygon (km^2)	48	39	33	40	36
Rainfall (cm)	12.5	18.9	15.7	13.4	17.3

(b) What are the factors that affect Evapotranspiration? Describe any one method of measurement of Evapotranspiration. **06**

Q-6 **Attempt all questions** **(14)**

(a) What is Darcy's Law? What are its limitations? How will you measure the coefficient of permeability of a soil? **08**

(b) Explain structural and non-structural approaches of controlling damage due to floods. **06**

Q-7 **Attempt all questions** **(14)**

(a) Explain the rain water harvesting and groundwater harvesting techniques with neat sketch. **07**

(b) Write short note on National Water Policy. **07**

Q-8 **Attempt all questions** **(14)**

(a) Write short notes on water user organization. **07**

(b) Write a brief note on flood damage analysis. **07**