

**C.U.SHAH UNIVERSITY**  
**Summer Examination-2020**

**Subject Name: Water Resources Engineering**

**Subject Code: 4TE05WRE1**

**Branch: B.Tech (Civil)**

**Semester : 5**

**Date : 26/02/2020**

**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) What is a cyclone?
- b) Which instrument is used to measure the variation of the atmospheric humidity with time?
- c) What is the use of flow mass curve?
- d) Abbreviate WUS.
- e) What is multi peak hydrograph reflecting?
- f) Define unconfined aquifer.
- g) Which instrument is used to measure evaporation?
- h) Define the term 'Watershed'.
- i) Write the use of 'Stream gauges'.
- j) Write the relationship between base period, delta and duty.
- k) What is the difference in levels in a well before and after pumping?
- l) Define trap efficiency.
- m) Write the water budget equation.
- n) What is the minimum distance of nearest object from a rain-gauge?

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

**Q-2 Attempt all questions (14)**

- (a) What are the factors that affect Evaporation? Describe any one method of measurement of evaporation. **07**
- (b) What is meant by 'water harvesting'? Explain methods of roof water harvesting and water harvesting for agricultural use. **07**

**Q-3 Attempt all questions (14)**

- (a) Enumerate the name of automatic rain gauges and explain any one in detail with neat figure. **07**



- (b) 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. **07**

Station	A	B	C	D	E
Area of Thiessen's polygon (km <sup>2</sup> )	43	39	32	45	36
Rainfall (cm)	12.5	18.9	15.7	13.4	17.3

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

- (a) There are four rain gauge stations existing in the catchment of a river. The average annual rainfall values at these stations are 800, 620, 400 and 540 mm respectively. **08**

(i) Determine the optimum number of rain gauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 10%.

(ii) How many more gauges will then be required to be installed.

- (b) Explain the procedure for plotting the depth-area-duration curves. What are their uses? **06**

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

- (a) Define Unit Hydrograph. Discuss basic assumptions, applications and limitations of Unit Hydrograph theory. **08**

- (b) Explain the double ring infiltrometer with a neat sketch. **06**

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

- (a) Explain factors affecting duty. **06**

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

- (c) Write short note on negative base flow. **04**

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

- (a) Write a brief note on flood damage analysis. **04**

- (b) Describe Recuperation test for open well. **04**

- (c) What is the need for planning of water resources projects? Discuss the steps involved in the water resources planning. **06**

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

- (a) Write detailed note on flood control by constructing levees and flood walls. **07**

- (b) What is Darcy's Law? What are its limitations? How will you measure the coefficient of permeability of a soil? **07**

