Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY
Winter Examination-2015

Subject Name: Water Resources Engineering
Subject Code : 4TE05WRE1 **Branch : B.Tech(Civil)**
Semester : 5 Date : 2/12/2015 Time : 2:30 To 5:30 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	(a)	Define sub-surface runoff.	1
	(b)	Define direct runoff.	1
	(c)	Explain the term confined aquifer.	1
	(d)	Explain the term unconfined aquifer.	1
	(e)	What is an area of catchment is suitable for unit hydrograph theory?	1
	(f)	Which chemical compound is generally used to reduce the evaporation from water surface?	1
	(g)	What is consumption use?	1
	(h)	What is hydrology?	1
	(i)	Which instrument is used to measures the variation of the atmospheric humidity with time?	1
	(j)	What is the use of double mass curve technique?	1
	(k)	What is bank storage?	1
	(l)	Define transmissibility.	1
	(m)	Define permanent wilting point.	1
	(n)	What is flood routing?	1

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

Q-2	(a)	Explain how will you find out missing rainfall data?	5
	(b)	Write short notes on the ultrasonic methods for the measurement of discharge.	5
	(c)	A rain gauge 'D' was inoperative during a specific storm. The rainfall recorded at three surrounding stations A, B and C during that storm was 52, 85 and 70 mm respectively. If the average annual rainfall of stations A, B, C and D are 650, 900, 820 and 700 mm respectively, estimate the storm rainfall of station D.	4
Q-3	(a)	Discuss Slope-Area method for the measurement of discharge of a river.	5
	(b)	What are the different types of aquifers? Explain each in brief.	5
	(c)	The total observed runoff volume during a 6 h storm with a uniform intensity of 1.5 cm/h is 21.6 x 10^6 m^3. If the area of the basin is 300 km^2, find the average infiltration rate for the basin.	4
Q-4	(a)	Explain methods for improvement of duty.	5
	(b)	A 12-hr unit hydrograph (UH) of a catchment is triangular in shape with a	5

base width of 144 hr and peak discharge of 23 m^3/s. Calculate the area of the catchment.

(c) Find the delta for a crop if the duty for a base period of 140 days is 3456 hectares/cumec. 4

Q-5 (a) What is watershed management? What are the needs of Watershed management? 5

(b) Discuss the objectives of water resources development. 5

(c) A fully penetrating well of diameter 0.4 m is drilled in a confined aquifer 2.5 m thick. If the steady state draw downs at 10 m and 50 m are observed to be 2.50 m and 0.5 m. Determine the discharge. Take k = 1 x 10^{-3} m/s. 4

Q-6 (a) Write a short note on flood control by constructing levees and flood walls. 5

(b) The runoff from a drainage basin area 4320 km^2 is estimated as 10000 cumec-days. What is the depth of runoff? 5

(c) Differentiate between hyetograph and hydrograph. 4

Q-7 (a) For a drainage basin of 600km^2, isohyets drawn for a storm gave the following data: 7

Isohyets (cm)	40	35	30	25	20	15	10
Catchment area enclosed (km^2)	-	35	90	150	310	430	600

Estimate the average depth of precipitation over the basin.

(b) Explain Horton's equation of infiltration with neat sketch. 7

Q-8 (a) Explain ø- index and W-index with the procedure to determine the same. 7

(b) What is unit hydrograph? How it is constructed? Write assumptions and limitations of the unit hydrograph. 7