C.U.SHAH UNIVERSITY
Summer Examination-2016

Subject Name : Water Resources Engineering

Subject Code : 4TE05WRE1   **Branch :** B.Tech(Civil)

Semester : 5   **Date :** 21/04/2016   **Time :** 02:30 To 05:30   **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 Cryology?   01
   b) What is the full name of IHP?   01
   c) What is the use of double mass curve technique?   01
   d) Define Infiltration rate.   01
   e) Which instrument is used to measure evaporation?   01
   f) What is Horton's infiltration equation?   01
   g) What is hyetograph?   01
   h) Define Stream gauging   01
   i) What is Design flood?   01
   j) Define ground water hydrology.   01
   k) What is aquiclude?   01
   l) What is specific yield?   01
   m) Define wilting coefficient.   01
   n) Define normal pool level in reservoir.   01

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

Q-2   **Attempt all questions**   **(14)**
   (a) Explain the procedure of separating base flow in a hydrograph.   05
   (b) A fluorescent tracer with a concentration of 40 gm/litre was injected into   05
      a stream at a constant rate of 6 cm^3/second. At a downstream section
      sufficiently far away from the point of injection, the concentration was
      found to be 0.005 parts per million (ppm). Estimate the discharge in the
      stream. Neglect the initial concentration of the tracer.
   (c) The rainfall values at gauging stations and corresponding areas of   04
      Thiessen's polygons for a drainage basin are as follows:

Station	A	B	C	D	E	F	G
Area of Thiessen's polygon (km^2)	160	135	92	110	68	70	35
Rainfall (cm)	10.0	13.5	9.1	12.6	11.2	14.0	10.8

      Compute the average rainfall over the basin.

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

(a) Explain, with a neat sketch, occurrence of ground water at various locations below earth surface.   05

(b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainers is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0m and radius of influence was 300 m. Calculate the discharge.   05

(c) Distinguish between: Confined and Unconfined aquifers.   04

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

(a) Write a note on watershed management.   05

(b) Discuss the salient features of the area-velocity method for the measurement of discharge of a river.   05

(c) A water course is designed to irrigate an area of 840 ha of rice. The transplantation of rice takes 15 days and during this period the total depth of water required is 40 cm. Find the duty of irrigation water on the field if there is an effective rainfall of 10 cm. Also find the duty and discharge at the head of the water course, assuming losses of water as 25% in the water course.   04

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

(a) Explain the mass curve method that can be used for determining reservoir capacity.   07

(b) Describe in detail the factors affecting infiltration.   07

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

(a) Define unit hydrograph. Describe the procedure of deriving a unit hydrograph from a given flood hydrograph.   07

(b) The rates of rainfall for successive 30 minute period of a 3-hour storm are 1.5, 3.2, 4.3, 2.7, 2.1 and 1.2 cm/hr. The surface runoff in response to the storm is estimated to be 3.0 cm. Determine ϕ-index and w-index. Consider a total of depression and interception losses of 1.0 cm.   07

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

(a) Discuss factors consider while selecting the site for stream gauging station. What are the uses of stream gauging?   07

(b) Discuss water resources planning and its objectives.   07

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

(a) How would you classify the soil moisture for crop? Explain in brief the availability of soil moisture to crops.   07

(b) What are the various causes for the reservoir sedimentation? How would you reduce the rate of sedimentation?   07