Total No. of Printed Pages:2

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

[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) What is the importance of hydrology?
     b) What is precipitation? What are its different forms?
     c) Define evaporation and evaporation process.
     d) Define evapotranspiration and enlist the various factors which affect the evapotranspiration.
     e) What is rainfall simulator?
     f) What is hydrograph? Enlist various hydrographs used for runoff analysis.
     g) Define stream gauging.
     h) What are the objectives of flood frequency analysis?

Q.2   a) What are the practical applications of hydrology? Explain the hydrologic cycle with a neat sketch.   08
     b) A 7hr storm produced the following rainfall intensities(in mm/h)at half an hour intervals over a basin of area 1830 km^2:4,9,20,18,13,11,12,2,8,16,17,13,6 and 1. If the corresponding observed runoff is 40 million m^3, estimate the Φ-index for the storm.   07

Q.3   a) What is unit hydrograph? Discuss the uses and limitations of unit hydrograph.   06
     b) Using the ordinates of a 12-h unit hydrograph, determine the ordinates of 6-h unit hydrograph: 09

Time (h)	0	6	12	18	24	30	36	42	48	54	60
Ordinates of $12 - h\ UH$	0	60	140	190	230	210	180	140	90	30	0

Q.4   a) Give the various empirical formulae used for the estimation of peak flood discharges.   07
     b) Discuss the importance of evaporation control of reservoirs and possible methods of achieving the same.   08

Q.5   Write a short note on (any three)   15
     a) Rain – gauge network
     b) Infiltrometers
     c) Base flow separation
     d) Gumbel's distribution

SECTION B

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

         a) Define with sketch cone of depression and drawdown.
         b) Define coefficient of transmissibility.
         c) Write down the discharge equation for confined and unconfined aquifer with its meaning.
         d) Enlist the different crops in India.
         e) Find the delta for a crop if the duty for a base period of 90 days is 1350 hectares / cumec.
         f) Define field capacity and permanent wilting point with neat sketch.
         g) Explain with neat sketch loose boulder structure.
         h) Define water logging and enlist the causes of water logging.

Q.7   a) What do you understand by recuperation test? Derive the equation used in the recuperation   07
           test.

         b) Calculate the discharge in m^3/ day from a tube well under the following conditions;   08
            i.   Diameter of the well $= 45cm$
           ii.   Drawdown at the well $= 12m$
          iii.   Length of strainer $= 30m$
          iv.   Radius of influence of the well $=200m$
           v.   Coefficient of permeability $= 0.01\ cm\ /\ sec$
          vi.   Aquifer type = unconfined

Q.8   a) Define irrigation. What are the functions of Irrigation water? Explain with neat sketch of   08
           layout of drip irrigation.

         b) The GCA for an irrigation canal is 30000 ha, out of which 55% is CCA. The intensity of   07
           irrigation is 40% for Rabi and 50% for Rice. If kor period is 3 weeks for Rabi and 2.5
           weeks for Rice, determine the outlet discharge. The duty of water on the field for Rabi and
           Rice may be assumed as 1500 hectares/cumec and 750 hectares / cumec. Also calculate
           delta for each case.

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

         b) How the drainage of irrigated areas is done for water logged areas.   07

Q.10   Write a short note on (<u>any three</u>)   15
         a) Different methods of ground water recharge
         b) Irrigation water standards
         c) Crop rotation and important crops in India.
         d) Storage coefficient and permeability.