Babu Banarasi Das -National Institute of Technology & Management, Lucknow

B. Tech Final Year (Seventh Semester) 2018-19
Department of Civil Engineering

ENGG. HYDROLOGY (NCE-035)
Assignment: I (Unit 1)

NOTE-ATTEMPT ALL PARTS

1. Describe the concept of hydrologic cycle with the help of a neat sketch.
2. What are the different components ofthe hydrologic cycle ? What do you mean by hydrologic system.
3. Write short notes on :
    i.   Intensity – Duration Curve and
    ii.   Probabilistic Maximum Precipitation Curve
4. What do you understand by consumptive use of water ? What are the factors affecting consumptive use ofwater ? List the various direct methods of measurement of consumptive use of water.
5. Define infiltration and describe the factors that affect the process of infiltration. How will you measure the rate of infiltration ?
6. What do you understand by infiltration indices ? How do you determine them ?
7. . Discuss the flow duration curve and mass duration curve
8. Describe various methods of computing average rainfall over a basin. How will you ascertain the missing raingauge data ?
9. Describe the salient features of probabilistic maximumprecipitation curves.and evaporation and its estimation.
10. The plan area of reservoir is 1km^2 the water level in the reservoir is observed to decline by 20cm in a certain period during this period the reservoir recives a surface inflow of 10 hactare –meter,20 hactare –meter are abstracted from the reservoir for irrigation and power.the pan evaporation and rainfall recorded during the same period at a near by metrological station are 12cm and 3cm respectively. The calibrated pan factor is 0.7 .then calculate the seepage loss

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ENNG. HYDROLOGY (NCE-035)
Assignment: II (Unit 2)

NOTE-ATTEMPT ALL PARTS

1. Explain Precipitation and explain different forms of precipitation?
2. Define - INTERCEPTON , EVAPOTRASPIRATION , AET, PET
3. Describes the different types of evaporimeters in common use.
4. Discuss briefly the various abstractions that take place from the precipitation?
5. Describe the different methods of recording of rainfall?
6. A catchment has six rain gauge stations. In a year, the annual rainfall recorded by the gauges are as follows
    Station AB C DE F
    Rainfall (cm)82.6 102.9 180.3 110.3 98.8 136.7
    For a 10% error in the estimation of the mean rainfall, calculate the optimum number of stations in the catchment.
7. What is DAD analysis?

8. The normal annual rainfall at stations A,B,C and D in a basin are 80.97, 67.59, 76.28 and 92.01 c.m. respectively. In the year 1985, the station D was inoperative and the stations A,B and C recorded annual precipitation of 91.11, 72.23, and 79.89 c.m. respectively. Estimate the rainfall at station D in that year ?
9. Define Hyetograph?
10. In a catchment there were 6 raingauges. The rainfall data collected by them in year 1987 as follows

Station	1	2	3	4	5	6
Rainfall (cm)	40	38	43	39	40	41

Fimd the average rainfall by arithmetic mean method.

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ENNG. HYDROLOGY (NCE-035)
Assignment: III (Unit 3)

NOTE-ATTEMPT ALL PARTS

1. What is the concept of Unit Hydrograph ? Explain the various assumptions involved in the theory.
2. Write a short note on 'Synthetic Unit Hydrograph'.
3. How will you derive the synthetic unit hydrograph from a number of unit hydrograph ? Illustrate the method with suitable example in a tabular form
4. Write in brief the SCS-CN method for estimating the run-offvolume
5. Ordinates of a 6 hour unit hydrograph are given below. Find the 12 hour unit hydrograph for the same catchment and calculate peak discharge for it.

time	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42
Ordinates of 6 hour unit hydrograph	0	9	20	35	49	43	35	28	22	17	12	9	6	3	0

6. The peak of flood hydrograph due to a 3-h duration isolated storm in a catchment is 270 m_3/s. The total depth of rainfall is 5.9 cm. Assuming an average infiltration loss of 0.3 cm/h and a constant base flow of 20 m_3/s, estimate the peak of the 3-h hydrograph (UH) of this catchment. IF the area of the catchment is 567 km_2; determine the base width of the 3-h unit hydrograph by assuming it to be triangular in shape.

7. In the following table the rainfall data at every 2-hoursinterval are given. Construct the ordinate of unitHydrograph. Assume the area of the basin = 25 km_2.

Hour	00 02 04 06 08 10 12 14
Total Discharge (Cumec)	6 8 10 16 28 42 60 80
Hour	16 18 20 22 24 26 28 30
Total Discharge (Cumec)	110 100 90 80 68 56 45 35
Hour	32 34 36 38 40 42 44
Total Discharge (Cumec)	26 18 11 9 8 7 6

8. Explain the various assumptions involved in the theory
9. The Hourly distribution of a 2-hour Unit Hydrograph are given below. Derive a 6-hours Unit hydrograph ordinates.
   Time (Hours) 0 1 2 3 4 5 6 7 8
   Discharge (Cumec) 0 1.0 2.7 5.0 8.0 9.8 9.0 7.5 6.3
   Time (Hours) 9 10 11 12 13 14 15
   Discharge (Cumec) 5.0 4.0 2.9 2.1 1.3 0.5 0

10. Describe various component of hydrograph.

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ENNG. HYDROLOGY (NCE-035)
Assignment: IV (Unit 4)

NOTE-ATTEMPT ALL PART

1- What is flood routing? Give the methods of flood routing and explain any one method.

2- Define risk and reliability

3- . A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years (a) What is the risk of this hydrologic design? (b) If a 10% risk is acceptable, what return period will have to be adopted?

4- For a river valley project the following results were obtained from flood frequency analysis using Gumbel's method

Return period T (years)	Peak flood (m^3/s)
40	27000
80	31000

        Estimate the flood magnitude with a return period of 240 years   (a) What is the risk of this hydrologic design? (b) If a 10% risk is acceptable, what return period will have to be adopted?

5-. The catchment area of a drainage basin is 2100 km^2. The length of main stream is 80 km and the distance along the main stream from the basin outlet to a point on the stream which is nearer to the centroid of the basin is 50 km. Compute the width of 3 hour synthetic unit hydrograph at 50% and 75% of peak discharge using snyder method. C_P=0.45, C_t=1.85.

6- What do you mean by design flood ?

7- ? What are the factors affecting the flood hydrograph ?

8- Explain the procedure of using a unit hydrograph to develop the flood hydrograph due to a storm in a catchment

9- Write down the limitations of rational formula.

10- Write down the various empirical formula for estimation flood discharge .

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ENNG. HYDROLOGY(NCE-035)
Assignment: V (Unit 5)

NOTE-ATTEMPT ALL PARTS

1. Describe an expression for the yield of tube-wells for the case of an un-confined aquifer. A 30 cm well fully penetrates an un-confined aquifer of 25 m depth. When a discharge of 2100 liters/minute was being pumped for a long time, observation wells at radial distances of 30 m and 90 m indicated draw down of 5 m and 4 m respectively. Estimate the coefficient of permeability and transmissibility of the aquifer

2. Briefly describe the relative merits and demerits of well irrigation and canal irrigation. What are the factors that govern the selection of suitable site for a tube well ?

3. Write short notes on :
    i. Well shrouding and well development
    ii. Types of open wells
    iii. Infiltration galleries

4. Describe various zones of under-ground water. Explain the terms : aquifer, aquiclude, and aquifuge.

5. An artesian tube-well has a diameter of 20 cm. The thickness of aquifer is 30 cm and its permeability is 38 m/day. Find its yield under a draw-down of 4 m at the well face. Use radius of influence as recommended by Sichardt.

6. Explain the method of determining the coefficient of transmissibility of a confined aquifer by pumping out test. How can this method be extended for unconfined aquifer ?

7. Distinguish clearly between a shallow well and a deep well. How does a deep well differ from a tube-well in confined aquifer ?

8. Two tube-wells, each of 20 cm diameter are spaced at100 m distance. Both the wells penetrate fully a confined aquifer of 12 m thickness. Calculate the discharge if only one-well is discharging under a depression head of 3 m. What will be the percentage of decrease in the discharge of the well if both the wells are discharging under the depression head of 3 m. Take radius of influence for each well equal to 250 m and coefficient of permeability of aquifer as 50 m/day.

9. Describe in brief the advantages and disadvantages of well irrigation over canal irrigation.

10. **A.** Describe the non equilibrium formulae far aquifer unsteady equation .which type you find out suitable site far well and give well efficiency .
    B. In an artesian aquifer the drawdown is 1.2m. at a radial distance of 10m. from a well after two hours of pumping. On the basis of thies non equilibrium equatinon ,determine the pumping time far the same draw down (i.e1.2m) at a radial distance of 30m from the well.

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