

Babu Banarasi Das -National Institute of Technology & Management, Lucknow
B. Tech Second Year (Third Semester) 2018-19
Department of Civil Engineering

WATER RESOURCE ENNG.(NCE-702)

Assignment: I (Unit 1)

NOTE-ATTEMPT ALL PARTS

1. Describe the concept of hydrologic cycle with the help of a neat sketch. What are the different components of the hydrologic cycle ? What do you mean by hydrologic system ?
2. A basin has the shape in the form of a regular pentagon with each side of the length of 2 km. The five rain – gauges located at the corners recorded the rainfall as 60, 81, 73, 59 and 45 mm respectively. Compute the average depth of rainfall over the basin by arithmetic mean method and Thiessen Polygon method, sketch few isohyets also.
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 of water ? 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. What do you understand by precipitation ? Explain various types of precipitation.
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 maximum precipitation curves and evaporation and its estimation.
10. The ordinates (in mm) of a rain fall mass curve on a storm ,which commenced at 6:30hr recorded by self recording raingauge at 15minutes interval are as under 0, 12.4, 22.1, 35.1, 52.7, 63.7, 81.9, 109.2, 123.5, 132.6, 143.3, 146 and 146 construct hyetograph and maximum intensity duration curve.

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Assignment: II (Unit 2)

NOTE-ATTEMPT ALL PARTS

1. What is the concept of Unit Hydrograph ? Explain the various assumptions involved in the theory of unit hydrograph. In the following table the rainfall data at every 2-hour interval are given. Construct the ordinate of unit hydrograph. Assume the area of the basin = 25 km².

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

2. 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

3. What do you understand by crop-rotation ? What are its advantages ? A field channel has CCA of 2000 ha. The intensity of irrigation for gram is 30% and for wheat is 50%. Gram has kor-period of 18 days and kor-depth of 12 cm, while wheat has a kor period of 15 days and a kor-depth of 15 cm. Calculate the discharge of the field channel.
4. What is run-off ? What are the factors that affect the run-off from a catchment area ? Describe the methods of computing run-off from a catchment area.
5. Write a short note on 'Synthetic Unit Hydrograph'. How will you derive the synthetic unit hydrograph from a number of unit hydrograph ? Illustrate the method with suitable example in a tabular form.
6. Distinguish between perennial and inundation canal. Describe the various factors considered for alignment of a canal. What is Bandhara irrigation system
7. Discuss the classification of canal and consideration of canal alignment with figure.
8. The table give necessary data about the duty ,base period and area under each crop 40% of water required for irrigation is assume to be available directly from precipitation channel conveyance and reservoir losses 15%and 10% respectively determine reservoir capacity.

CROP	B(DAYS)	AREA (HECT)	DUTY (HA/CUMECS)
Sugarcane	320	600	1800
wheat	120	600	800
rice	120	300	900
cotton	200	1200	1400
Bajra	100	500	1200

9. What do you mean by sediment transport describe bed load and suspended load.
10. Base period and crop period and duty delta relation ship,intensity and frequency and efficiency of irrigation. ALSO explain methods of irrigation hydrograph and its component.

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Assignment: III (Unit 3)

NOTE-ATTEMPT ALL PARTS

1. What do you understand by regime channel ? Explain the initial regime and final regime of a channel. Using Lacey's theory, design an irrigation channel for the following data :
Discharge, $Q = 50$ cumecs
Lacey's silt factor, $f = 1.0$ Trapezoidal section side-slope = $0.5 : 1$
2. Explain 'water logging'. What are the various causes of water logging ? Describe the adverse effects of water logging. What are the various methods adopted as anti-water logging measures ?
3. Design a concrete lined channel to triangular section to carry a discharge of 45 cumecs at a slope of 1 in 10 km. The side slopes of the channel are $1.25 : 1$ and Manning's coefficient 'N' may be taken as 0.018.
4. Describe the main features of the cross-section of an irrigation channel with suitable sketches
5. Write the comparison of Kennedys and Lacey's theories for design of canal. draw Garrets diagram and design procedure.
6. Write the remedial measures for the water logging problem & Describe different type of drains. and derive far spacing of drain.
7. Write the necessity and advantages of canal lining & disadvantages of canal lining draw cross section for canal lining give area and perimeter
8. Define various type of canal losses ,draw laceys diagram for design of canal. Also draw Kennedys diagram for design of canal.
9. Define Kennedy's theory for design of stable canal .design a canal to carry a discharge of 45 cumecs .take $N=0.0225, m=1.05$ channel slope 1 in 5000.
10. Describe Sediment transport .In a wide stream , a suspended load sample taken at a height of 0.3 m from the bed indicate a concentration of 1000ppm of sediment by weight .the stream is 5.0 m deep and bed slope of $1/4000$.the bed material can be assumed to be uniform size with a fall velocity of 2.0 cm/s. Estimate the concentration of the suspended load at mid depth.

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Assignment: IV (Unit4)

NOTE-ATTEMPT ALL PARTS

1. What are the different types of canal regulation works constructed for efficient working and safety of an irrigation channel ? Describe in brief with suitable sketches.
2. What is an outlet ? Write down the requirements that an outlet should fulfil. Distinguish clearly between nonmodular and semi-modular outlets with suitable examples.
3. What do you mean by river training ? Give the classification of various types of river-training work. What do you mean by high water training, low water training and medium water training
4. Describe 'canal regulation works'. What are the different types of canal regulation works provided ? Explain each in detail?
5. Discuss the different type of river training works.
6. Discuss the different type of canal outlets.
7. What do you mean by flexibility and sensitivity of canal outlet . explain various type of semi module outlet with fig
8. explain-
 - i. flexibility
 - ii. proportionality
 - iii. setting
 - iv. sensitivity
9. What is non modular , semi module and rigid module outlet?

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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 at 100 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 for aquifer unsteady equation .which type you find out suitable site for 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 this non equilibrium equation ,determine the pumping time for the same draw down (i.e.1.2m) at a radial distance of 30m from the well.

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