



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Hydrology(16CE156)

Course & Branch: B.Tech – AG

Year & Sem: II-B.Tech & II-Sem

Regulation: R16

UNIT-I

PRECIPITATION AND ABSTRACTIONS

1. Define Hydrology. Explain "Hydrological Cycle " and its Components with Neat Sketch ? 12M
2. What do you understand by precipitation? Explain types and forms of precipitation ? 12M
3. Explain with Sketch "Non-Automatic "type of Rain Gauge ? 12M
4. Enlist different recording type of rain gauges and explain any one of type rain gauge with suitable sketch in brief ? 12M
5. a.) How to determine statically the optimum number required to be installed in a given catchment? 6M
- b.) A catchment has six rain gauge stations. In a year ,the annual rainfall recorded by the gauges are as follows : 6M

Station	A	B	C	D	E	F
Rainfall (cm)	82.6	102.9	180.3	110.3	98.8	136.7

6. a.) Discuss various methods briefly to Estimate the missing precipitation ? 6M
- b.) The Normal Annual Rainfall at stations A, B, C, and D in a basin are 80.97, 67.59, 76.28 and 92.01 cm respectively. In the Year 1985, the Station D was inoperative and stations A, B and C recorded annual precipitation of 91.11, 72.23 and 79.89 cm respectively. Estimate the rainfall at station D in that year 6M
7. a.) Explain briefly different methods used for computing average rainfall over a Basin ? 6M
- b.) Estimate the mean Precipitation using Isohyetal Method ? 6M

Isohyetals (cm)	15-12	12-9	9-6	6-3	3-1
Inter-isohyetal area (km²)	92	128	120	175	85

8. a.) Define the term “Evaporation”. Describe the factors affecting for evaporation losses. 6M
- b.) Define the term “Infiltration”. Describe the factors affecting for infiltration rates. 6M
9. a.) Explain briefly about Single Ring and Double Ring infiltrometer with neat Sketch ? 6M
- b.) The infiltration capacity is a basin represented by Horton’s equation as $f=3+e^{-2t}$. Where f is in cm/hr, time is in hours. Assuming the infiltration to take place at capacity rates in a storm of 60 min duration. 6M
- Estimate the depth of infiltration. a) The first 30min b) Second 30min.
10. a.) Explain briefly about infiltration indices (w-index and ϕ -index) 6M
- b.) The rate of rainfall for successive 30 minutes periods of a 4-hour storm are as follow: 3.5, 6.5, 8.5, 7.8, 6.4, 4.0, 4.0, 6.0 cm/hr. Taking a value of ϕ - Index as 4.5 cm/hr. 6M
- Compute The following : a) Total Rainfall b) Total Rainfall Excess & C) W-Index

UNIT-II
RUNOFF

1. Define Catchment, basin and Watershed ? Explain the Characteristics of Catchment ? 12M
2. Define Runoff and its Classification. Explain the various factors which affect the run-off from basin. 12M
3. Explain SCS-CN Method of Estimating Runoff Volume ? 12M
4. In a 350 ha watershed the CN value was assessed as 70 for AMC-III. 12M

Date	July 1	July 2	July 3	July 4
Rainfall(mm)	50	20	30	18

(a) Estimate the value of direct runoff volume for the following 4 days of rainfall.

(b) What would be the runoff volume if the CN_{III} value were 80 ?

5. Explain the Runoff Estimation using any two Empirical Equations ? 12M
6. Explain briefly about Stream Flow Measurement? 12M
7. Explain about the Stage- Discharge Relationship in Stream flow Measurement ? 12M
8. What is hydrograph? Draw a single peaked hydrograph and explain its components? 12M
9. Give a neat sketch of a unit hydrograph and discuss the various assumptions in deriving the same. 12M
10. Given below are the ordinates of 6-h unit hydrograph for a catchment. Calculate the ordinates of the DRH due to a rainfall excess of 3.5 cm occurring in 6 h. 12M

Time (h)	0	3	6	9	12	15	18	24	30	36	42	48	54	60	69
UH ordinate (m^3/s)	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

UNIT-III
FLOOD AND DROUGHT

1. Explain about Flood Frequency Studies ? 12M
2. A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years . 12M
 - (i) what is the risk of this hydrologic design ?
 - (ii) If a 10% risk is acceptable, what return period will have to be adopted ?
3. Explain the various methods of flood control in brief ? 12M
4. Explain Gumbel's Method for flood frequency analysis ? 12M
5. The mean annual flood of a river is 600 m³/s and the standard deviation of the annual flood series is 150 m³/s . What is the Probability of a flood of magnitude 1000 m³/s occurring in the river within next 5 years? Use Gumbel's Method ? 12M
6. Explain the Risk, Reliability and Safety Factor of a hydraulic structure ? 12M
7. Explain about the Drought Management in India ? List the major Drought areas in India ? 12M
8. What do you understand by Drought ? Explain the classification of Droughts ? 12M
9. Explain the Drought assessment using IMD method ? 12M
10. Explain about NDVI analysis in Drought Management ? 12M

UNIT-IV
RESERVOIRS

1. What is meant by a Reservoir ? Explain the various types of Reservoirs ? 12M
2. Describe in brief various investigations required for reservoir Planning ? 12M
3. What are the Factors on which the selection of the site of a Reservoir depend ? 12M
4. Define the following : Surcharge Storage, Valley Storage, Safe yield and Secondary Yield ? 12M
5. Explain the Hydrologic Reservoir Routing Method? 12M
6. Explain the Life of a Reservoir ? 12M
7. Explain how the storage capacity of a Reservoir is fixed ? 12M
8. Discuss various methods of Reservoir Sediment Control ? 12M
9. Explain the Various Storage Zones of the dam Reservoir ? 12M
10. a.) Explain the Relation between Inflow, Outflow and Storage data for a Reservoir ? 12M
b.) What is the Relation between “Reservoir Capacity” and “Reservoir Yield” ? 12M

UNIT-V**GROUNDWATER AND MANAGEMENT**

1. Develop the equation relating Steady-State discharge from a well in an confined aquifer ? 12M
2. Explain the Properties of Aquifer ? 12M
3. Explain the Classification of Subsurface Water with neat Sketch ? 12M
4. Develop the equation relating the unsteady-state ground water flow in a Confined aquifer ? 12M
5. Explain the terms of 'storage coefficient' and 'coefficient of transmissibility'. 12M
6. A 30 cm diameter well completely penetrates a confined aquifer of Permeability 45 m/day . 12M
The length of the strainer is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3 m and the radius of influence was 300 m . Calculate the discharge ? 12M
7. Define the following terms: a) Aquifer b) Aquiclude c) Aquifuge d) Specific yield & e) Specific retention. 12M
8. Discuss the Principle of Recuperation test of an open well ? 12M
9. Describe the Groundwater Resources of India and its utilization ? 12M
10. What is Rain Water Harvesting ? List the techniques involved for Rain Water Harvesting in both Rural and Urban Areas ? 12M

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