

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)

Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)****Subject with Code:** Hydrology & Water Resources Engineering (20CE0126)**Course & Branch:** B.Tech (CIVIL)**Year & Sem:** III / II**Regulation:** R20**UNIT –I****INTRODUCTION TO HYDROLOGY & HYDROGRAPH ANALYSIS**

1	Explain the components of hydrological cycle with the help of a sketch.	[L2][CO1]	[12M]																										
2	a) Demonstrate your understanding about precipitation.	[L2][CO1]	[4M]																										
	b) Briefly explain different types of soil structures which can occur in nature.	[L2][CO1]	[8M]																										
3	Define Evaporation and Explain the factors affecting the rate of evaporation.	[L2][CO1]	[12M]																										
4	Define Infiltration and Explain the factors affecting the rate of Infiltration.	[L2][CO1]	[12M]																										
5	a) Explain the water budget method with a neat sketch	[L2][CO1]	[6M]																										
	b) Explain the energy balance method with a neat sketch.	[L2][CO1]	[6M]																										
6	a) With the help of a neat sketch explain the single tube infiltrometer.	[L2][CO1]	[6M]																										
	b) Explain about Φ -index and W-index.	[L2][CO1]	[6M]																										
7	a) Compute the weekly evaporation from a reservoir using the water-budget method from the following data recorded during the week. Average inflow into the reservoir is $32.5\text{m}^3/\text{s}$, average out flow from the reservoir is $40.2\text{m}^3/\text{s}$, average water spread area is 15.8km^2 , storage at the beginning of the week is 9180ha-m and storage at the end of the week is 8360ha-m .	[L1][CO1]	[6M]																										
	b) What do you mean by Hydrograph and Unit hydrograph?	[L3][CO1]	[6M]																										
8	Explain the construction and limitations of unit hydrograph.	[L3][CO1]	[12M]																										
9	Given below are the ordinates of a 4-h unit hydrograph as below. Derive the ordinates of a 12-h unit hydrograph for the same catchment.																												
	<table border="1"> <tbody> <tr> <td>Time (h)</td> <td>0</td> <td>4</td> <td>8</td> <td>12</td> <td>16</td> <td>20</td> <td>24</td> <td>28</td> <td>32</td> <td>36</td> <td>40</td> <td>44</td> </tr> <tr> <td>Ordinates of 4-h UH</td> <td>0</td> <td>20</td> <td>80</td> <td>130</td> <td>150</td> <td>130</td> <td>90</td> <td>52</td> <td>27</td> <td>15</td> <td>5</td> <td>0</td> </tr> </tbody> </table>	Time (h)	0	4	8	12	16	20	24	28	32	36	40	44	Ordinates of 4-h UH	0	20	80	130	150	130	90	52	27	15	5	0	[L4][CO1]	[12M]
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10	a) Explain the procedure for construction of S-curve.	[L2][CO1]	[4M]																										
	b) Derive the S-curve for the 4-h unit hydrograph given below.	[L3][CO1]	[8M]																										
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UNIT –II
GROUND WATER & IRRIGATION

1		Explain in detail about the different types of aquifers with neat sketch.	[L1][CO2]	[12M]
2	a)	Explain ground water well and basic assumptions.	[L2][CO2]	[6M]
	b)	In certain alluvial basin of 120km ² , 100Mm ³ of ground water was pumped in a year and the ground water table dropped by 5m during the year. Assuming no replenishment, estimate the specific yield of the aquifer. If the specific retention is 12%, what is the porosity of the soil?	[L3][CO2]	[6M]
3	a)	Explain geological formations with an example for each.	[L2][CO2]	[8M]
	b)	Define aquifer Parameters.	[L2][CO2]	[4M]
4	a)	With a neat sketch explain Dupuit's theory for confined aquifer.	[L1][CO2]	[8M]
	b)	An undisturbed rock sample has an over dry weight of 1305gm. When it is completely saturated with kerosene it weighed 1436gm. The saturated sample, when immersed in kerosene displaced 605gm of kerosene. What is the porosity of the sample?	[L2][CO2]	[4M]
5		Explain the necessity and importance of Irrigation.	[L2][CO2]	[12M]
6		List out the advantages of Irrigation in detail.	[L1][CO2]	[12M]
7	a)	Briefly discuss in detail with flow chart about the types of irrigation.	[L1][CO2]	[8M]
	b)	Define duty and delta of irrigation.	[L2][CO2]	[4M]
8		Explain in detail about the methods of application of irrigation water.	[L1][CO2]	[12M]
9	a)	Enumerate in detail about factor affecting duty of irrigation water.	[L1][CO2]	[6M]
	b)	Explain in detail about the methods of improving duty	[L2][CO2]	[6M]
10		The left branch canal carrying a discharge of 20cumecs has a Culturable commended area of 20000 hectares? The intensity of rabi crop is 80% and base period is 120 days. The right branch canal carrying a discharge of 8 cumecs has a Culturable commanded area of 12000 hectares, intensity of irrigation of rabi crop is 50% and base period is 120 days. Compare the efficiencies of the two canal systems.	[L3][CO2]	[12M]

UNIT –III
WATER REQUIREMENT OF CROPS & CANAL REGULATION WORKS

1	Explain any five irrigation efficiencies	[L2][CO3]	[12M]
2	a) A water course commands an irrigation area 1000 hectares. The intensity of irrigation of rice in this area is 70%. The transplantation of rice crop takes 15 days and during the transplantation period, the total depth of water required by crop on the field is 500 mm. During transplantation period, the useful rain falling on the field is 120 mm. Find the duty of irrigation water for crop on the field during transplantation at the head of the field and also at the head of the watercourse assuming the loss of water to be 20% in the water course. Also, calculate the discharge required in the water course.	[L3][CO3]	[8M]
	b) Write a short notes on necessity of crop rotation.	[L2][CO3]	[4M]
3	a) Illustrate about G.C.A. and C.C.A.	[L2][CO3]	[8M]
	b) Briefly explain about Culturable cultivated area and Culturable uncultivated area.	[L2][CO3]	[4M]
4	A field of 4 hectares has an average root zone depth of 1.0m, a field capacity of 18% (both by weight). Assume that it is desirable to irrigate when 60% of available moisture has been extracted. The field is irrigated by a sprinkler system which delivers 300 m ³ /hour over a period of 12 hours. What is water application efficiency? Density of soil is 1400 kg/m ³ .	[L3][CO3]	[12M]
5	Explain the types of falls with neat sketches.	[L2][CO3]	[12M]
6	What do you mean by roughening devices in canals and also explain its varieties?	[L1][CO4]	[12M]
7	Write the step by step design procedure for sarada type falls with formulas.	[L3][CO4]	[12M]
8	Design a Sarada type fall for the following set of data. Full Supply Discharge- 14 m ³ /s, Bed width- 18 m, Full Supply Depth (FSD) - 1.5 m, Full Supply Level (U/S) -101.00 m, Full Supply Level (D/S) -100.00 m, U/S Bed Level - 99.5 m, D/S Bed Level- 98.5m, Natural Surface Level-99.5 m (D/S), Bligh's Coefficient (c) is -8.	[L4][CO4]	[12M]
9	a) Explain the function of cross regulators and distributor head regulators.	[L1][CO4]	[6M]
	b) Write the criteria to design the crest level and length of downstream floor in cross regulator design.	[L3][CO4]	[6M]
10	Demonstrate about consumptive use of water and write in detail about factors affecting consumptive use of water.	[L2][CO4]	[12M]

UNIT –IV
CROSS DRAINAGE WORKS & RESERVOIR PLANNING

1		Explain about cross drainage work and its types.	[L2][CO5]	[12M]
2	a)	Illustrate the criteria to select the suitable type of cross drainage work.	[L2][CO5]	[8M]
	b)	Write the three classifications of aqueducts.	[L1][CO5]	[4M]
2		Define the following items:	[L1][CO5]	[12M]
3		Describe in detail about various investigation to be carried for reservoir planning.	[L3][CO5]	[12M]
4		What are the various factors on which the selection of the site of a reservoir depends on ?	[L2][CO5]	[12M]
5		Explain the different types of zones of storages in the reservoir with the help of neat sketch.	[L1][CO5]	[12M]
6	a)	Explain the mass inflow curve and demand curve.	[L2][CO5]	[6M]
	b)	Write down the Procedure for calculation of life of a reservoir.	[L2][CO5]	[6M]
6		A compressible layer is expected to have total settlement of 15 cm under a given loading. It settles by 3 cm at the end of two months after the application of load increment? How many months will be required to reach a settlement of 7.5 cm? What is the settlement in 18 months? The layer has double drainage.	[L3][CO5]	[12M]
7		Write the calculation of reservoir capacity for a specific yield from mass inflow curve.	[L3][CO5]	[12M]
8		What is flood routing and explain about method of flood routing by graphical method.	[L1][CO5]	[12M]
9		Explain various types of reservoirs?	[L1][CO5]	[12M]
10	a)	Explain the term life of reservoir in detail.	[L2][CO5]	[6M]
	b)	Write the calculation of determination of safe yield from reservoir.	[L2][CO5]	[6M]

UNIT –V
DAMS & GRAVITY DAMS

1	Classify the various types of dams according to use in detail with sketches.	[L2][CO6]	[12M]
2	a) Discuss in brief about the merits and demerits of any two types of dam.	[L1][CO6]	[6M]
	b) What do you understand by gravity dam?	[L3][CO6]	[6M]
3	Discuss the physical factors that govern selection of type of dam.	[L2][CO6]	[12M]
4	What are the factors to be considered for selection of site for a dam?	[L2][CO6]	[12M]
5	a) Explain with sketch about galleries in gravity dam.	[L1][CO6]	[4M]
	b) Write briefly on various forces that act on a gravity dam.	[L2][CO6]	[8M]
6	Discuss in detail various modes of failure of a gravity dam.	[L2][CO6]	[12M]
7	Explain the stability analysis for dam carried out by analytical method.	[L3][CO6]	[12M]
8	Draw and explain the elementary profile of a gravity dam.	[L2][CO6]	[12M]
9	A masonry dam 6 m high and 1.5 m wide at the top and 4.5 m wide at the bottom, with vertical face. Determine the normal stresses at the toe and heel for reservoir empty and reservoir full conditions. Take $\rho=2.4$ and $c=1$.	[L3][CO6]	[12M]
10	Explain the types of spillways with the help of neat sketches.	[L3][CO6]	[12M]

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