SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: IRRIGATION & DRAINAGE ENGINEERING(19AG0721) **Course & Branch**: IDE&AGE

Year & Sem: IV & I   **Regulation:** R19

UNIT –I
INTRODUCTION-IRRIGATION ENGINEERING

1	a	Define irrigation and necessity of irrigation? Explain advantages and dis-advantages of irrigation?	[L1][CO1]	**[8M]**
	b	Write on development of irrigation in India.	[L2][CO1]	**[4M]**
2	a	What are the prospective irrigation developments and explain in detail?	[L2][CO1]	**[6M]**
	b	Give the classification of irrigation projects.	[L2][CO1]	**[6M]**
3		Explain the relationship between duty and delta and list out the factors affecting duty.	[L2][CO1]	**[12M]**
4	a	Find the delta of a crop if the duty for a base period of 120 days is 1450 ha/cume	[L2][CO1]	**[6M]**
	b	Define the following: (a) Base and crop period (b) Gross command area and culturable command area (c) Irrigation interval.	[L1][CO1]	**[6M]**
5		Define the following: (a) Water intake (b) Percolation (c) Interflow (d) Seepage (e) Permeability	[L1][CO1]	**[12M]**
6	a	Find the duty of water if a crop requires a total depth of 920 mm of water for a base period of 120 days	[L2][CO1]	**[6M]**
	b	Define the following: (a) Saturation capacity (b) Field capacity (c) Permanent wilting point (PWP) (d) Moisture equivalent (e) Gross irrigation area (GIA)	[L1][CO1]	**[6M]**
7		Express a duty of 1800 ha/cumec for a base period of 120 days in ha per million m3	[L4][CO1]	**[6M]**
8	a	A canal was designed to supply irrigation needs of 1200 ha of land growing rice of 140 days base period and having a delta of 134 cm. IF the canal waters are used to irrigate wheat of base period 120 days and having a delta of 52 cm the area that can be irrigated is?	[L2][CO1]	**[6M]**
	b	What are the factors effecting duty?	[L2][CO1]	**[6M]**
9	a	Explain methods of improving duty	[L2][CO1]	**[6M]**
	b	An irrigation canal has gross commanded area of 80,000 hects. Out of which 85% is culturable irrigable. The intensity of irrigation for kharif season is 30% and for Rabi season is 60%. Find the discharge required at the head of canal if the duty at its head is 800 hect/cumec for kharif and 1,700 hect/cumec for rabi season	[L3][CO1]	**[6M]**
10		The table below gives the necessary data about the crops, their duty and the area under each crop, commanded by a canal taking off from a storage tank. Taking a time factor to be 13/20, calculate the discharge required at the head of the canal. If the capacity factor is 0.8, determine the design discharge.	[L3][CO1]	**[12M]**

Crop	Base period (days)	Area (hect.)	Duty at the head of the canal (hect/cumec)
1. Sugarcane	320	850	580
2. Overlap for sugarcane (hot weather)	90	120	580
3. Wheat (Rabi)	120	600	1600
4. Bajri (Monsoon)	120	500	2000
5. Vegetables (hot weather)	120	360	600

UNIT –II
SPRINKLER AND DRIP IRRIGATION

1	a	Write a short note on sprinkler layout and draw the system design.	[L3][CO2]	**[6M]**
	b	Define Uniformity coefficient and its formula for calculation?	[L1][CO2]	**[4M]**
2	a	Define sprinkler irrigation system? What are the advantages and limitation of sprinkler system	[L2][CO2]	**[6M]**
	b	Define Irrigation and classify irrigation methods.	[L1][CO2]	**[6M]**
3		What are the types of sprinkler irrigation system?	[L1][CO2]	**[12M]**
4	a	Define Net depth of water application, Irrigation frequency, and Gross depth of water application.	[L3][CO2]	**[6M]**
	b	A sprinkler system 18m spacing along the main and 12m along the laterals is used to irrigate crop grown on coarse sandy soil over compact soil land slope of 3%. Twenty sprinklers are used to irrigate field. Optimum application rate 3.75cm/hr. Determine the total system capacity.	[L2][CO2]	**[6M]**
5		A twenty hectare area has medium texture loam soil grown with Wheat crop peak. Daily water use of wheat crop is 6.2 mm day-1. The available soil moisture ($\theta FC - \theta WP$) is 120 mm m-1. The allowable soil moisture depletion is 50%. The crop root zone depth (DRZ) is 0.8 m. Soil infiltration rate is 6 mm/ hr and using application efficiency of 75% of sprinkler irrigation. Determine the maximum net depth of water application, irrigation frequency and gross depth of water application.	[L2][CO2]	**[12M]**
6	a	Explain system capacity, Discharge through sprinkler, Height of sprinkler, sprinkler spacing, Discharge through sprinkler, water application rate	[L4][CO2]	**[6M]**
	b	What are the inventory resource and parameters required for design of sprinkler	[L1][CO2]	**[6M]**
7		Explain briefly the components of sprinkler irrigation system with neat sketch	[L4][CO2]	**[12M]**
8		Determine the uniformity co-efficient from the following data obtained from a field test on a square Plot bounded by four sprinkler Sprinkler - 4.365×2.381 MM nozzles at 2.8 kg/cm2 Spacing – 24M×24M Wind – 3.5 Km/hr. from South-West Humidity – 42% Time of test – 1.0 hr. S- Location of sprinklers	[L2][CO2]	**[12M]**
9		Explain in brief the hydraulics design of sprinkler system	[L3][CO3]	**[12M]**
10		Define Drip irrigation system, Explain its suitability, advantages and disadvantages	[L5][CO1]	**[12M]**

For Question 8, the location/data grid:

S	8.9	7.6	6.6	S
8.1	7.6	9.9	10.2	8.3
8.9	9.1	9.1	9.4	8.9
9.4	7.9	9.1	8.6	9.1
S	7.9	6.6	6.8	S

UNIT –III
MAINTENANCE OF MICRO IRRIGATION SYSTEM

1		Define clogging and explain the types of clogging in micro irrigation system?	[L1][CO3]	**[12M]**
2	a	Define fertigation and explain advantages, limitation of fertigation?	[L5][CO3]	**[6M]**
	b	Explain fertilizer solubility and their compatibility	[L3][CO3]	**[6M]**
3		Define filters and briefly explain about types of filters?	[L3][CO3]	**[12M]**
4	a	Explain frequency of fertigation and fertilizer injection rate	[L2][CO3]	**[4M]**
	b	What are the precautions for successful fertigation system?	[L2][CO3]	**[6M]**
5		Briefly explain the venture injection fertilizer method advantages and dis advantages with neat diagram.	[L5][CO3]	**[12M]**
6	a	Write short note on maintenance of Micro irrigation system	[L2][CO3]	**[6M]**
	b	Briefly explain the pressure differential fertigation method.	[L5][CO3]	**[6M]**
7	a	Explain the frequency of fertilizer application and computation of the quantity of fertilizer to be applied.	[L3][CO3]	**[8M]**
	b	A sprinkler system is used apply fertilizer at the recommended dose of 60 kg/h at each setting. The sprinkler laterals are spaced at 20 m on the main line. Ten sprinklers are attached in a lateral and these are spaced at 12 m apart. Determine the amount of fertilizer to be applied in each setting.	[L3][CO3]	**[4M]**
8	a	Explain the principle of hydro cyclone filter and what are the factors influencing the effective fertigation.	[L2][CO3]	**[6M]**
	b	Explain the working and backflusing of sand filter with neat sketch	[L3][CO3]	**[6M]**
9		Explain the need of filters in MIS and types of filters used with its working	[L5][CO3]	**[12M]**
10	a	Explain the need of chlorine treatment and procedure for chlorine treatment	[L3][CO3]	**[6M]**
	b	Explain the factors influencing the effective fertigation.	[L1][CO3]	**[6M]**

UNIT –IV
WATER LOGGING, SURFACE DRAINAGE, SUB-SURFACE DRAINAGE SYSTEM
AND
SPECIAL DRAINAGE SYSTEMS

1		Define drainage, explain different types of surface drainage system with sketch	[L5][CO4]	**[12M]**
2		Derive Ernst equation with neat diagram	[L4][CO4]	**[12M]**
3		Derive Hooghoudt equation with neat diagram	[L4][CO4]	**[12M]**
4	a	Define water logging, List and explain the causes and impact of water logging.	[L3][CO4]	**[6M]**
	b	Discuss conjunctive use of saline and fresh water.	[L3][CO4]	**[6M]**
5		Briefly explain the investigation for subsurface drainage	[L4][CO4]	**[12M]**
6	a	Write in detail the accessories for tile drainage system.	[L3][CO4]	**[6M]**
	b	Define subsurface drainage and write the specific benefits of sub surface drainage	[L2][CO4]	**[6M]**
7		Explain in detail the design of surface drainage system	[L3][CO4]	**[12M]**
8	a	Explain in detail the reclamation of saline and alkaline soils?	[L3][CO4]	**[6M]**
	b	Explain leaching requirement	[L3][CO4]	**[6M]**
9	a	Define bio drainage and vertical drainage system? Define drainage Co efficient and Mole drainage system?	[L1][CO4]	**[6M]**
	b	Write a short note on Drainage porosity and drain Envelopes in tile drainage system.	[L2][CO4]	**[6M]**
10		Explain in detail the design of subsurface drainage system	[L5][CO4]	**[12M]**

UNIT –V
HYDRALICS OF DRAINAGE PIPES

1		Explain about the unsteady state equation in pipe flow	[L5][CO5]	**[12M]**
2		Define Hydraulic conductivity, porosity, drainable porosity, infiltration, percolation and interflow.	[L5][CO5]	**[12M]**
3		Explain in detail about the steady state equation used in pipe flow	[L5][CO5]	**[12M]**
4		Explain the methods involved in determination of hydraulic conductivity	[L5][CO5]	**[12M]**
5		Write a short note on economics of drainage system	[L5][CO5]	**[12M]**
6	a	Define observation wells and write in detail about its installation	[L4][CO5]	**[6M]**
	b	Explain manning's equation and its application.	[L3][CO5]	**[6M]**
7	a	Write a note on selection of suitable steady state Drainage equation	[L3][CO5]	**[6M]**
	b	Briefly explain about indices used in economic evaluation of drainage system	[L4][CO5]	**[6M]**
8	a	Explain the Investigation of drain design parameters through drain testing.	[L3][CO5]	**[6M]**
	b	Explain the lab method for determination of hydraulic conductivity	[L2][CO5]	**[6M]**
9	a	Briefly explain about the Glover-Dumm Equation	[L2][CO5]	**[6M]**
	b	Write a short note on comparison of steady and unsteady state equation	[L3][CO5]	**[6M]**
10		Define Net present value, Benefit cost ratio, Internal rate of return and Capital Recovery Factor (CRF)? What is the comparison between NPV, B-C Ratio and IRR is used economic indices?	[L5][CO3]	**[12M]**

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