Enrollment No._____

NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech Civil Engineering
Year: 3rd **Semester:** 5th
Examination: End Semester Examination
Examination year: December - 2023

Course Code: CE-424 **Course Name:** Water Resources Engineering
Date: 25/11/2023
Time: 01 pm to 03 pm

Total Marks: 40
Total Pages: 02

Instructions:

- *Write each answer on a new page.*
- *Use of a calculator* ***is permitted***
- *Draw figures wherever applicable.*

Q. No.	Details	Marks	CO	BTL
Q.1	**Short Questions (Any 10)** 1. _____type of soil water is readily available for plants (a) Adsorbed water (b) Gravitational Water (c) Capillary water 2. The intensity of precipitation could be evaluated from the Hyetograph. (True/ False) 3. Available moisture = 75% (W_{fc} -W_{pwp}). (True/ False) 4. The time difference between maximum rainfall excess and peak discharge is known as_____ _____. (a) Peak time (b) Lag time (c) Base time (d) Time of concentration 5. _____type of rain gauge could be used to obtain rainfall data from hilly regions. 6. The infiltration capacity of the soil remains constant. (True/False) 7. Storm hydrograph can be obtained after deducting ordinates of direct run-off hydrograph from base flow. (True/False) 8. which irrigation method is employed if the irrigation channels are too small to distribute water efficiently? (a) Sprinkler Irrigation (b) Free flooding method (c) Furrow method (d) All of the above 9. Define Delta 10. Fan shaped Catchments give higher amount of runoff. (True/ False)	10	1,2,3,4	1,2,3

	11. _____ method of base-flow separation is preferable when the groundwater contributions are more. (a) Straight-Line Method (b) Two lines Method (c) Curves Extension Method (d) All of the above			
Q.2	List various sub-surface irrigation methods and explain any one in detail with a diagram	**5**	**2**	**1,2,3**
Q.3	List the factors affecting infiltration and explain any two in detail.	**5**	**3**	**1,2,3**
	OR			
Q.3	Explain various components of hydrograph in detail	**5**	**4**	**1,2,3**
Q.4	The rate of rainfall for successive 1 hour of a 4-hour storm are as follows: 8.5; 11.3; 17.8; 8.9; 10.8; 12.2; 11.7; 12.0 cm/hr Taking a value of ϕ index as.10.0 cm/ hr compute the following : (a) Total Rainfall; (b) Total rainfall excess and (c) Wi	**4**	**1**	**2,3,5**
Q.5	A culturable commanded area of 2000 hectares is available. The irrigation intensity for Wheat crop is 60% and for Mustard crop is 35%, both the crops being Rabi crops. Wheat crop has a Kor period of 15 days and Mustard crop has Kor period of 20 days. Calculate the discharge of water course if the Kor depth for Wheat crop is 18 cm and for Mustard crop it is 24 cm.	**6**	**2**	**2,3,5**
	OR			
Q.5	The base period intensity of irrigation and duty of various crops under a canal system are given in table below. Find the reservoir capacity if the canal losses are 25% and reservoir losses are 10%.	**6**	**2**	**2,3,5**
Q.6	The 4-hr Unit Hydrograph Ordinates are represented below. A storm has 2 successive 4-h intervals of rainfall magnitude of 10 cm, and 9 cm respectively. Assuming a ϕ- index of 5 mm/h and a base flow of 20 m^3 /s. Evaluate the ordinates of storm hydrograph of flow.	**10**	**4**	**2,3,5**

Crop	Base Period (days)	Duty at the field (ha/cumecs)	Area under the crop
Wheat	120	1800	4800
Sugar-cane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Time (hrs)	Ordinates of 4-h UH (m^3/s)
0	0
4	300
8	900
12	1200
16	700
20	600
24	350

	28	220			
	32	100			
	36	75			
	40	40			
	44	0			
	OR		**10**	**4**	**2,3,5**
Q.6	Derive the S-curve for the 4-h unit hydrograph given below				

Time (h)	0	4	8	12	16	20	24	28
Ordinate of 4-h UH (m^3/s)	0	10	30	25	18	10	5	0

**********End of Question Paper**********