ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

CIVIL ENGINEERING (EM&TM)
VII Semester
CE 5701 & Irrigation Engineering
(Regulation 2019)

Time:3 hrs   Max. Marks: 100

CO1	Describe the National Water Policy structure and soil plant water characteristics.
CO2	Describe the basics of requirements and estimation of crop water.
CO3	Design the various types of hydraulic structures including dams, spillways and dissipaters.
CO4	Design the components of irrigation canal including canal drops and cross drainage works.
CO5	Apply the concepts of Irrigation water management, water users' association, for participatory irrigation management.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

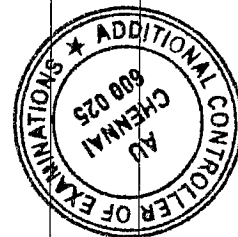## PART- A (10x2=20 Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	Find out the water content of the soil on volume basis just before irrigation from the following data. The thermo-gravimetric method is used for the determination of the water content. Wt. of empty box = 35.00 gm Wt. of empty box + fresh soil sample = 95.35 gm Wt. of oven dry soil + box = 85.17 gm Density of water = 1 gm/cm^3, Bulk density of soil = 1.53 gm/cm^3	2	1	L2
2	Give the organogram of the Tamil Nadu Water Resources Department.	2	1	L2
3	Write a brief note on SAR.	2	2	L1
4	Define "*kor period*".	2	2	L1
5	Sketch an arch dam and mark its components.	2	3	L1
6	Indicate the function of U/S and D/S piles in a weir.	2	3	L1
7	List out the classification of canals based on discharge.	2	4	L1
8	Fixed outlets though efficient are not popular. Why?	2	4	L2
9	Write a short note on '*Shejpali*' system of water delivery.	2	5	L2
10	Expand SCADA and mention its use in irrigation water management.	2	5	L1

PART- B (5x 13=65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	Discuss on the National Water Policy, 2002, highlighting the irrigation-related issues mentioned there.	13	1	L3
OR				
11 (b)	With a neat sketch elaborate the soil water constants and their importance.	13	1	L3
12 (a) (i)	Different crops, their base period, area under irrigation of each crop and duty of water at head of the canal are given in the table. If	9	2	L4

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<table>
<tr><td colspan="5">whole of this area is under the command of one canal, find out the maximum discharge required in the canal. Value of time factor may be taken ¾. Assume 20% extra for meeting out the Kor period demand.</td><td></td><td></td><td></td></tr>
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S. No.	Name of the Crop	Base Period (days)	Area (ha)	Duty at head (ha/cumecs)
1	Sugarcane	300	750	600
2	Overlap of sugarcane in Summer	80	200	600
3	Wheat	120	110	1700
4	Spiked millet	100	490	2200
5	Hot weather vegetables	110	350	650

12 (a) (ii)	Write a note on Penman-Monteith method of estimation of evapotranspiration.	4	2	L3

<div align="center">OR</div>

12 (b) (i)	Area, duty and base period of various crops under a canal system are given in the table below. If the reservoir losses are conveyance losses in the canal system are 8% and 15% respectively, find out the reservoir capacity.	9	2	L4

S. No.	Name of the Crop	Base Period (days)	Area (ha)	Duty at field (ha/cumecs)
1	Wheat	120	5400	1800
2	Sugarcane	300	3200	700
3	Cotton	210	2500	1200
4	Rice	140	6500	750
5	Vegetables	100	1700	600

12 (b) (ii)	Discuss the crop seasons in India.	4	2	L3
13 (a)	With neat sketches discuss on the location and functioning of the head regulator and river training works. .	13	3	L3

<div align="center">OR</div>

13 (b)	Elaborate on the design procedure of a gravity dam.	13	3	L3
14 (a) (i)	Design an unlined canal to carry 20 cumecs of water, in alluvium. The silt factor is unity and the side slope is ½ :1. Find the longitudinal slope also.	9	4	L4
14 (a) (ii)	Compare and contrast Kennedy's theory and Lacey's theory.	4	4	L3

<div align="center">OR</div>

14 (b)	Draw the classification tree of different irrigation methods and elaborate on any two popular surface irrigation methods with neat sketches, highlighting their advantages and limitations.	13	4	L3
15 (a)	Water is moving from a social good to an economic good. In this context substantiate the necessity of looking into the economics of irrigation, which the largest consumer of water in India.	13	5	L3

<div align="center">OR</div>

15 (b)	Rice cultivation needs a relook from conventional to contemporary method of irrigation, to improve water and crop productivity – Discuss the SRI method of rice cultivation to achieve this.	13	5	L3

PART- C (1x 15=15 Marks)
(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	You are being asked to plan and design an irrigation network, from the storage structure up to the field channel. As an irrigation engineer, who has attained a theoretical perspective on the concepts, how do you proceed? With the help of a flow chart explain the sequence of activities, focusing on the preliminary investigation, detailed investigation on technical; social and economic feasibility. ***Hints:*** *Semi-arid area / Upstream rolling terrain-downstream plain, Soil: predominantly clayey loam; Staple crop is paddy (but crop diversification need to be planned); Landuse: 60% agricultural land,30% urbanized, 5% forest land, 5% others; Funding: expected from World Bank.*	15	1,2,3 ,4,5	L5