ADDITIONAL CONTROLLER OF EXAMINATIONS
AU
CHENNAI
600 025

Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech. /B. Arch. (Full Time) - END SEMESTER EXAMINATIONS, NOV-DEC 2025

IRRIGATION ENGINERING
VII Semester

CE 5701 – IRRIGATION ENGINEERING
(Regulation 2019)

Time: 3 hrs | Max. Marks: 100

CO 1	Describe the National Water Policy structure and soil-plant-water characteristics
CO 2	Describe the basics and estimation of crop water requirement
CO 3	Design the various types of hydraulic structures including dams, spillways and dissipaters
CO 4	Design the components of irrigation canal including canal drops and cross drainage works
CO 5	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 (10 x 2 = 20 Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	A loamy soil has field capacity of 21% and wilting coefficient of 10%. The dry unit weight of soil is 1.45g/cm^3. If the depth of root zone is 650 mm, find out the maximum storage capacity of the soil.	2	1	2
2	Plot the soil moisture retention curves for sandy, loamy and clayey soils.	2	1	2
3	If the consumptive use of a crop is 43.5 cm and the effective rainfall received is 2.5 cm. Find out the consumptive irrigation requirement and field irrigation requirement, if the water application efficiency is 0.7.	2	2	2
4	Differentiate between sequence cropping and relay cropping.	2	2	2
5	Sketch a barrage and mark the parts.	2	3	1
6	Give a short note on river training works.	2	3	1
7	List any two requirements of a good canal outlet.	2	4	1
8	What is SAR? What is its importance?	2	4	1
9	What do you mean by '*turn over*'?	2	5	1
10	Write any two types of water delivery systems.	2	5	1

PART- B (5 x 13 = 65 Marks)

Q. No.	Questions	Marks	CO	BL
11 (a) (i)	With a neat sketch explain the different soil water constants.	6.5	1	3
(ii)	Discuss on the physical properties of soil that influence soil moisture characteristics.	6.5	1	3
	OR			

<table>
<tr><td>11 (b) (i)
(ii)</td><td>Detail the ill effects of irrigation.
Bring out the salient features of the National Water Policy, 2012.</td><td>6.5
6.5</td><td>1
1</td><td>3
1</td></tr>
<tr><td>12 (a) (i)</td><td>A stream of 135 liters per second was diverted from a canal and 105 liters per second was delivered to the field. An area of 1.8 hectares was irrigated in 8 hours. The effective depth of root zone was 1.7 m. The runoff loss in the field was 400 m^3. The depth of water penetration varied linearly from 1.7 m at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity of the soil is 20 cm per meter depth of soil. Find out the (i) water conveyance efficiency, (ii) water application efficiency, (iii) water storage efficiency and (iv) water distribution efficiency. Irrigation was started at a moisture extraction level of 50% of the available moisture.</td><td>8</td><td>2</td><td>4</td></tr>
<tr><td>(ii)</td><td>Describe any two methods of estimating crop water requirement.</td><td>5</td><td>2</td><td>3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>12 (b) (i)</td><td>Base period, area and duty of various crops under a canal irrigation system are given in the table below. If the reservoir losses are 12% and the conveyance loss in canal system is 18%, find out the reservoir capacity.
<table>
<tr><th>S. No.</th><th>Crop</th><th>Base Period (days)</th><th>Area (ha)</th><th>Duty at field (ha/cumecs)</th></tr>
<tr><td>1</td><td>Wheat</td><td>110</td><td>5000</td><td>1800</td></tr>
<tr><td>2</td><td>Sugarcane</td><td>320</td><td>6000</td><td>800</td></tr>
<tr><td>3</td><td>Cotton</td><td>200</td><td>3200</td><td>1200</td></tr>
<tr><td>4</td><td>Rice</td><td>120</td><td>3000</td><td>800</td></tr>
<tr><td>5</td><td>Vegetables</td><td>90</td><td>1700</td><td>700</td></tr>
</table></td><td>8</td><td>2</td><td>4</td></tr>
<tr><td>(ii)</td><td>Give a brief on crops and crop seasons in India.</td><td>5</td><td>2</td><td>3</td></tr>
<tr><td>13 (a)</td><td>With a neat sketch explain the various components and functions of a diversion headwork.</td><td>13</td><td>3</td><td>3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>13 (b)</td><td>Describe all the forces acting on a gravity dam with neat sketches.</td><td>13</td><td>3</td><td>3</td></tr>
<tr><td>14 (a)</td><td>A channel has to be designed for the following data.
Discharge = 30 cumecs; silt factor = 1.00; side slope = ½ : 1. Find out the longitudinal slope also.</td><td>13</td><td>4</td><td>3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>14 (b)</td><td>Discuss on the various types of cross drainage works with neat sketches, indicating their locations, advantages and limitations.</td><td>13</td><td>4</td><td>3</td></tr>
<tr><td>15 (a) (i)</td><td>Elaborate on the differences between the conventional method and SRI method of rice cultivation.</td><td>6.5</td><td>5</td><td>3</td></tr>
<tr><td>(ii)</td><td>Bring out the need and feasibility of modernization of irrigation systems in the State of Tamil Nadu.</td><td>6.5</td><td>5</td><td>5</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>15 (b) (i)</td><td>Discuss on the role of Command Area Development Programme in irrigation management.</td><td>6.5</td><td>5</td><td>3</td></tr>
<tr><td>(ii)</td><td>Elaborate on the economics of irrigation.</td><td>6.5</td><td>5</td><td>3</td></tr>
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PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	A farmer has owned a 10 ha plot in a tropical country. He has chosen Tomato as the crop to be grown in his field, wherein the wheatear parameters are conducive for its growth.			
	(i) Explain the conventional surface irrigation method used for irrigating Tomato with a neat sketch, highlighting its salient points and limitations.	**7.5**	4	5
	(ii) With the objective of saving water and retaining the same crop in a water-scarce condition, as an irrigation engineer, what type of irrigation method would you recommend. Discuss.	**7.5**	4	5

