



VALLIAMMAI ENGINEERING COLLEGE



SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

VII SEMESTER

CE6703 – WATER RESOURCES AND IRRIGATION ENGINEERING

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Prepared by

Mr. G. VAITHIYANATHAN, Assistant Professor/CIVIL

Mr.M. MOGAN RAJ, Assistant Professor/CIVIL

Mr.S. KARTHICK, Assistant Professor/CIVIL

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SUB. CODE: CE6703

YEAR: IV

SUB. NAME: WATER RESOURCES AND IRRIGATION ENGINEERING

SEM : VII

QUESTION BANK**(As per Anna University 2013 Regulation)****UNIT I - WATER RESOURCES**

Water resources survey – Water resources of India and Tamilnadu – Description of water resources planning – Estimation of water requirements for irrigation and drinking- Single and multipurpose reservoir – Multi objective - Fixation of Storage capacity -Strategies for reservoir operation - Design flood-levees and flood walls.

PART-A

1.	Define Meteorology.	BT-1	Remember
2.	How do you calculate Average Annual Runoff depth?	BT-1	Remember
3.	What are the uses of socio-economic data in water resource planning?	BT-1	Remember
4.	What are the two important standards for irrigation water?	BT-1	Remember
5.	Define reservoir.	BT-1	Remember
6.	Define Flood Walls.	BT-1	Remember
7.	Differentiate b/w consumptive and non – consumptive use of water.	BT-2	Understand
8.	Differentiate b/w single and multipurpose reservoir.	BT-2	Understand
9.	Describe about Water Resources in India and Tamil Nadu.	BT-2	Understand
10.	Discuss the term Reservoir operation	BT-2	Understand
11.	How will you estimate the quantity of water consumed?	BT-3	Application
12.	Classify the various zones of storage in a reservoir.	BT-3	Application
13.	Show the location where the floodwalls and levees are located	BT-3	Application
14.	Write down the steps for Water Resources planning.	BT-4	Analyse
15.	How do you fix a capacity of reservoir?	BT-4	Analyse
16.	Enumerate the factors to be considered in selection of site for reservoir.	BT-4	Analyse
17.	What are the factors on which water requirement for irrigation (Drinking	BT-5	Evaluate

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	water, Navigation) depends on?		
18.	Enumerate the preferable combinations for a multipurpose reservoir.	BT-5	Evaluate
19.	Explain the term storage capacity of the reservoir	BT-6	Create
20.	Compare storage and retarding reservoir	BT-6	Create

PART-B

1.	Describe the steps involved in water resource planning	BT-1	Remember
2.	How will you fix the capacity of reservoir? Explain.	BT-1	Remember
3.	How water requirement for drinking purpose is estimated? Discuss.	BT-1	Remember
4.	What are the flood control methods? Explain.	BT-1	Remember
5.	Differentiate between single and multipurpose reservoir.	BT-2	Understand
6.	Distinguish between structural and nonstructural measures for flood control.	BT-2	Understand
7.	Describe about the water resources in India and Tamil Nadu.	BT-2	Understand
8.	Illustrate the water quality standards for irrigation and drinking water purpose.	BT-3	Application
9.	classify the various zones of storage in a reservoir.	BT-3	Application
10.	Analyse the strategies for efficient reservoir operation.	BT-4	Analyse
11.	Explain in detail about economics of water resource planning.	BT-4	Analyse
12.	Explain the stepwise planning procedure for multipurpose projects.	BT-4	Analyse
13	Write short note on single and multipurpose reservoir with its advantages and disadvantages.	BT-5	Evaluate
14.	Summarize the water requirements for irrigation, hydropower generation, navigation, drinking and disposal of sewage and industrial waste.	BT-6	Create

PART-C

1	What is multipurpose project? What are the functional requirements in multipurpose project? How to estimate requirement of water for irrigation and domestic purposes?	BT-1	Remember
2	Define storage capacity of the reservoir. List out and explain various storage zones of reservoir with neat sketch?	BT-3	Application
3	Write a case study on multipurpose reservoir	BT-5	Evaluate

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4	Develop a yearly plan for operating a reservoir for irrigation, drinking and power supply.	BT-3	Application
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UNIT II - WATER RESOURCE MANAGEMENT

Economics of water resources planning; – National Water Policy – Consumptive and non-consumptive water use - Water quality – Scope and aims of master plan - Concept of basin as a unit for development - Water budget- Conjunctive use of surface and ground water

PART-A

1.	What is the Need for National Water policy?	BT-1	Remember
2.	When will you revise National Water policy and State Water policy?	BT-1	Remember
3.	Define National Water policy.	BT-1	Remember
4.	List out the factors affecting the consumptive use of water.	BT-1	Remember
5.	Define water budget.	BT-1	Remember
6.	List out any 4 important river basins in India.	BT-1	Remember
7.	Differentiate between National Water policy (1987) and National Water policy (2002)?	BT-2	Understand
8.	Differentiate consumptive and non-consumptive use of water	BT-2	Understand
9.	Describe about basin.	BT-2	Understand
10.	What do you mean by change in storage?	BT-2	Understand
11.	Classify the contents of Master Plan.	BT-3	Application
12.	Identify the purpose of Master Plan? Explain.	BT-3	Application
13.	Illustrate the water allocation priorities of water resource planning	BT-3	Application
14.	Write down the methodologies in watershed management.	BT-4	Analyse
15.	Write the components of Master Plan.	BT-4	Analyse
16.	Discuss about the physical and chemical characteristics of water.	BT-4	Analyse
17.	State the principles of Master Plan.	BT-5	Evaluate
18.	Enumerate the equation for determination of consumptive use?	BT-5	Evaluate
19.	Explain inflow and outflow.	BT-6	Create
20.	Discuss the different methods to measure consumptive use.	BT-6	Create

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PART-B

1.	Show the Necessity of National Water Policy? Explain	BT-1	Remember
2.	Define Master Plan in water resources? Explain the scope and aims in detail.	BT-1	Remember
3.	What are the different equations for determination of consumptive use? Briefly explain it.	BT-1	Remember
4.	Define the concept of basin as a unit for development?	BT-1	Remember
5.	Show the points about water allocation priorities in National Water Policy.	BT-2	Understand
6.	Write briefly about water budget and its development plan.	BT-2	Understand
7.	Summarize the different characteristics of water? Briefly discuss about it?	BT-2	Understand
8.	Interpret the water characteristics to be investigated?	BT-3	Application
9.	Show the features and limitations of National Water policy.	BT-3	Application
10.	Explain in detail about the (i) Water budget equation(8) (ii) Components of Master Plan(8)	BT-4	Analyse
11.	Classify the consumptive use of water and the factors affecting consumptive use of water. How will you measure it?	BT-4	Analyse
12.	Explain in detail the conjunctive use of surface and ground water.	BT-4	Analyse
13.	Rewrite the economics of water resource planning.	BT-5	Evaluate
14.	Explain the methods for determination of consumptive use?	BT-6	Create

PART- C

1	Outline briefly the concept of ground water budgeting and its importance in the determination of the safe yield from a basin.	BT-2	Understanding
2	What are the quality criteria for irrigation water? show the relationship between the different parameters. Classify the irrigation water based on various parameters.	BT-1	Remembering
3	List the various steps needed for planning an irrigation project. List the various objectives of water resources of water resources development in the context of the lesser developed countries.	BT-4	Analyzing
4	(i) Evaluate the necessity and importance of irrigation water in our country. (ii) What are the quality criteria for irrigation purposes? Describe the chemical constituents, which affect the suitability of water for irrigation?	BT-5	Evaluating

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UNIT III - IRRIGATION ENGINEERING

Need – Merits and Demerits – Duty, Delta and Base period – Irrigation efficiencies – Crops and Seasons - Crop water Requirement – Estimation of Consumptive use of water.

PART-A

1.	What are the two standards of irrigation water?	BT-1	Remember
2.	Show the necessity of irrigation and its advantages.	BT-1	Remember
3.	Write about duty and its standard values	BT-1	Remember
4.	What is meant by crop Season?	BT-1	Remember
5.	Define delta of a crop and list the standard values of some crops.	BT-1	Remember
6.	What are the different types of duty and their units?	BT-1	Remember
7.	Infer the points you refer from consumptive use of Water.	BT-2	Understand
8.	Summarize about the following (i) cash crops (ii) Transpiration ratio	BT-2	Understand
9.	Explain about irrigation and its types.	BT-2	Understand
10.	Compare the factors affecting duty of the water canal system.	BT-2	Understand
11.	A canal was designed to supply the irrigation needs of 1000 ha of land growing rice of 140 days base period and having a delta of 130 cm. If the canal water is used to irrigate wheat of base period 119 days and having a delta of 50 cm, Find the area that can be irrigated	BT-3	Application
12.	One cumec of water is pumped into a farm distribution system. 0.9 cumec is delivered to a turn-out, 0.8 kilometer from the well. Compute the conveyance efficiency.	BT-3	Application
13.	Find the delta for rice, when its duty is 1080 hectares /cumec on the field. Assume the base period of the crop as 120 days.	BT-3	Application
14.	Distinguish between the gross command area and cultivable command area.	BT-4	Analyze
15.	Differentiate Khraif crops & Rabi crops.	BT-4	Analyze
16.	Enumerate the difference between base period, crop period and crop ratio	BT-4	Analyze
17.	Evaluate field capacity terminology.	BT-5	Evaluate
18.	Identify the methods of measuring the consumptive use (Evapo - transpiration) of water.	BT-5	Evaluate
19.	Discuss the need of crop rotation and some rotational crops	BT-6	Create
20.	Elaborate the idea of assessment of irrigation water.	BT-6	Create

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PART-B

1.	List and explain the main crop seasons of India.	BT-1	Remember
2.	With neat sketch enumerate factors affecting Duty and list the methods to improve duty.	BT-1	Remember
3.	(i) Describe the necessity of irrigation in India. (8) (ii) Write the benefits and ill effects of irrigation. (8)	BT-1	Remember
4.	Define consumptive use of water? Explain the Factors affecting consumptive use of Water.	BT-1	Remember
5.	(i) Derive the relationship between Duty and Delta for the given base period (ii) Explain about irrigation requirement of crops.	BT-2	Understand
6.	Summarize about irrigation efficiencies.	BT-2	Understand
7.	What is the water requirement of crops? What are the factors affecting duty? A reservoir with live storage capacity of 300 million cubic hectare is able to irrigate an ayacut 40000 hectare with 2 fillings each year. The crop season is 120 days. What is the duty?	BT-2	Understand
8.	The root zone of an irrigation soil has dry weight of 15 kN/m^3 and a field capacity of 30%. The root zone depth of a certain crop, having permanent wilting percentage of 8% is 0.8 m. Determine (a) depth of moisture in the root zone at field capacity (b) depth of moisture in the root zone at permanent wilting point, and (c) depth of water available.	BT-3	Application
9.	After how many days will you supply water to a clay loam soil in order to ensure efficient irrigation of the given crop, if (a) Field capacity of the soil is 27% (b) Permanent wilting point is 14% (c) Density of soil is 1.5 gm/cc (d) Effective depth of root zone is 75cm and (e) Daily consumption use of water for the give crop is 11mm	BT-3	Application
10.	A certain crop is grown in an area of 2000 hectares which is fed by a canal system. The data percentage to irrigation are as follows : Field capacity of soil = 25%	BT-4	Analyse

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	<p>Optimum moisture =12%</p> <p>Percentage wilting point =10%</p> <p>Effective depth of root zone =80 cm</p> <p>Relative density of soil =1.4</p> <p>If the frequency of irrigation is 10 days and the overall efficiency is 23%, Determine (a) the daily consumptive use (b) The water discharge in m³/sec required in the canal feeding the area.</p>		
11.	The field capacity of a certain soil is 20% and its apparent specific gravity is 1.6. Before applying irrigation water, a wet sample of soil was taken and its mass was found as 150 gm. The same sample weighed as 136 gm after oven drying. Determine the depth of water that must be applied to irrigate the soil to a depth of 0.9 m.	BT-4	Analyse
12.	What is meant by transpiration by plants? Do you consider it an evil as it causes water losses from the soil and plants? What does transpiration means?	BT-4	Analyse
13.	Explain soil moisture constants with neat diagrams	BT-5	Evaluate
14.	Discuss the methods to estimate the consumptive use of water.	BT-6	Create

PART C

1	U are going to a suppose a chief member of Cauvery management board enforced by Supreme court of India ,In what way you suggest a solution to resolve the inter-dispute water problem between the South-Indian states . Prepare a case study report.	BT-6	Create
2	A stream of water of 125 liters per second was diverted from a canal and 100 liters per second were delivered to the field .An area of 1.6 hectares were irrigated in 8 hours. The effective depth of root zone was 1.7 m. The run off loss in the field was 420m 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 .Determine the various irrigation efficiencies. Irrigation was started at a moisture extraction level of 50% of the available moisture.	BT-3	Application
3	Prepare a report to justify the need of irrigation development to improve agricultural sector and nation development.	BT-4	Analyse

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4	Write the importance of “Social response to improve irrigation requirement of state of Tamilnadu.”	BT-5	Evaluate
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UNIT – IV - CANAL IRRIGATION

Types of impounding structures: Gravity dam – Diversion Head works - Canal drop – Cross drainage works – Canal regulations – Canal outlets – Canal lining – Kennady’s and Lacey’s Regime theory.

PART-A

1.	Write the important factors to be considered in the alignment of canals.	BT-1	Remember
2.	Define super passages	BT-1	Remember
3.	What is meant by canal escape and its types?	BT-1	Remember
4.	What is impounding structures and give few examples?	BT-1	Remember
5.	What is the function of silt extractor in a canal headwork?	BT-1	Remember
6.	Why canal drops are necessary in canal irrigation?	BT-1	Remember
7.	Sketch the advantages of canal lining.	BT-2	Understand
8.	Illustrate the functions of canal head regulator.	BT-2	Understand
9.	Compare the forces acting in a gravity dam.	BT-2	Understand
10.	Classify dams based on materials.	BT-2	Understand
11.	Select the different types of canal outlets	BT-3	Application
12.	Identify the various types of cross drainage works in canal network.	BT-3	Application
13.	Choose the location where aqueduct is located in cross drainage works.	BT-3	Application
14.	Enumerate the different between silt excluder and silt extractor.	BT-4	Analyse
15.	Outline the differences between lacey and kennedy theories.	BT-4	Analyse
16.	Factor the difference between sensitivity and flexibility of canal outlet.	BT-4	Analyse
17.	Explain the importance of canal alignment	BT-5	Evaluate
18.	Sketch the plan and section of arch dam. Give an example of arch dam in India.	BT-5	Evaluate
19.	Discuss the conditions where gravity dam can be adopted.	BT-6	Create
20.	Elaborate the drawbacks of Kennedys theory.	BT-6	Create

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PART-B

1.	Briefly describe and discuss about various methods of canal lining. Give the cross section of lined canal.	BT-1	Remember
2.	Discuss the physical factor that governs the selection and location of dam	BT-1	Remember
3.	Describe in detail about following (i) Forces acting on gravity dam (ii) Causes for failure of gravity dam	BT-1	Remember
4.	(i) Discuss in detail the various types of canals. Explain how they are classified (ii) Elaborate on alignment of canal in detail.	BT-1	Remember
5.	Classify the different types of dams with example.	BT-2	Understand
6.	Compare the merits and demerits of lined and unlined canals.	BT-2	Understand
7.	Compare the function of different component of typical canal head works with neat sketch indicating the different components.	BT-2	Understand
8.	Design a trapezoidal shaped concrete lined channel to carry a discharge of 200 cumec at a slope of 30 cm/km. The side slopes of the channel are 1.5:1. The value of N may be taken as 0.017. Assume limiting velocity in the channel as 2m/s.	BT-3	Application
9.	Design an irrigation channel on Kennedy theory to carry a discharge of 5cumec. Assume $N = 0.0225$ and $m = 1$. The channel has a bed slope of 0.2 m per kilometer.	BT-3	Application
10.	Design a irrigation channel in alluvial soil according to lacey's theory for the following data. Full supply discharge= 10 cumec Lacey silt factor = 0.9 Side slope of channel = 0.5(H): 1(V)	BT-4	Analyse
11.	Elaborately explain the following: (i) Lacey's and Kennedy theory. (ii) Comparison of above theories. (iii) Merits and defects.	BT-4	Analyse

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12.	Examine the different types of canal drop.	BT-4	Analyse
13.	Evaluate the functions of canal regulation with neat sketch.	BT-5	Evaluate
14.	Elaborate the purposes of cross drainage works and its types and Describe the use of siphon in cross drainage works	BT-6	Create

PART C

1	Write about the following (i) Practical profile of gravity dam. (ii) Elementary profile of gravity dam (iii) Modes of failure of gravity dam (iv) Advantages and disadvantages of gravity dam.	BT-2	Understand
2	Enlist the various hydrological and irrigational features of dams in Tamilnadu with example.	BT-1	Remember
3	Discuss the key features of theories regarding design of unlined canals.	BT-6	Create
4	As an irrigation engineer, enumerate the importance, necessity and scope of Irrigation in India.	BT-5	Evaluate

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UNIT V - IRRIGATION METHODS AND MANAGEMENT

Lift irrigation – Tank irrigation – Well irrigation – Irrigation methods: Surface and Sub-Surface and Micro Irrigation - Merits and demerits – Irrigation scheduling – Water distribution – Participatory irrigation management with a case study.

PART-A

1.	Define irrigation and why drip irrigation is preferred	BT-1	Remember
2.	Describe what is meant by tank irrigation?	BT-1	Remember
3.	Define micro irrigation. When Micro irrigation technique is adopted?	BT-1	Remember
4.	Describe the term “turnover” in irrigation management?	BT-1	Remember
5.	Define participatory irrigation management.	BT-1	Remember
6.	What is lift irrigation?	BT-1	Remember
7.	Differentiate tank and well irrigation.	BT-2	Understand
8.	Differentiate b/w surface and sub-surface irrigation.	BT-2	Understand
9.	Describe about irrigation management in India and Tamil Nadu.	BT-2	Understand
10.	Discuss the term irrigation management.	BT-2	Understand
11.	Illustrate why a proper plan for operation & maintenance of irrigation system is necessary?	BT-3	Application
12.	Classify the various types of irrigation.	BT-3	Application
13.	List out the factors considered in irrigation scheduling.	BT-3	Application
14.	Write a note on participatory irrigation management. Explain the objectives of participatory irrigation management?	BT-4	Analyse
15.	Under which favorable conditions the sub-surface irrigation is practiced?	BT-4	Analyse
16.	Enumerate the factors to be considered in adopting well irrigation.	BT-4	Analyse
17.	Compose the problems of irrigation management without participatory management?	BT-5	Evaluate
18.	Enumerate the different methods of sub surface irrigation?	BT-5	Evaluate
19.	Explain the term water distribution.	BT-6	Create
20.	Assess the essential components of a drip irrigation?	BT-6	Create

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PART-B

1.	Identify the various types of irrigation? Describe in detail.	BT-1	Remember
2.	Enumerate and discuss the factors affecting the irrigation scheduling	BT-1	Remember
3.	Describe the kinds of participation that are necessary for irrigation management activities?	BT-1	Remember
4.	Examine in detail about i) lift irrigation and ii) tank irrigation.	BT-1	Remember
5.	Distinguish between Surface, Sub-surface and micro irrigation methods.	BT-2	Understand
6.	(i) Discuss about the favorable conditions for sub-surface irrigation. (ii) Describe the modes of applying water to crops with neat sketches.	BT-2	Understand
7.	Summarize the methods of Surface and Sub-Surface irrigation.	BT-2	Understand
8.	Demonstrate in detail about the water distribution techniques.	BT-3	Application
9.	Show briefly the various techniques used for distributing water in the farms.	BT-3	Application
10.	Explain stepwise planning and executing procedure for lift irrigation.	BT-4	Analyse
11.	(i) Explain the tank irrigation. (ii) Analyze about well irrigation.	BT-4	Analyse
12.	(i) Explain water users association in irrigation water management. (ii) Explain the performance evaluation of implanted project.	BT-4	Analyse
13.	Compose a short note on tank and well irrigation with its advantages and disadvantages.	BT-5	Evaluate
14.	Compare and explain about irrigation management in India and Tamil Nadu.	BT-6	Create

PART C

1.	What is tank irrigation? Differentiate between isolated tanks and group tanks. How can we compute the storage capacity of an irrigation tank?	BT-2	Understand
2.	Explain participating irrigation management? Give a case study to assess the above type of management .	BT-6	Create
3.	Classify the different methods of surface irrigation? Analyse the methods point out the prerequisites for adoption of this method.	BT-4	Evaluate
4.	Formulate the essential components of a drip irrigation systems? Prepare and draw a layout plan of the drip irrigation system.	BT-5	Evaluate