

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech.

Branch : Civil Engineering

Semester : IV

Subject Code & Name: BTCVC404 Water Resources Engineering

Max Marks: 60

Date: 24/08/2022

Duration: 3.45 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks																						
Q. 1 Solve Any Two of the following.																								
A) Explain the different methods of distribution of water.	COI Understand	6																						
B) After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if <ul style="list-style-type: none"> (i) Field capacity of the soil = 28% (ii) Permanent wilting point = 13% (iii) Dry density of soil = 1.3 gm/c.c. (iv) Effective depth of root zone = 70 cm (v) Daily consumptive use of water for the given crop = 12 mm Assume any other data not given.	COI Apply	6																						
C) The gross command area for a distributary is 6000 hectares, 80% of which is culturable irrigable. The intensity of irrigation for Rabi season is 50% and that for Kharif season is 25%. If the average duty at the head of the distributary is 2000 hectares/cumec for Rabi season and 900 hectares/cumec for Kharif season, find out the discharge required at the head of the distributary from average demand considerations.	COI Apply	6																						
Q.2 Solve Any Two of the following.																								
A) What are the different Zones of storage/ control levels in a reservoir? Explain with the help of a diagram.	CO2 Understand	6																						
B) Analyse the following failures in Gravity dam:- <ul style="list-style-type: none"> a) By overturning (or rotation) about the toe b) By crushing (or compression) 	CO2 Analyze	6																						
C) A proposed reservoir has capacity of 500 ha-m. The catchment area is 125 km ² , and the annual stream flow averages 12 cm of runoff. If the annual sediment production is 0.03 ha.m/km ² , what is the probable life of the reservoir before its capacity is reduced by 10% of its initial capacity by sedimentation? The relationship between trap efficiency η (%)	CO2 Apply	6																						
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>C/I</th><th>0.01</th><th>0.02</th><th>0.04</th><th>0.06</th><th>0.08</th><th>0.1</th><th>0.2</th><th>0.3</th><th>0.5</th><th>0.7</th></tr> </thead> <tbody> <tr> <td>η (%)</td><td>43</td><td>60</td><td>74</td><td>80</td><td>84</td><td>87</td><td>93</td><td>95</td><td>96</td><td>97</td></tr> </tbody> </table>	C/I	0.01	0.02	0.04	0.06	0.08	0.1	0.2	0.3	0.5	0.7	η (%)	43	60	74	80	84	87	93	95	96	97		
C/I	0.01	0.02	0.04	0.06	0.08	0.1	0.2	0.3	0.5	0.7														
η (%)	43	60	74	80	84	87	93	95	96	97														

Q. 3 Solve Any Two of the following.

- A) Explain the components of earthen dam and their functions with the help of a diagram.
- B) Write a short note on following failures in earthen dam:-
 - a. Hydraulic Failure
 - b. Seepage Failure
 - c. Structural Failure

CO2
Understand

CO3
Understand

- C) What are the assumptions and limitations regarding Kennedy's silt theory?**

CO3
Understand

6

Q.4 Solve Any Two of the following.

- A)** A catchment has 6 raingauge stations. In a year, the annual rainfall recorded by the gauges are as follows:

Station	A	B	C	D	E	F
Rainfall (cm)	82.6	102.9	180.3	110.3	98.8	136.7

For a 10% error in the estimation of mean rainfall, calculate the optimum numbers of stations in the catchment.

- B)** The ordinates of 3hr UH of a catchment are given below

Time (hr)	0	3	6	9	12	15	18	21
3 hr UHO (m ³ /s)	0	10	20	16	12	8	4	0

Derive flood hydrograph at the catchment outlet due to a storm given below.

Assume Φ index is 3 mm/hr and constant base flow 10 m³/s.

Time (hr) for start of storm	0	3	6	9
Accumulated rainfall (cm)	0	3.9	4.7	7.6

- C)** Explain the following methods to analyze rainfall record data with the help of diagram:

- a. Mass Curve of rainfall
b. Hyetograph

CO3
Apply

6

Q. 5 Solve Any Two of the following.

- A)** Explain groundwater movement using Darcy's law.
- B)** Explain Bligh's Creep Theory and its limitations.
- C)** What are the causes and ill-effects of water logging?

CO3
Understand

6

CO3
Understand

6

CO3
Understand

6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2025

Course: Second Year B. Tech (Sem-IV) Branch : Civil Engineering Semester :IV

Subject Code & Name: BTCVC404 Water Resources Engineering

Max Marks: 60 Date: 19/07/2025 Duration: 3 Hr.

Instructions to the Students:

1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

				(Level/CO)	Marks
Q. 1 Objective type questions. (Compulsory Question)					12
1 What is the primary purpose of irrigation?				BL2/CO 1	1
	a) Increase rainfall	b) Supply water to crops	c) Drain excess water	d) Improve soil texture	
2 Kennedy's theory is related to:				BL2/CO 1	1
	a) Silt transportation in canals	b) Stability of dams	c) Design of weirs		
3 What does a mass curve represent in reservoir planning?				BL2/CO 1	1
	a) Rainfall data	b) Cumulative inflow and outflow	c) Flood frequency		
4 The useful life of a reservoir is primarily reduced by:				BL2/CO 2	1
	a) Silting	b) Rainfall	c) Evaporation losses		
5 Which of the following is a primary function of a gallery in a gravity dam?				BL2/CO 1	1
	a) Enhancing stability	b) Preventing seepage	c) Drainage and inspection		
6 Which failure mode is specific to earth dams?				BL2/CO 2	1
	a) Sliding	b) Piping	c) Overturning		
7 The Bligh's creep theory is used to analyze:				BL2/CO 1	1
	a) Silt deposition	b) Seepage in weirs	c) Stability of dams		
8 What is the primary function of inverted filters in earth dams?				BL2/CO 2	1
	a) To increase drainage efficiency	b) To reduce uplift pressure	c) To minimize seepage		
9 The unit hydrograph is used to determine:				BL2/CO 2	1
	a) Rainfall intensity	b) Catchment area size	c) Runoff response from rainfall		

10	Which formula is typically used to estimate runoff in a catchment?				BL2/CO 1	1
	a) Darcy's equation	b) Manning's formula	c) Rational method	d) Bernoulli's equation		
11	Flood hydrographs are primarily used to study:				BL2/CO 1	1
	a) Evaporation losses	b) Rainfall distribution	c) Flow variations during a flood	d) Groundwater recharge		
12	Which type of reservoir classification is based on its purpose?				BL2/CO2	1
	a) Single-purpose reservoir	b) Zoned reservoir	c) Overflow reservoir	d) Silting reservoir		
Q. 2	Solve the following.					12
A)	Derive relationship between duty and delta.				BL2/CO 1	6
B)	Differentiate between the lift irrigation and flow irrigation				BL2/CO1	6
Q.3	Solve the following.					12
A)	Explain the process of selecting a site for a reservoir. What are the key factors that influence the site selection for constructing a reservoir?				BL3/CO1	6
B)	Explain elementary profile of gravity dam.				BL3/CO2	6
Q. 4	Solve Any Two of the following.					12
A)	Discuss the components of an earthen dam, their functions, and the design criteria to ensure stability and prevent failure.				BL3/CO2	6
B)	Explain Bligh's creep theory and state its limitations.				BL2/CO2	6
C)	Determine the section of Lacey's regime channel to carry 15 m ³ /s of water in an alluvium with a sediment size of 0.85 mm.				BL4/CO3	6
Q.5	Solve Any Two of the following.					12
A)	Explain the hydrologic cycle and describe the major processes involved in it.				BL2/CO2	6
B)	What is a flood hydrograph, and how is it used to estimate flood flow in a river or stream?				BL3/CO3	6
C)	In a catchment area, there are five existing rain gauge stations. The annual rainfall at these stations is recorded as follows: 500 mm, 700 mm, 400 mm, 750 mm, and 680 mm. The allowable percentage error in the mean rainfall value is 11%. Calculate the optimum number of rain gauges required in the catchment to achieve the desired accuracy.				BL3/CO3	6
Q. 6	Solve Any Two of the following.					12
A)	A tube well is constructed in a basin with a specific yield of 0.35. If the area of influence of the well is 1000 m ² and the drawdown during pumping is 10 m, calculate the discharge of the tube well. Use Darcy's Law for the calculation.				BL3/CO3	6
B)	Explain with neat sketch rain water harvesting.				BL2/CO3	6
C)	Describe the causes of water logging in irrigated lands. Discuss the preventive and curative measures for it.				BL4/CO3	6
*** End ***						