Marking Scheme
CE3CO07 Water Resources Engineering

Q.1	i.	Unit Hydrograph theory was enunciated by (c) Le-Roy K. Shermen		**1**
	ii.	Infiltration capacity of soil depends upon (d) All of these		**1**
	iii.	The design flood commonly adopted in India for barrages and minor dams is (d) Standard project flood or a 100- year flood, whichever is higher.		**1**
	iv.	Probability of a 10-year flood to occur at least once in the next 4 years is (b) 35 %		**1**
	v.	The discharge per unit drawdown at the well is known as (d) Specific capacity		**1**
	vi.	Draw-down or depression head is (b) Difference between the water level in the well after pumping and the level of unaffected water table		**1**
	vii.	Delta of crop means (c) Depth of water required by the crop		**1**
	viii.	Crop rotation means (c) Growing different crops in successive seasons		**1**
	ix.	Head Regulator (d) Both (b) & (c)		**1**
	x.	The canal aligned along the watershed is known as (a) Ridge canal		**1**
Q.2	i.	Definition	1 Mark	**2**
		Name of any two types	1 Mark	
	ii.	Definition	1 Mark	**3**
		Explanation of types	1 Mark	
		Diagram	1 Mark	
	iii.	Definition of hydrograph	1 Mark	**5**
		Explanation of components of hydrograph		
		Diagram	1 Mark	
		Rising limb	1 Mark	
		The peak or crest element	1 Mark	
		The recession limb	1 Mark	
OR	iv.	Solution;		**5**
		Mean = 88.08cm	1 Mark	
		Standard deviation= 13.41	1 Mark	
		Cv=15.22	1 Mark	
		N=7	1 Mark	
		Additional number of station= 7-5=2	1 Mark	
Q.3	i.	Define Flood Frequency.		**2**
		Definition	2 Marks	
	ii.	Standard project flood	1 Mark	**3**
		Maximum probable flood	1 Mark	
		Design flood	1 Mark	
	iii.	Five point 1 mark for each	(1 Mark*5)	**5**
OR	iv.	Solution:		**5**
		$(K_{80}-K_{40})\ \sigma n\text{-}1=4000$	1 Mark	
		$(Y_{80}-Y_{40})\ \sigma n\text{-}1/Sn=4000$	1 Mark	
		$\sigma n\text{-}1/Sn=5718.5$	1 Mark	
		$Y_{240}=5.479$	1 Mark	
		$X_{240}=37300 m^3/s$	1 Mark	
Q.4		Attempt any two:		
	i.	Aquifer	1 Mark	**5**
		Aquiclude	1 Mark	
		Specific yield	1 Mark	
		Peizometric surface	1 Mark	
		Perched aquifer	1 Mark	
	ii.	Diagram	2 Marks	**5**
		Derivation	2 Marks	
		Final equation	1 Mark	
	iii.	Solution:		**5**
		Formula of $Q = 2.72\ bks/\log_{10}(R/r)$	2 Marks	
		Unit conversion of values	2 Marks	
		Final answer Q= 23.6 lit/sec	1 Mark	
Q.5	i.	Definition Duty	1 Mark	**2**
		Definition Delta	1 Mark	
	ii.	Definition	1 Mark	**3**
		Diagram	1 Mark	

		Explanation	1 Mark	
	iii.	For left canal		**5**
		Duty=800 hectares/cumec	2.5 Marks	
		For right canal		
		Duty=750 hectares/cumec	2.5 Marks	
OR	iv.	Definition of Irrigation Efficiencies	1 Mark	**5**
		Any 4 types out of	4 Marks	
		(water conveyance efficiency, water application efficiency, water use efficiency, water storage efficiency, water distribution efficiency, consumptive use efficiency)		
Q.6		Attempt any two:		
	i.	Define losses in canals	1 Mark	**5**
		Types of losses	4 Marks	
	ii.	Five points difference 1 mark for each	(1 Mark*5)	**5**
	iii.	Definition	1 Mark	**5**
		Types with diagram	4 Marks	

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Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

CE3CO07 Water Resources Engineering

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Unit Hydrograph theory was enunciated by **1**

(a) Merril Bernard (b) W.W. Horner

(c) Le-Roy K. Shermen (d) Robert E. Horten.

ii. Infiltration capacity of soil depends upon **1**

(a) Number of voids present in the soil

(b) Shape and size of soil particles

(c) Arrangement of soil particles

(d) All of these

iii. The design flood commonly adopted in India for barrages and minor dams is **1**

(a) Probable maximum flood

(b) A flood of 50-100 years return period

(c) Peak flood

(d) Standard project flood or a 100- year flood, whichever is higher.

iv. Probability of a 10-year flood to occur at least once in the next 4 years is **1**

(a) 25 % (b) 35 % (c) 50 % (d) 65 %

v. The discharge per unit drawdown at the well is known as **1**

(a) Specific yield (b) Specific storage

(c) Specific retention (d) Specific capacity

vi. Draw-down or depression head is **1**

(a) Difference of water level before and after pumping

(b) Difference between the water level in the well after pumping and the level of unaffected water table

(c) Depth of water level below ground level after pumping

(d) None of these

P.T.O.

vii. Delta of crop means **1**
(a) Area under the crop
(b) Crop period
(c) Depth of water required by the crop
(d) None of these

viii. Crop rotation means **1**
(a) Giving rest to cultivable land
(b) Adding manure to land
(c) Growing different crops in successive seasons
(d) Improve the cultivable land

ix. Head Regulator **1**
(a) Regulates river flow
(b) Supplies measured quantity of water to irrigation canal
(c) Regulates silt entry
(d) Both (b) & (c)

x. The canal aligned along the watershed is known as **1**
(a) Ridge canal (b) Contour canal (c) Side slope canal (d) Field canal

Q.2 i. What are Rain Gauges? **2**

ii. What do you understand by precipitation? Explain various types of precipitation **3**

iii. What is a hydrograph? Draw a single peaked hydrograph and explain its components. **5**

OR iv. A catchment has five rainguage stations. In a year, the annual rainfall recorded by the gauges are 78.8 cm, 90.2cm, 98.6 cm, 102.4 cm and 70.4 cm. For a 6 % error in the estimation of the mean rainfall, determine the additional number of gauges needed. **5**

Q.3 i. Define Flood Frequency. **2**

ii. Explain different types of floods. **3**

iii. Give the points of limitations of Rational Formula of flood forecasting. **5**

OR iv. For a river valley project, the following results were obtained from flood frequency analysis using Gumbel's method: **5**
Using below data, Estimate the flood magnitude with a return period of 240 years

Return period T (years)	Peak flood (m^3/s)
40	27000
80	31000

Q.4 Attempt any two:

i. Define the following terms: **5**
Aquifer, aquiclude, specific yield, peizometric surface, aquitard.

ii. Derive an expression for discharge from a well in unconfined aquifer. The well fully penetrates it. **5**

iii. A tube well of 30 cm diameter penetrates fully in an artesian aquifer. The strainer length is 15 m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 metres. **5**

Q.5 i. Define Duty and Delta? **2**

ii. Explain Drip Irrigation System with proper diagram **3**

iii. The left branch canal carrying a discharge of 20 cumec has culturable command area of 20,000 hectares. The intensity of Rabi crop is 80 %, and the base period is 120 days. The right branch canal carrying discharge of 8 cumec has culturable commanded area of 12,000 hectares, intensity of irrigation of Rabi crop is 50 %, and the base period is 120 days. Compare the efficiencies of the two canal systems. **5**

OR iv. Explain Irrigation Efficiencies and its types. **5**

Q.6 Attempt any two:

i. Explain losses in canals **5**

ii. Differentiate between Kennedy's and Lacey's theory of canal design. **5**

iii. What are Dams? Explain in brief different types of dams. **5**

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