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

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec-2023

CE3CO29 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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. A hydrograph is a plot of- **1**

(a) Rainfall intensity against time
(b) Stream discharge against time
(c) Cumulative rainfall against time
(d) Cumulative runoff against time

ii. Intensity of rainfall is measured by_____. **1**

(a) Continuously recording gauge
(b) Anemometer
(c) Hydrometer
(d) Seismometer

iii. For predicting floods of a given frequency, the best reliable method is- **1**

(a) Unit hydrograph (b) Gumbel's method
(c) California method (d) None of these

iv. Ryve's formula for flood estimate in cumecs, is- **1**

(a) $Q = CA^{3/4}$ (b) $Q = CA^{2/3}$
(c) $Q = CA^{1/2}$ (d) $Q = CA^{1/4}$

v. Water wells excavated through confined aquifers are known as _____. **1**

(a) Artesian wells (b) Non-artesian wells
(c) Gravity wells (d) Water table wells

vi. The geological formation which may contain water but does not contain any yield is _____. **1**

(a) Aquifer (b) Aquiclude (c) Aquifuge (d) Aquitard

vii. The process of artificially supplying water to the soil for raising crop is known as- **1**
(a) Irrigation (b) Ground water
(c) Both (a) and (b) (d) None of these

viii. Total depth of water required by a crop during the entire period of crop in the field is known as- **1**
(a) Duty (b) Delta (c) Paleo (d) Capacity Factor

ix. What type of losses can be mainly avoided by lining the canals? **1**
(a) Seepage (b) Percolation
(c) Evaporation (d) Absorption

x. Cross regulators in main canals are provided- **1**
(a) To regulate water supply in the distributaries
(b) To increase water head upstream when a main canal is running with low supplies
(c) To overflow excessive flow water
(d) None of these

Q.2 i. Explain hydrological cycle with neat sketch. **4**

ii. Define Unit Hydrograph theory. What are the assumption underlying the unit hydrograph theory? **6**

OR iii. A catchment has six rain gauge stations. In a year the annual rainfall recorded by the gauges are as follows: **6**

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

(a) Determine the standard error in the estimation of mean rainfall in the existing set of rain gauges.
(b) For a 10% error in the estimation of mean rainfall, calculate the optimum number of rain gauge station in the catchment.

Q.3 i. What are types of floods? **3**

ii. What are the different methods of flood control? Explain them in detail. **7**

OR iii. Flood Frequency computation for the river Chambal at Gandhisagar dam by using Gumbel's method yielded the following: **7**

Return Period T(Year)	Peak flood (M^3/s)
50	40809
100	46300

Estimate the flood magnitude in this river with a return period of 500 years.

Q.4 i. Explain the types of aquifers. **4**

ii. Derive an expression for discharge from a well in confined aquifer. **6**

OR iii. Derive an expression for discharge from a well in unconfined aquifer. **6**

Q.5 i. Define the terms duty and delta. **4**

ii. Explain Sprinkler method of irrigation with its merits or demerits. **6**

OR iii. Explain drip method of irrigation with its merits or demerits. **6**

Q.6 i. Define the type of irrigation channel. **3**

ii. Explain the comparison between Kennedy's and Lacey's theory. **7**

OR iii. Design an irrigation channel on Kennedy theory to carry discharge of 45 cumecs. **7**
Take N=0.0225, m=1.05. The channel has a bed slope of 1 in 5000. Full supply discharge 50 m^3/sec., Lacey's silt factor 1.0 and side slope of channel ½ H: 1 V.

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