Q.6 Attempt any two:

i. Compare between Kennedy's and Lacey's Silt theories. **5**

ii. Explain various types of canals, according to various classification system. **5**

iii. Design an irrigation canal to carry a discharge of 14 cumecs. Assume N = 0.0225, m = 1 & B/D = 5.7 **5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

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. The mass curve of rainfall of a storm is a plot of **1**

(a) Rainfall depths for various equal durations plotted in decreasing order

(b) Rainfall intensity v/s time in chronological order

(c) Accumulated rainfall intensity v/s time

(d) Accumulated precipitation v/s time

ii. 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

iii. For a return period of 1000 years the gumbel's reduced variate y_T is **1**

(a) 6.907 (b) 4.001 (c) 5.386 (d) 6.632

iv. The hydrologic flood routing methods use **1**

(a) Continuity equation only

(b) Both momentum and continuity equation

(c) Energy equation only

(d) Equation of motion only

v. Pick up the correct statement from the following: **1**

(a) The zone below water table, is called zone of saturation

(b) The zone above water table, is called zone of aeration

(c) Water in the zone of saturation, remains under hydrostatic pressure

(d) All of these

P.T.O.

vi. Pick up the correct statement from the following: **1**
(a) Perched aquifer is found in unconfined aquifer
(b) The top surface of the water held in the perched aquifer, is known as perched water table
(c) Perched aquifer is formed in unconfined aquifer if an impervious layer exists
(d) All the above.

vii. Choose the correct one **1**
(a) Irrigation frequency refers to the number of days between irrigation during periods without rainfall
(b) Irrigation frequency refers to the number of days between irrigation during periods with rainfall
(c) Both (a) and (b)
(d) None of these

viii. The useful moisture of soil is equal to its **1**
(e) Field capacity
(b) Saturation capacity
(c) Moisture content at permanent wilting point
(d) Difference between filed capacity and permanent wilting point within the root zone of plants.

ix. Lining of irrigation canals **1**
(a) Increases the water logging areas
(b) Decreasing the water logging areas
(c) Does not change the water logging area
(d) None of these

x. The various regulation works may be categorised as under **1**
(a) Canal Fall (b) Cross regulator
(c) Canal outlet (d) All of these

Q.2 Attempt any two:

i. Define Hydrograph? Draw a single peaked hydrograph and explain its components. **5**

ii. A 12 hour storm rainfall has the following depth in cm for each hour occurring over a basin: **5**
1.8, 2.6, 7.8, 3.9, 10.6, 5.4, 7.8, 9.2, 6.5, 4.4, 1.8 and 1.6

The surface runoff resulting from above storm is found to be 24.4 cm depth over the basin. Determine the average infiltration index for the basin.

iii. The following are the ordinates for a flood hydrograph resulting from an isolated storm of 6 hours duration. **5**

Time (h)	0	12	24	36	48	60	72	84	96
Ordinates of flood hydrograph(cumecs)	5	15	40	80	60	50	25	15	5

Determine the ordinates of 1cm – 6 hours unit hydrograph if catchment area is 450 sq.km.

Q.3 Attempt any two:

i. Define Flood. Explain all the types of floods. **5**

ii. From the analysis of available data on annual flood peaks of a stream for a period of 40 years, the 50 years and 100 years floods have been estimated to be 878 m^3/s and 970 m^3/s. Using Gumbel's method, estimate the 200 years flood for the stream. **5**

iii. Define Flood routing. List out the categories of flood routing. Explain any one in detail. **5**

Q.4 i. Define **3**
(a) Aquifer (b) Aquiclude (c) Aquifuge

ii. Derive an expression for discharge from a well in unconfined aquifer. The well fully penetrates it. **7**

OR iii. Derive an expression for discharge from a well fully penetrating a confined aquifer. **7**

Q.5 Attempt any two:

i. Define the term duty and delta. Also derive an expression to show the relationship between them. **5**

ii. A field has culturable command area of 2000 hectares. The intensity of irrigation for gram is 30% and for wheat is 50%. Gram has a kor period of 18 days and kor depth of 12cm, while wheat has 15 days and 15 cm resp. calculate the discharge of the field channel. **5**

iii. What are the factors affecting Duty? **5**

P.T.O.

Marking Scheme
CE3CO07 Water Resources Engineering

Q.1 i. The mass curve of rainfall of a storm is a plot of **1**
(d) Accumulated precipitation v/s time

ii. A hydrograph is a plot of **1**
(b) Stream discharge against time

iii. For a return period of 1000 years the gumbel's reduced variate y_T is **1**
(a) 6.907

iv. The hydrologic flood routing methods use **1**
(a) Continuity equation only

v. Pick up the correct statement from the following: **1**
(d) All of these

vi. Pick up the correct statement from the following: **1**
(d) All of these

vii. Choose the correct one **1**
(a) Irrigation frequency refers to the number of days between irrigation during periods without rainfall

viii. The useful moisture of soil is equal to its **1**
(d) Difference between filed capacity and permanent wilting point within the root zone of plants.

ix. Lining of irrigation canals **1**
(b) Decreasing the water logging areas

x. The various regulation works may be categorised as under **1**
(d) All of these

Q.2 Attempt any two:

i. Definition 1 mark **5**
Drawing of single peaked hydrograph 1 mark
Explanation of its components 3 marks

ii. Determine the average infiltration index for the basin. **5**
All Correct formula 1 mark
Correct method 1 mark
Correct answer 3 marks

iii. Determine the ordinates of 1cm – 6 hours unit hydrograph if catchment area is 450 sq.km. **5**
Correct formula 1 mark
Correct values of ordinates 4 marks

Q.3 Attempt any two:

i. Definition of Flood 1 mark **5**
Types of floods and its explanation
1 mark for each type (1 mark *2) 2 marks
Name of types of floods only
0.5 mark for each (0.5 mark 4) 2 marks

ii. Using Gumbel's method, estimate the 200 years flood for the stream. **5**
All Correct formula 1 mark
Correct method 1 mark
Correct answer 3 marks

iii. Definition of Flood routing 1 mark **5**
There are two categories of flood routing
0.5 marks for each (0.5 mark * 2) 1 mark
Explanation of any one 3 marks

Q.4 i. Definition 1 mark for each (1 mark * 3) **3**
(a) Aquifer (b) Aquiclude (c) Aquifuge

ii. Derive an expression for discharge from a well in unconfined aquifer. **7**
The well fully penetrates it.
For correct sketch with labelling 1 mark
For correct expression 1 mark
For correct derivation 5 marks

OR iii. Derive an expression for discharge from a well fully penetrating a confined aquifer. **7**
For correct sketch with labelling 1 mark
For correct expression 1 mark
For correct derivation 5 marks

Q.5 Attempt any two:

i. Definition duty and delta 1 mark **5**
Derivation 3 marks
For correct expression 1 mark

ii. Calculate the discharge of the field channel. **5**
All Correct formula 1 mark
Correct method 1 mark
Correct answer 3 marks

iii. Factors affecting Duty 1 mark for each (1 mark * 5) **5**

Q.6 Attempt any two:

i. Compare between Kennedy's and Lacey's Silt theories. **5**
1 mark for each (1 mark * 5)

ii. Types of canals, according to various classification system. **5**
1 mark for each classification (1 mark * 5)

iii. Design an irrigation canal to carry a discharge of 14 cumecs. **5**
All Correct formula 1 mark
Correct method 1 mark
Correct answer 3 marks

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