

Total No. of Questions: 6

Total No. of Printed Pages:3

Enrollment No.....



Faculty of Engineering  
End Sem Examination May-2023  
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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. Which of these is a type of recording Rain Guage? **1**  
(a) Tipping bucket (b) Floating bucket  
(c) Weighing bucket (d) All of these
- ii. Which of these is not a type of precipitation? **1**  
(a) Cyclonic precipitation (b) Paragraphic precipitation  
(c) Frontal precipitation (d) Convective precipitation
- iii. Which of these is a type of flood routing? **1**  
(a) Channel routing (b) Pipe routing  
(c) Tank routing (d) Pond routing
- iv. Which of these is a Flood control measure? **1**  
(a) Dykes (b) River training works  
(c) Flood ways (d) All of these
- v. Which of these is a test for calculating Yield of Well? **1**  
(a) Pumping test (b) Recuperation test  
(c) Both (a) and (b) (d) None of these
- vi. What is the correct equation of Darcy's Law? **1**  
(a)  $V=KL$  (b)  $V=KI$  (c)  $K=VI$  (d)  $K=V/I$
- vii. What is a low permeability unit which can store the water and transfer it slowly from one body to other? **1**  
(a) Confined Aquifer (b) Aquitard  
(c) Aquiclude (d) Aquifuge

P.T.O.

[2]

- viii. Which of these is the correct definition for Warabandi system? **1**  
 (a) Water distribution system  
 (b) Rotation of water supply according to a fixed schedule  
 (c) Rotational water allocation system  
 (d) All of these
- ix. Irrigation canals are generally aligned along- **1**  
 (a) Ridge line (b) Contour line  
 (c) Valley line (d) Straight line
- x. Which of these canals require maximum cross drainage work? **1**  
 (a) Watershed canal (b) Single bank canal  
 (c) Side slope canal (d) Ridge canal
- Q.2 i. Enlist the various phases of hydrological cycle. **2**  
 ii. Write short note on Rain-Guage System. **2**  
 iii. Enumerate all the basic data required for hydrological studies with significance of each. **6**
- OR iv. The effective rainfall hyetograph of a complex storm has duration of 12 hours, with rainfall intensities of 1.5, 0.5 and 5.0 cm/hr respectively in successive 4-hour period. The ordinates of the corresponding direct runoff hydrograph read at 4-hour intervals are 150, 250, 529, 313, 394, 212, 102 and 45 m<sup>3</sup> /sec respectively. Determine the ordinates of the 4 - hour unit hydrograph. **6**
- Q.3 i. What are the types of floods? **2**  
 ii. List any four factors which affect the hydrograph. **3**  
 iii. Determine the design flood discharge (allowing an increase of one third) for a bridge site with the following data: **5**  
 Catchment area = 2x10<sup>5</sup> hectares  
 Duration of storm = 8 hours  
 Storm precipitation = 3m  
 Time of concentration = 2 hours  
 Gauged discharge for a part flood with average maximum daily rainfall of 18cm was 3400 cumec.
- OR iv. Write short note on: **5**  
 (a) Flood control methods (b) Flood routing methods

[3]

- Q.4 i. List out Dupit's Assumptions **2**  
 ii. Draw a neat sketch to indicate the different types of aquifers. **3**  
 iii. In a certain area groundwater discharge into a canal. The soil has hydraulic conductivity  $K = 1.0 \text{ cm/s}$  and a porosity of 0.2. The groundwater flow is practically horizontal and the gradient of the head is 1 in 100 along flow direction, in plan view, that is at 45° to line of the canal. A conservative tracer is introduced into the ground at a point "A" perpendicular distance of 6 m from the canal. If dispersion and diffusion of the tracer are assured negligible estimate how long it will take for the tracer to appear in the canal. **5**
- OR iv. Derive an expression for discharge from a well fully penetrating a confined aquifer. **5**
- Q.5 i. Briefly explain the well irrigation. **2**  
 ii. Enumerate various factors affecting Irrigation water quality. **3**  
 iii. A tube well is used to irrigate rabi crop to cover an area of 0.2 hectare. The discharge from the well is 0.04m<sup>3</sup>/sec. The average depth of flow of the crop is expected to be 10cm with an infiltration of 4cm/h, find the time required to irrigate and the maximum area that can be irrigated. **5**
- OR iv. Define the term duty and delta along with factors effecting them. Also derive relation between duty and delta. **5**
- Q.6 Attempt any two: **5**  
 i. Enlist and describe various types of irrigation channels. **5**  
 ii. Explain Kennedy's method of channel design in detail. **5**  
 iii. Discuss all the canal regulation structures in detail. **5**

\*\*\*\*\*

- Q1 (i) ANS  $\rightarrow$  (D) A  
 (ii) ANS  $\rightarrow$  (B)  
 (iii) ANS  $\rightarrow$  (A)  
 (iv) ANS  $\rightarrow$  (D)  
 (v) ANS  $\rightarrow$  (C)  
 (vi) ANS  $\rightarrow$  (B)  
 (vii) ANS  $\rightarrow$  (B)  
 (viii) ANS  $\rightarrow$  (D)  
 (ix) ANS  $\rightarrow$  (A)  
 (x) ANS  $\rightarrow$  (A)

Q.2

- (i) ANS  $\rightarrow$  VARIOUS PHASES  
 (ii) ANS  $\rightarrow$  Rain Gauge system  
 (iii) ANS  $\rightarrow$  SIX BASIC Data  
 (iv) ANS  $\rightarrow$  STEPS  
 CORRECT ORDINATES  
 HYDROGRAPH PLOT

0.5 MARKS EACH = 2  
 ONE MARK EACH = 2  
 ONE MARK EACH = 6  
 ONE MARK =  
 FOUR MARKS =  
 ONE MARK = 6

Q.3.

- (i) ANS  $\rightarrow$  TYPES OF FLOOD  
 (ii) ANS  $\rightarrow$  ONE FACTOR  
 (iii) ANS  $\Rightarrow$  CORRECT FORMULA  
 STEPS  
 ANS

1 MARK EACH  $\Rightarrow$  2  
 1 MARK  $\times$  ~~3~~ = 3  
 1 MARK  
 3 MARKS  
 1 MARK  $\Rightarrow$  5

- (iv) ANS (a) Method (F.C) 1 MARK each = 5

Q.4 (i) ANS  $\rightarrow$  ASSUMPTION ONE MARK =  $1 \times 2 = 2$   
 EACH

(ii) ANS  $\Rightarrow$  SKETCH OF AQUIFER ONE MARK =  $1 \times 3 = 3$   
 EACH

(iii) ANS  $\Rightarrow$  FORMULA  $\rightarrow$   $\frac{1}{3}$   $\Rightarrow$  5 MARKS  
 STEPS  $\rightarrow$   
 CORRECT ANS  $\rightarrow$  1

(iv) ANS  $\Rightarrow$  CORRECT EXPRESSION  $\rightarrow$  4 MARKS 5 MARKS  
 DIAGRAM  $\rightarrow$  1 MARK

Q.5 (i) ANS  $\Rightarrow$  WELL IRRIGATION  $\rightarrow$  2 MARKS

(ii) ANS = various factor  $\rightarrow$  3 MARKS  
 Each factor

(iii) ANS = formula  $\rightarrow$  1  
 step  $\rightarrow$  3  
 ANS  $\rightarrow$  1  
 5 MARKS

(iv) ANS = Duty  $\Rightarrow$  1 MARK  
 Delta  $\Rightarrow$  1 " 5 MARKS  
 factor  $\Rightarrow$  1 "  
 Relation  $\Rightarrow$  2 "

Q.6 (i) ANS  $\Rightarrow$  various type ONE MARK EACH =  $1 \times 5$   
 $\Rightarrow$  5

(ii) ANS  $\Rightarrow$  Kennedy Method  
 Design steps  $\rightarrow$  2 5 MARKS  
 diagram  $\rightarrow$   $\frac{1}{2}$   
 $\rightarrow$   $\frac{1}{2}$

formula  $\rightarrow 2/2$

(iii) Ans = Each Structure ONE Marks = 5 Marks