Printed Pages: 02 **Sub Code:KCE-055**

Paper Id: | 2 | 3 | 1 | 6 | 5 | 2 | **Roll No.** | | | | | | | | | | | | |

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
ENGINEERING HYDROLOGY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

(a) Write water budget equation.
(b) Define actual evapotranspiration.
(c) Write 2 basic assumptions of unit hydrograph.
(d) What is mass curve?
(e) Write down the Ryves formula of flood estimation.
(f) Define attenuation.
(g) Draw diagram to show mutual interference of wells.
(h) What is perched water table.
(i) What are different types of contamination in groundwater?
(j) Define tube well.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

(a) What are different forms of precipitation? Also draw a schematic section of tropical cyclone.
(b) Explain double mass curve of rainfall. Also write the steps to correct the consistency of data.
(c) Explain risk, reliability and safety factors. Flood frequency computations for a river by using Gumble's method, yielded the following results. Calculate the flood magnitude in the river with the return period of 1000 years.

Return Period T (Years)	Peak Flood (m^3/sec)
50	40,809
100	46,300

(d) Derive an equation to calculate discharge from anunconfined aquifer for steady state conditions.
(e) Write the applicability of water wells. Mention its advantages and disadvantages.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain in detail different types of recording rain gauges.
(b) The average annual rainfall of 5 rain gauges in a basin 890, 540,450,410 and 550 mm respectively. Calculate the additional gauges required, if it is desired to limit the error to only 15%?

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain time characteristics of hydrograph.

(b) Define Hydrograph and its components in detail with neat sketch. Explain Unit Hydrograph by defining 1-hour, 6-hour and 24- hour unit hydrograph.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) A bridge has an expected life of 25 year and is designed for a flood magnitude of return period 100 years. Calculate the following: -
(a) What is the risk of this hydrologic design?
(b) If a 10% risk is acceptable, what return period will have to be adopted?

(b) Analysis of annual flood series of a river yielded a sample mean of 1000 m^3/s and standard deviation of 500 m^3/s. Derive the design flood of a structure on this river to provide 90% assurance that the structure will not fail in next 50 years. Use Gumbles method and assume the sample size to be very large.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Drawdown in observation well is 5m and 10 m and corresponding radius from well is center is 20m and 15 m respectively. Radius of circle of influence for a well is 500 meters. A tube well is 0.65 m in diameter. The unconfined aquifer is of 25 m depth. After drawdown depth of water is 12 m in the well. Permeability of soil is 27.50 m/day. Calculate the discharge from the well.

(b) Explain different types of saturated formations.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Differentiate between Open wells and tube wells. Provide its method of construction by analyzing the soil and ground level characteristics.

(b) Write the well construction methods in detail. Also Describe the operation and maintenance of water wells.