

Subject Code: XXXXX

Roll No:

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**BTECH
(SEM-5) ENGINEERING HYDROLOGY 2021-22**

TIME:3 HOUR

Total Marks: 100

Instruction: Attempt the questions as per the given instructions. Assume missing data suitably.

SECTION - A

Attempt *All Parts* in Brief

2*10 = 20

| Q1 | Questions | Marks |
|-----------|--------------------------------------------------------------------------------------|--------------|
| (a) | Write expression for normal ratio method to calculate missing rainfall at a station. | 2 |
| (b) | Write various applications of hydrology. | 2 |
| (c) | List the factors affecting flood hydrograph. | 2 |
| (d) | What is unit hydrograph ? Write the assumption involved. | 2 |
| (e) | What is risk and reliability ? | 2 |
| (f) | Define attenuation and lag ? | 2 |
| (g) | What is the difference between specific yield and specific capacity ? | 2 |
| (h) | What is well loss ? | 2 |
| (i) | What is well development ? | 2 |
| (j) | What is rainwater harvesting? | 2 |

SECTION - B

Attempt Any Three of the following

3*10 = 30

| Q2 | Questions | Marks |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| (a) | A river reach had a flood passing by. At a given instant the storage in the river was estimated as 16 ha-m. What would be the storage in the river after an interval of 3 hours if the average inflow and outflow are 15.2 m ³ /sec and 10.2 m ³ /sec respectively ? | 10 |
| (b) | Explain the procedure of using a flood hydrograph occurred in a catchment to develop a unit hydrograph. | 10 |
| (c) | What do you mean by prism and wedge storage with reference to hydrologic routing ? Also draw a labeled diagram.. | 10 |
| (d) | Discuss the principle of recuperation test of an open well. | 10 |
| (e) | Write short notes on following : i. Return Period. ii. Transmissibility | 10 |

SECTION - C

Attempt Any One of the following

5*10 = 50

| Q3 | Questions | Marks | | | | | | |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------|----|--------|-----|--------|----|
| (a) | Explain different types of precipitation with diagrams. | 10 | | | | | | |
| (b) | Draw a diagram showing distribution of soil moisture in infiltration process. Also explain different zones. | 10 | | | | | | |
| Q4 | Questions | Marks | | | | | | |
| (a) | Draw a neat sketch of flood hydrograph. Briefly explain its component parts. | 10 | | | | | | |
| (b) | Explain the method of S-curve using appropriate example. | 10 | | | | | | |
| Q5 | Questions | Marks | | | | | | |
| (a) | <p>Flood frequency computation for the Tehri dam, by using Gumbel's method, yielded the following results :</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Return Period T (years)</th> <th>Peak Flood (m³/sec)</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>40,809</td> </tr> <tr> <td>100</td> <td>46,300</td> </tr> </tbody> </table> <p>Estimate the flood at a return period of 250 years.</p> | Return Period T (years) | Peak Flood (m ³ /sec) | 50 | 40,809 | 100 | 46,300 | 10 |
| Return Period T (years) | Peak Flood (m ³ /sec) | | | | | | | |
| 50 | 40,809 | | | | | | | |
| 100 | 46,300 | | | | | | | |
| (b) | A bridge has an expected life of 30 years and is designed for a flood magnitude of 120 years. Calculate risk involved. What return period have to be adopted if 15 % risk is acceptable | 10 | | | | | | |

| Q6 | Questions | Marks |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| (a) | What are the different forms of subsurface water Explain with the help of diagram. | 10 |
| (b) | Derive an equation to calculate discharge from a well in case of unconfined aquifer. A tube well is 0.46 m in diameter. The unconfined aquifer is of 18 m depth. After drawdown depth of water is 12 m in the well. Permeability of soil is 24.50 m/day. Radius of circle of influence is 275 metres. Calculate the discharge of the tube well. | 10 |
| Q7 | Questions | Marks |
| (a) | Write the difference between open wells and tube wells. Provide its method of construction by analysing the soil and ground level characteristics. | 10 |
| (b) | Write the well construction methods in detail. Also describe the operation and maintenance of water wells. | 10 |