**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **3BT5158** | Roll No. | Total Printed Pages: 1 |
| **3BT5158** |  |
| B. Tech. III Year V- Semester (Main/Back) End Semester Examination, November 2021  **(CV)** | |
| **BCV05109 : Hydrology & Ground water** | | | |

# Time: **3**Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | The hyetograph of a storm of 6 hours duration is constructed with varying time intervals at 20 minutes time interval for the first one hour, at 40 minute time interval for the next 2 hours and at 1 hour time interval for the last 3 hours. The successive ordinates of the hyetograph in mm/hr are 66, 75, 54, 48, 69, 51 38, 47 and 25. What is the total rainfall depth produced by the storm is? | **(12)** | **Evaluate** |
|  | **OR** |  |  |
| **Q.2** | Raingauge D was inoperative for part of a month during which a storm occurred. The storm rainfall recorded in the three surrounding stations A, B & C were 8.5,6.7 and 9 cm respectively. If the annual average rainfall for the stations are 75, 84, 70 & 90 cm respectively. What is the missing storm rainfall at station ‘D’? | **(12)** | **Evaluate** |
|  | **UNIT-II (CO2)** |  |  |
| **Q.3** | The rainfall on five successive days on a catchment was 3, 6, 9, 5 and1cm respectively. If the Φ-index for the storm can be assumed to be 3 cm/day, what is the total, direct runoff from the catchment due to this storm? | **(12)** | **Evaluate** |
|  | **OR** |  |  |
| **Q.4** | Seven hour storm produced the following rainfall intensities (in mm/hr) at half an hour intervals over a basin of area 1830 km2 are 4,9,20, 18, 13, 11, 12, 2, 8, 16, 17, 13,6 and 1.If the corresponding observed runoff is 36.6million m3 estimate the Φ-index for the storm. | **(12)** | **Analyze** |
|  | **UNIT-III (CO3)** |  |  |
| **Q.5** | The peak of flood hydrograph due to a 3h duration isolated storm in a catchment is 270m3/s. The total depth of rainfall is 5.9cm. Assuming as average infiltration loss of 0.3cm/h and a constant base flow of 20 m3/s, estimate the peak of 3-h unit hydrograph of this catchment. If the area of the catchment is 567km2 determine the base width of the 3-h unit hydrograph assuming it to be triangular in shape | **(12)** | **Analyze** |
|  | **OR** |  |  |
| **Q.6** | Evaluate the importance of S-curve and also critically analyze the need and utility of S-curve | **(12)** | **Apply** |
|  | **UNIT-IV (CO4)** |  |  |
| **Q.7** | On the basis of rainfall data of 100 years of daily maximum rainfall in Chennai the maximum daily rain is 16cm. Determine the probability of daily rainfall of magnitude greater than or equal to 16cm occurring:  (a) At least once in 10 successive years (b) Once in 10 successive years | **(12)** | **Analyze** |
|  | **OR** |  |  |
| **Q.8** | The mean annual flood of a river is 600m3/s and the standard deviation of the annual flood time series is 150 m3/s. What is the probability of a flood of magnitude 1000 m3/s occurring in the river within the next 5 years? Use Gumbel’s method and assume the sample size to be very large | **(12)** | **Evaluate** |
|  | **UNIT V (CO5)** |  |  |
| **Q.9** | Write a short note on various types of saturated formations | **(12)** | **Remember** |
|  | **OR** |  |  |
| **Q.10** | Explain recuperation test | **(12)** | **Remember** |