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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**Make-Up Examinations, July 2024**

**Semester**: IV (2021 batch)

**Course Code**: CIV2010

**Course Name**: Hydrology and Irrigation System

**Program** : B.Tech,

**Date**: 02 JULY 2024

**Time**: 09:30 AM – 12:30PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | Define Irrigation. Explain any three merits and demerits of irrigation. | (CO 4) | [Knowledge] |
|  | | | |
| 2 | Define hydrograph and draw the hydrograph with its components. | (CO 3) | [Knowledge] |
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| 3 | Define duty and delta and list any three methods to improve duty of an irrigation water | (CO 4) | [Knowledge] |
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| 4 | Discuss the Methods to control water logging | (CO 4) | [Knowledge] |
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| 5 | List and discuss the Objectives of Irrigation | (CO 4) | [Knowledge] |
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| 6 | Define infiltration and list any four factors affecting infiltration capacity | (CO 3) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | Explain when you would recommend drip irrigation with respect to type of soil, crop, climate and water. Also list the advantageous and disadvantageous of drip irrigation. | (CO 4) | [Comprehension] |
|  | | | |
| 8 | Explain when you would recommend drip irrigation with respect to type of soil, crop, climate and water. Also list the advantageous and disadvantageous of drip irrigation. | (CO 4) | [Comprehension] |
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| 9 | Given below are the ordinates of a 6-h unit hydrograph for a catchment. Calculate the ordinates of the direct runoff hydrograph due to a rainfall excess of 3.5 cm occurring in 6 h.    Also draw the hydrograph showing both 6-hr unit hydrograph and 6-hr direct runoff hydrograph | (CO 3) | [Comprehension] |
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| 10 | The average infiltration rate helps to determine the water depth stored in the given time of irrigation/rainfall in the soil profile. With a neat diagram, explain the process of measuring infiltration rate using Infiltration capacity curve (Horton curve) and also explain the measurement of infiltration using ϴ- Index method. | (CO 3) | [Comprehension] |
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| 11 | In order to ensure proper planning and operation of lakes control of evaporation is necessary. Explain the methods to control evaporation from lakes | (CO 2) | [Comprehension] |
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| 12 | In order to ensure proper planning and operation of reservoirs and irrigation systems estimation of evaporation is necessary. However exact measurement of evaporation is not possible. Write the working principle of Pan measurement method for evaporation loss. | (CO 3) | [Comprehension] |
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| 13 | One of the essential requirements for precipitation to occur is the cooling of large masses of moist air. Lifting of air masses to higher altitudes is the only large scale process of cooling. Hence the types of precipitation based on the mechanism which causes lifting of air masses. Enlist the types of precipitation and explain the mechanism of any two types of precipitation. | (CO 1) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Determine the frequency of irrigation from the following data  Field capacity of soil = 35%  Permanent wilting point = 18%  Dry density of soil = 15 kN/m3  Depth of root zone = 70 cm  Daily consumptive use of water = 17 mm  Readily available moisture = 75% of the available moisture | (CO 4) | [Application] |
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| 15 | The command area of channel is 4000 ha. Intensity of irrigation of a crop is 70%. The crop requires 60 cm of water in 15 days, when the effective rainfall is recorded as 15 cm during that period.  Find  The duty at the head of field  The duty at the head of channel  The head discharge at the head of channel.  Assume total losses as 15% | (CO 4) | [Application] |
|  | | | |
| 16 | a) Explain the method of determining optimum number of rain gauge stations  b) Determine the optimum number of rain gauges in a catchment area using following data  Number of existing rain gauges = 08  Mean annual rainfall at the gauges = 100 cm, 95 cm, 90 cm, 85 cm, 80 cm, 70 cm, 60 cm and 40 cm.  Permissible error = 6% | (CO 2) | [Application] |