**POORNIMA UNIVERSITY, JAIPUR.**

**END SEMESTER EXAMINATION, April 2023**

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|  | **3BT6220** | Roll No. | Total Printed Pages: 2 |
| **3BT6220** |  |
| B. Tech. III Year VI- Semester (Back) End Semester Examination, April 2023  **(CV)** | |
| **BCV06103 : Irrigation Engineering** | | | |

# Max. Time: **3** Hours. Max. 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.----------------------------------------------** **2.-----------------------------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | Write short note on:  (i) Consumptive use of water (ii) Intensity of irrigation | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Describe with the help of sketch various forms of soil moisture. Which of these soil moistures is mainly available for utilization by plants? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | Explain the terms ‘duty’ and ‘delta’. Derive a relationship between the two for a given base period. | **(6)** | **Create** |
|  | **(b)** | The root zone of an irrigation soil has dry weight of 15 kN/m3 and a field capacity of 35%. The root zone depth of a certain crop, having permanent wilting percentage of 8% is 0.8 m. Determine (a) depth of moisture in the root zone at field capacity (b) depth of moisture in the root zone at permanent wilting point, (c) depth of water available. | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | What are the requirements of canal? Classify different types of canals. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Describe briefly the various considerations made in the alignment of an irrigation canal. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.4** | **(a)** | Design an irrigation canal to carry a discharge of 25 cumec. Assume N=0.0225, m=1.0. The channel has a bed slope of 0.2 m per kilometre. Use Kennedy’s theory. | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Explain the terms:  (i) KhsraBandi (ii) Jamabandi (iii) Warabandi | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **UNIT-III (CO3)** |  |  |
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| **Q.5** | **(a)** | What do you understand by resistance of flow? Explain the role and factors affecting resistance of flow. | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Discuss about aggradation and degradation with neat diagram. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.6** | **(a)** | Enlist different stages of river and their characteristics briefly. In which stage of the river delta formed and why? | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | What do you understand by semi-modular outlets? What are the functions of canal outlets? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | What do you understand by tube well? Classify them. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Suggest the considerations will you take to reclaim saline and alkaline soil. | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | Illustrate the drainage coefficient. Classify different layout of tile drainage with neat diagrams. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Design a concrete lined channel having a trapezoidal section for the following data:  Discharge: 400 cumec  Bed slope: 1in9000  Side slope of the channel = 1.25:1 (H:V)  Depth of channel restricted to 4m.  Adopt mannings n= 0.012 | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
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| **Q.9** | **(a)** | The following is the set of observed data for successive 15 minutes period of 105 minutes storm in a catchment:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Duration (min) | 15 | 30 | 45 | 60 | 75 | 90 | 105 | | Rainfall (cm/hr) | 2.0 | 2.0 | 8.0 | 7.0 | 1.25 | 1.25 | 4.5 |   Taking the value of**φ-** index of 3 cm/ hour, find out the net runoff and the total rainfall. | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | How will you determine areal mean rainfall over a basin by (i) Thiessen polygon method (ii) Arithmetic mean method? Support your answers with illustrative sketches. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | What is unit Hydrograph? Explain clearly the basic postulates of Unit Hydrograph theory. Describe how can you obtain the Unit Hydrograph from a flood hydrograph resulting from a storm of certain duration? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | A precipitation station X was inoperative for some time during which a storm occurred. At three stations A, B and C surrounding X the total precipitation recorded during this storm are 70, 52 and 45 mm respectively. The normal annual precipitation amounts at stations X, A, B and C are respectively 700,800,600 and 500mm. Estimate the storm precipitation for station X. | **(6)** | **Apply** |