PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

End Term Examinations, August 2024

Winter Semester: 2023 - 24

Course Code: CIV2010

Course Name: Hydrology and Irrigation System

Program & Sem: B.Tech, & IV Sem (DCET)

Date: 06.08.2024

Time: 9:30AM – 12:30PM

Max Marks: 100

Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) Do not write any matter on the question paper other than roll number.

PART A

ANSWER ANY 4 QUESTIONS   4Q X 5M=20M

1 Define the below terminologies of unit hydrograph.

a) Total Runoff   b) Surface Runoff   c) Direct Runoff   (CO 3)[Knowledge]

2 . Define Irrigation. Explain the necessity of irrigation.   (CO 4)[Knowledge]

3. Define duty and delta and Base period and write the equation of it.

(CO 4) [Knowledge]

4. What is water logging? List the causes of water logging.

(CO 4) [Knowledge]

5. Explain the classification of Indian Irrigation projects based on Culturabe command Area (CCA).

(CO 4) [Knowledge]

6 .Define infiltration and list any four factors affecting infiltration capacity.

(CO 3) [Knowledge]

PART B

ANSWER ANY 5 QUESTIONS   5Q X 10M=50M

7 .A hydrograph is a plot of the run off or discharge in a stream versus time. Enlist the factors affecting a runoff hydrograph and explain how shape of the basin affects the hydrograph with neat sketch.

(CO 3) [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]

9 .A tube infiltrometer has a drawback that infiltration in it does not represent or simulate the actual field conditions because the water tends to disperse laterally after coming out at the bottom. Which device you will suggest to overcome this draw back. Explain the working principle of the same with neat sketch.

(CO 2) [Comprehension]

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 Ө- Index method.

(CO 3) [Comprehension]

11 .In surface Irrigation technique, water flows and spreads over the surface of the land. Varied quantities of water are allowed on the fields at different times. Enlist the method of surface irrigation and explain by suggesting the suitable method of irrigation for crops such as Wheat, Barley, Groundnut, Bajra and Berseem.

(CO 4) [Comprehension]

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 2) [Comprehension]

13 .The spray of water is developed by the flow of water under pressure through small orifices or nozzles. Identify the irrigation method and discuss its advantages and Disadvantages.

(CO 1) [Comprehension]

PART C

ANSWER ANY 2 QUESTIONS   **2Q X 15M=30M**

14. Canal irrigation is one of the types of irrigation, where in the reservoir water is carried to the field through channels having specific shape and bed channel slope. Elucidate classification of canal based on different criteria with figure.   (CO 4) [Application]

15 .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.

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4-h UH	0	20	80	130	150	130	90	52	27	15	5	0

Also draw the hydrograph showing both 6-hr unit hydrograph and 6-hr direct runoff hydrograph

(CO 3) [Application]

16 .Solve the below problems on irrigation.

a) Determine the frequency of irrigation from the following data

Field capacity of soil = 30%
Permanent wilting point = 18%
Dry density of soil = 15 kN/m³
Depth of root zone = 70 cm
Daily consumptive use of water = 15 mm
Readily available moisture = 70% of the available moisture

b) The command area of channel is 5000 ha. Intensity of irrigation of a crop is 70%. The crop requires 60 cm of water in 20 days, when the effective rainfall is recorded as 15 cm during that period. Find

a) The duty at the head of field

b) The duty at the head of channel

c) The head discharge at the head of channel.

Assume total losses as 15%

(CO 4)   [Application]