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The Assam Royal Global University, Guwahati

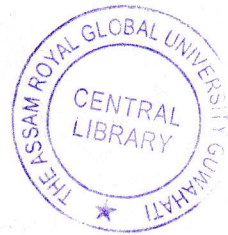
Royal School of Engineering and Technology

B. Tech. (Civil Engineering) 6th Semester

Special Supplementary Examination, September 2023

Course Title: Irrigation Engineering

Course Code: CEE022D607



Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

SECTION – A

Q.1. Attempt *all questions*. (Maximum Word Limit 50) 2×8=16

- a. Differentiate between Gross Command Area(GCA) and Culturable Command Area(CCA)
- b. Mention few advantages and disadvantages of drip irrigation.
- c. What is Cumec day? Express it in hectare-metre.
- d. What is wilting point and permanent wilting point?
- e. Write about the primary objectives of canal lining.
- f. What are the drawbacks of Kennedy's theory?
- g. Distinguish between silt excluder and silt extractor.
- h. Describe the benefits of drainage system.

SECTION – B

Q.2. Answer *any one* of the following. 12×1=12

- a. Explain canal falls and its necessity. An irrigation canal has Gross Command Area of 70,000 hectares out of which 85% is culturable irrigable. The intensity of irrigation for kharif season is 32% and for rabi season 60%. Find the discharge required at the head of canal if duty at its head is 800hectares/cumec for kharif season and 1600hectares/cumec for rabi season. Take peak discharge as 120%.
- b. What do you understand by contour farming? An irrigation field 40 m wide 250 m long has soil which has apparent specific gravity equal to 1.56 and field capacity equal to 22%. The depth of root zone is 0.6 m. If the irrigation is started when 70% of the available moisture has been used, compute (a) net depth of irrigation water required, and (b) time required to irrigate the field if the discharge in the field channel is 20 litres per second.

Q.3. Answer *any two* of the following. 7×2=14

- a. Explain soil fertility manure and fertilizers.
- b. Explain the classification of soil water using suitable diagrams.
- c. A loam soil has F.C. of 22% and wilting coefficient of 10%. The dry unit wt- of soil is 15 kN/m². If depth of root zone is 70 cm, determine the storage capacity of the soil. Irrigation water is applied when moisture content falls to 14%. If water

application efficiency is 75%, determine the water depth required to be applied in the field.

Q.4. Answer *any two* of the following.

7×2=14

- a. What are the criteria used to classify canals? Write briefly about each category.
- b. Write briefly about the various components of diversion headwork using suitable diagram.
- c. Design a trapezoidal canal section for full supply discharge of $30 \text{ m}^3/\text{sec}$, silt factor of 1 and side slope of 0.5:1 using appropriate method.

Q.5. Answer *any two* of the following.

7×2=14

- a. Write a note on selection of suitable type of cross-drainage works.
- b. What is water logging? Describe the remedial measures to control water logging.
- c. Describe broadly about the different categories of canal regulation works.