B.Tech Even Semester Examination, May, 2025

Agricultural Engineering

(6th Semester)

Course No: AE-604

(Irrigation & Drainage Engineering)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

Note:

1. Attempt any five questions taking one from each unit.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

UNIT-I

1. Define: 2x7=14

   i) Lysimeter ii) Specific Yield

   iii) Base Period iv) Bulk density

   v) Porosity vi) Volumetric water content

   vii) Field Capacity

2. a) Classify briefly the different types of irrigation. 6

   b) Distinguish between Perennial irrigation & Lift or well Irrigation 4

   c) Briefly explain the need for irrigation? 4

UNIT-II

3. a) Derive the relationship between Duty & Delta. 5

   b) What is the general rotation of crop for better irrigation and water availability? 2

   c) Enlist the various factors affecting Evapotranspiration? 3

   d) If wheat requires about 7.5 cm of water after every 28 days, and the base period for wheat is 140 days, find out the value of delta for wheat 4

4. a) Give some measures for improving duty of water. 5

   b) What are the factors affecting duty. 9

UNIT-III

5. a) Write about the merits and demerits of well irrigation. 4

   b) The piston makes 50 double strokes per minute. The suction and delivery heads are 5m and15m, respectively. Find

   i) the discharge capacity of the pump in litres per minutes,

   ii)the force required to work the piston during the suction and delivery strokes if the efficiency of suction and delivery strokes are 60% and 75%, respectively, and

   iii) the H.P. required by the pump for its operation 10

6. a) What are the methods of measuring Soil Water Content? 4

   b) A double acting reciprocating pump has a piston of 25cm diameter and a piston rod of 5cm diameter which is on one side of the piston only. The length of the piston stroke is 35 cm and the speed of the crank moving the piston is 60cm rpm. The suction and d is charge heads are 4.5m and 18m, respectively. Determine the discharge capacity of the pump in litres per minute and the H.P. required to operate the pump. 10

UNIT-IV

7. a) Briefly describe the Classes and availability of soil water with the help of a neat diagram. 8

   b) Enumerate the different irrigation efficiencies. 6

8. a) Draw a layout of drip irrigation system. Enlist its different components. 9

   b) What are the factors affecting Consumptive Use of Water? 5

UNIT-V

9. a) Derive Hoogodout equation. 10

   b) Write briefly about Components of Fertigation 4

10. a) Discuss the design characteristics of Open Channel. 10

    b) Discuss the Water Balance Method. 4

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