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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.-4)

IRRIGATION ENGINEERING – I

Subject Code : BTCE-405

Paper ID : [A1175]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.
4. Assume any missing data suitably.

SECTION-A**1. Write briefly :**

- a. What is the time required to irrigate an area 0.203 hectare by a stream discharge of 0.043 cumecs, to provide an average depth of 6.35 cm to the field? Take average rate of infiltration 5 cm/h.
- b. What is the optimum depth of kor watering for rice crop?
- c. Enlist the factors influences the efficiency of water conveyance system.
- d. In a given year for a certain irrigation project 72% and 56% of the cultural command area remained un-irrigated in Kharif and Rabi season respectively. Determine the intensity of irrigation for that year.
- e. Enlist the requirements of an ideal regime condition in Lacey's regime theory.
- f. Enlist the factors contribute to water logging.
- g. Define specific yield and specific retention of an aquifer.
- h. How would you rehabilitate a tube well?
- i. Enumerate the criteria to classify the irrigation projects.
- j. What is deflecting groyne?

SECTION-B

2. Describe various methods of irrigation along with the conditions which govern their suitability.
3. Explain the measures to be taken to improve duty of water. Describe different efficiencies of irrigation system.
4. Design an irrigation canal to carry a discharge of 45 cumecs with a base width to depth ratio as 2.50. The critical velocity ratio is 1.0. Use Kennedy's method and assume suitable value of Kutter's rugosity coefficient.
5. Design a concrete lined channel to carry a discharge of 375 cumecs at a slope of 1 in 6000. The side slope of the channel is $1\frac{1}{2}:1$. Mannig's n for lining material is 0.013, limiting depth of the channel is 4.5 m.
6. Explain the measures to be taken for reclamation of saline and alkaline lands.

SECTION-C

7. a) A 40 cm diameter well penetrates 30 m below the static water table. After 24 hours of pumping at the rate of 5500 litres/minutes, the water level at the test well at 100 m lowered by 0.45 m and in a well 40 m away the drawdown is 1.10 m. Determine transmissibility of the aquifer and drawdown in the main well. (5)
- b) Describe how you would evaluate the economic feasibility of an irrigation projects. (5)
8. a) What is the difference between permeable and impermeable spurs? Describe the types of spurs commonly used in river control. (4)
- b) A pumping test was carried out on an aquifer and following observations were made :
Well diameter = 20 m

Discharge from well = 240 m³/h

Water table R. L. before pumping = 240.5 m

Water table R. L. at constant pumping = 235.6 m

Impervious layer R.L. = 210 m

Water table R. L. in observation well = 239.8 m

Radial distance of observation well from tube well = 50 m.

Determine :

- a. Permeability of aquifer.
- b. The error in permeability if observations are not taken in observation well and radius of influence assumed to be 300 m.
- c. Actual radius of influence based on the observations of observation well. (6)

9. Write short notes on the following :

- a) Pitched Islands
- b) Multi purpose projects
- c) Failure and rehabilitation of tube well
- d) Afflux embankment
- e) Documentation of project report

(2×5=10)