

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019****Subject Code: 2170609****Date: 28/11/2019****Subject Name: Irrigation Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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|---|--------------|
| Q.1 (a) Derive the relation between duty and delta. | 03 |
| (b) Define: (i) field capacity (ii) permanent wilting point (iii) ultimate wilting point (iv) available moisture | 04 |
| (c) What is consumptive use of water? Describe any one method in detail. | 07 |
| Q.2 (a) define : (i) crop ratio (ii) paleo (iii) capacity factor | 03 |
| (b) List various irrigation efficiencies and explain any two. | 04 |
| (c) A canal takes off from a reservoir. Data for irrigated crops are given in table below. | 07 |

Sr. No.	Name of crop	Base Period (days)	Area under crop (ha)	Duty at the head of the canal (ha/cumecs)
1	Bajri(monsoon)	120	6500	2500
2	Jwar (Rabi)	120	5000	1500
3	Sugarcane	280	500	600
4	Sugarcane (overlap (HW)	100	250	600
5	Vegetable (HW)	120	500	700

Compute discharge required at the head of the canal. Time factor is 0.65 and capacity factor is 0.8 Assume losses as 20%

OR

- (c) A certain crop is grown in an area of 4000 hectares which is fed by a canal system. The data pertaining to irrigation are :
Field capacity of soil = 25%
Optimum moisture = 12%
Permanent wilting point = 10%
Effective depth of root zone = 80cm
Relative density of soil = 1.4
If the frequency of irrigation is 10 days and overall efficiency is 23% , find (i) the daily consumptive use (ii) the water discharge in m³/sec required in the canal. 07
- Q.3** (a) What should be the objective of a good method of application of water? 03
(b) Give the classification of various methods of irrigation. 04
(c) Explain the salient features of the sprinkler irrigation system. 07
- OR**
- Q.3** (a) What are contour laterals? 03
(b) What are the advantages of furrow irrigation? 04
(c) Explain the salient features of the drip irrigation system. 07
- Q.4** (a) Draw the layout of a canal system. 03
(b) What are the requirements of good lining material? 04
(c) Design an irrigation channel by Kennedy's theory to carry a discharge of 8 cumecs. Take $m=1.0$, $N=0.0225$, and B/D ratio=5.0 07
- OR**
- Q.4** (a) What is leaching? 03
(b) What are the ill effects of water logging? 04
(c) The bed slope of a regime channel is 1 in 6000. Determine the channel section and discharge. The average particle size is 0.323mm 07
- Q.5** (a) What are scouring sluices? Why it is provided? 03
(b) Draw a neat sketch of vertical drop weir. 04
(c) Describe Bligh's creep theory for the design of weir over pervious foundation. 07
- OR**
- Q.5** (a) What is fish ladder? Why it is provided? 03
(b) What is canal fall? Why is it necessary to provide a fall in a canal? 04
(c) Explain with neat sketch aqueduct and siphon aqueduct 07
