

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER 2014

Subject Code: 180606**Date: 27-05-2014****Subject Name: Irrigation Water Management****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.

Q-1

- (a) What should be the objectives for proper management of irrigation water? What is the scope of management of irrigation water in Gujarat? [7]
- (b) How would be the Remote Sensing (RS) and Geographical Information System (GIS) helpful in canal irrigation system? [7]

Q-2

- (a) What are the limitations in the adoptability of check basin method of water application? What are the four basic stages in the hydraulics of check basin irrigation? Draw a typical advance front and recession tail curve for check basin irrigation. [7]
- (b) An irrigation stream of 0.03 cumecs is irrigating a ring basin of radius 5m. The water holding capacity of soil is 17% per meter depth. Prior to water application , the moisture content of the soil is found 7.4%. The depth of the root zone is 1.1 m. The apparent specific gravity of the root zone soil is 1.6. How long irrigation stream should be applied to the basin to replenish the root zone moisture to it's field capacity. [7]

OR

- (b) What is a accumulated infiltration in a furrow? What is the principle of cutback stream in furrow irrigation?
Furrows 100m long, 1m apart and having a slope of 0.2 percent are irrigated by an initial stream of size equal to the maximum non corrosive stream The stream then reduce to half and continued for 95 minutes. Determine the average depth of irrigation. [7]

Q-3

- (a) With neat sketches describe the moisture distribution pattern of rotating sprinkler (i) under favorable condition and (ii) under windy condition.
If 120 samples are uniformly placed in the area covered by three sprinklers and average penetration of water caught in a given time is 1.25 cm with the average variation from the mean of 0.25 cm, What is the uniformity coefficient? Assuming that infiltration did not exceeded and water did not penetrate below the root zone, What is the application efficiency? [7]

OR

- (a) What is system coefficient of manufacturing variation in emitters? Define emitter coefficient of manufacturing variation. How is design of emission uniformity in a drip irrigation system different from uniformity coefficient in sprinkler irrigation?
The following data were obtained for determination emORission uniformity coefficient of a drip irrigation lateral'
 $Q_{\min} = 37$ lit/minute
 $Q_{\max} = 54$ lit/minute
 $C_V = 0,075$
Slope = 1.5%
Determine emission uniformity coefficient. [7]

- (b) Why is the inflow outflow method for evaluation of furrow irrigation considered superior to other methods? How does the furrow irrigation carried out in black cotton soil? [7]
OR
- (b) Explain different types of emitter in the drip irrigation? Under which site situations are pressure compensatory emitters particularly suitable? What are their limitations? [7]

Q- 4

- (a) What are the factors influencing the land leveling requirements? Distinguish between land leveling and land smoothening with respect to equipment and procedures. [7]
OR
- (a) Define irrigation scheduling. What is the maximum available deficiency allowed in planning irrigation schedules? What are the commonly used indices in scheduling irrigation? [7]

- (b) A stream of 150 liters per second was diverted from canal and delivered to the field. An area of 2 hectares was irrigated in 9 hrs. The effective depth of root zone is 1.7m. The run-off in the field was observed as 1500 cumecs. The depths of water penetrated were as 1.9 m at head end and 1.25 m at tail. Available moisture holding capacity was 21 cm per m depth. Determine

- (i) water conveyance efficiency
(ii) water application efficiency
(iii) water storage efficiency and
(iv) water distribution efficiency

Irrigation started at a moisture extraction level of 60% of available moisture. [7]

OR

- (b) The topographic survey of a field gave the following elevations (in m) at grid points which were selected at 25 m interval. The elevations of the points are as under.

	1	2	3	4	5	6	7
A	8.41	9.75	8.27	9.38	-	-	-
B	9.06	9.35	8.68	8.79	9.01	-	-
C	8.75	9.37	9.13	8.89	8.80	9.11	-
D	8.89	9.12	8.78	8.78	7.97	8.37	8.56
E	8.95	9.10	8.98	9.09	9.17	8.77	9.14
F	9.21	8.95	7.98	9.13	8.97	8.87	8.12

Calculate the position of centroid of the field and average elevation of the field. The field has to have the downward slope of 0.3% . Determine the formation level at grid points and amount of cut at each point. [7]

Q-5

- (a) What are the distinguishing factors influencing the water charges of tubewell as compared to those of canal water supply? What are the needs for appropriate pricing of water. [7]

OR

- (a) Discuss the common criterions for judging the performance of irrigation system. [7]
- (b) State the water delivery systems. Write about the rotation by turn (Warabandhi) system. [7]

OR

- (b) Write about the farmer's participation and role of irrigation managers in practicing the irrigation. [7]
