Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: X70605 **Date: 10-12-2013**

Subject Name: Irrigation Water management

Time: 10.30 am - 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)**	i. Give the equations for calculating friction head loss in blind pipes without nozzles ii Give the use of "F" correction factor for calculating head loss for a sprinkler lateral.	**07**
	(b)	i. If the difference of head permitted between the first sprinkler and the last sprinkler is 20%of the head at the first sprinkler; find the difference of discharge between the first and the last sprinkler. ii. Write the expression for distribution efficiency in the agricultural field and explain its significance. Explain which method of irrigation gives better distribution efficiency.	**07**
Q.2	**(a)**	State the end area method and prismoidal method for earthwork calculations in land leveling operations in agricultural fields. Taking the grid spacing in an agricultural land leveling operation as 25 meters and the cut depths at the four vertex points of the square grid as 0.132, 0.186, 0.76 and 0.035m find the cut volume using the four point method	**07**
	(b)	Explain how remote sensing and GIS can be used for monitoring of irrigated areas. Explain soil moisture studies by use of remote sensing in this context	**07**
		OR	
	(b)	Explain factors affecting land leveling and explain how cut fill ratios are maintained in an agricultural field	**07**
Q.3	**(a)**	Explain necessity of drainage and give the comparison of surface and sub surface drainage.	**07**
	(b)	Draw sketches to show the layout for border strip irrigation. Explain the suitability of border strip irrigation and discuss how the length, width and the slope decided for border strip irrigation.	**07**
		OR	
Q.3	**(a)**	Give the design steps for components of drip irrigation system	**07**
	(b)	Give the preventive and curative measures to avoid water logging.	**07**
Q.4	**(a)**	Draw sketches to show the layout of fields irrigated by furrow irrigation method. Explain how the shape size and the slope of furrows decided	**07**
	(b)	Find the time required for the water front to advance to a length of 205 meters for border strip 10 meters wide if the stream discharge is 0.045 cumecs, average depth of flow expected is 65 mm and average infiltration capacity is 50 mm/hr. Also find the maximum length that can be irrigated.	**07**
		OR	
Q.4	**(a)**	Define application, storage and water use efficiency and explain how application efficiency can be improved	**07**
	(b)	Determine the discharge of an individual sprinkler for lateral spacing 20 m, nozzle spacing 15 m and infiltration capacity as 1.3 cm/hr. Calculate	**07**

diameter of the same nozzle if coefficient of discharge is 0.95 and head at sprinkler is 30 meters

Q.5	**(a)**	Explain the plane method and profile method of land levelling	**07**
	(b)	Furrows 120 m long 0.9 m apart have a slope of 0.35% and are irrigated by a n initial non erosive stream for one hour. The stream size is then reduced to one third and continued for 45 minutes. Determine the average depth of irrigation	**07**

OR

Q.5	**(a)**	Explain the concept of water cooperatives and their benefits to farmers for better utilization of irrigation waters.	**07**
	(b)	i Explain evaporation losses in wild flooding and furrow irrigation ii Explain the suitability of sprinkler and drip irrigation with respect to crop, soil, topography and climate.	**07**

****