MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester : **VI (New)**	**Term** : **II**	**Academic Year** : **2015-16**	
Course No. : IDE 365	**Title** : **Advanced Irrigation System Design**		
Credits : 2 (1+1)			
Day & Date : Thursday, 28.04.2016	**Time** : 09.00 to 11.00	**Total Marks** : **40**	

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Explain the constraints of sprinkler irrigation system.

b) Enlist components of sprinkler irrigation system.

Q.2 a) Enlist different types of micro irrigation systems.

b) Enlist different types of fertigation equipments used and explain any one of them.

Q.3 Design the drip irrigation system for 1 ha sapota using following data.

Crop	Sapota	Static head	12m
Spacing	6x6m	Wetted area	25%
Size of land	100x100m	Crop factor	0.7
Type of soil	Medium black	Pan factor	0.7

Maximum evaporation = 10 mm/day

Outlet factor = 0.34 Emission uniformity = 90%

Water source = at the corner of field

Hazen William constant for PVC = 150 and lateral = 140

Assume necessary data required

Q.4 a) Write utility of following irrigation system components (Any four).

1) Vaccum release valve
2) Debris screen
3) Desiliting basin
4) Emitter
5) Lateral

b) Determine the required capacity of a sprinkler system to apply water at the rate of 1.25cm/hr. Two 186 meter long sprinkler lines are required. Sixteen sprinklers are spaced at 12m interval on each line. The spacing between lines is 18 meters.

Q.5 a) Define Chemigation and enlist chemicals used for acid and chlorine treatment.

b) Explain the working principle and utility of hydro cyclone filter with diagram.

Q.6 Determine the uniformity of sprinkler irrigation system by using following data.

S	8.3	8.9	9.9	**S**
9.1	8.1	7.9	9.4	9.1
8.9	9.4	9.1	7.9	8.6
S	10.2	8.9	9.1	**S**

(P.T.O)

Q.7 Write short notes on (Any two).

1) Sand filter
2) Maintance of trickle irrigation system
3) Moisture distribution pattern under sprinkler irrigation

Q.8 a) Explain criteria for selection of emitters.

b) Enlist different types of sprinkler irrigation systems.

Q.9 a) Calculate the frictional head loss through a lateral of drip system for following data

No of emitter = 50
Discharge of emitter = 41ph
Hazen William constant = 120
Lateral equivalent length/m = 0.35m
Lateral diameter =16mm
Lateral length = 50m
Outlet factor = 0.36

b) Determine the water spread area of the sprinkler having sprinkler nozzle diameter of 3.0x2.5mm at operating pressure of 2 kg/cm^2

Q.10 Determine the size of sprinkler nozzle, diameter of lateral required using following data.

1) Length of lateral =84m
2) Distance between laterals along the main = 18m
3) Length of main = 72m
4) Application rate = 12mm/day
5) Operating head of sprinkler = 30m
6) Spacing between sprinkler = 12m
7) C_d=0.96
8) Outlet factor =0.42
9) Scobey's coefficient Ks=0.32

SECTION "B"

Q.11 Define the following terms.

1) Fertigation
2) Micro-irrigation
3) Jet brake index.
4) Application rate of sprinkler

Q.12 State True or False

1) Fine textured soils are not suitable for sprinkler irrigation.
2) Disk filter have double stage filtration.
3) Permissible discharge variation in the drip irrigation is 20 per cent.
4) Acid treatment is given to remove algae.

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