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MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: VI (Old)	**Term**	: **II**	**Academic Year** :	**2017-18**
Course No.	: IDE 365	**Title**	: **Advanced Irrigation System Design**		
Credits	: 2 (1+1)				
Day & Date	: Saturday, 28.04.2018	**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 Discuss in brief the following types of micro irrigation systems, along with their main characteristics.

a) Surface drip system

b) Bubbler irrigation system

c) Spray/Microjet irrigation system

d) Sub surface drip system

Q.2 Enlist the advantages of sprinkler irrigation. Discuss in brief the types of sprinkler system based on its portability.

Q.3 a) Determine the discharge in lps, from a sprinkler nozzle 2.5 mm in size and operating at 2.0 kg/cm^2, if the coefficient of discharge for the nozzle is 0.90.

b) Compute the application rate in mm/hr for the 0.95 lps nozzle when the sprinkler spacing is 12 m x 18 m.

Q.4 a) Compare rotating head and perforated pipe sprinkler system.

b) Pomegranate crop is spaced at 4.5 m x 3.0 m in one hectare orchard. Compute the operation time for a drip irrigation system if the water requirement is 32.8 liter per day per plant. Each plant is provided with four emitters with 4 lph discharge at the operating pressure of 1kg/cm^2. Assume the system emission uniformity as 90%.

Q.5 Explain the emission uniformity and coefficient of manufacturer's variation with reference to drip irrigation system. How are they related with each other?

Q.6 a) Enlist the different advantages of fertigation through drip.

b) Calculate the amount of fertilizer required per split for one hectare area, if fertilizer dose of 90:30:30 is to be applied in 20 splits through venturi by using 19:19:19 WSF and urea (46% N).

Q.7 Write short notes (Any Two).

a) Probable reason and remedies for non operation of sprinkler head

b) Basic information required for design of drip system

c) Emitter discharge exponent in drip system

(P.T.O)

Q.8 Estimate the uniformity coefficient from the data obtained from a field test on a square plot bounded by four sprinklers.

- Sprinkler size and operating pressure – 4.365×2.381 mm nozzles at 2.8 kg/cm^2
- Spacing – 24m × 24m
- Humidity – 42 %
- Wind – 3.5 km/h from South West
- Time of test – 1 h

S	8.9	7.6	6.6	S
8.1	7.6	9.9	10.2	8.3
8.9	9.1	9.1	9.4	8.9
9.4	7.9	10.1	8.6	9.1
S	7.9	6.6	6.8	S

Note: S indicated the location of sprinklers.

Q.9 Enlist the different types of filters used in drip irrigation system. Explain gravel filter for drip system.

Q.10 A 120 m long, 63 mm lateral (ID 59 mm) is having 0.26 lps sprinklers installed at a spacing of 12 m. Assume outlet factor for the given number of sprinklers on the lateral to be 0.415. If the value Ks for Scobey's equation is 0.32 and the Hazen-William constant for the lateral material as 150, compare the frictional head loss estimated by two different methods.

SECTION "B"

Q.11 Fill in the blanks from the given alternatives.

1) _____ filters are effective when the solid particles to be separated are of higher density than water. (Media/ Hydro cyclone/ Slow flow filters/Gravel)

2) The water application rate of sprinkler is determined on the basis of _____. (Infiltration characteristic of soil/ PWP/ FC/ all above).

3) The pressure loss across venturi is _____ of operating pressure. (1/8th / 1/2th / 1/3rd 1/6th)

4) The concentration of chlorine during super chlorination is _____. (05 ppm/ 50 ppm /500 ppm/ > 500 ppm)

Q.12 Write the functions/application of the following.

1) Inline emitter in drip system   2) Sprinkler riser

3) Back flushing of filter   4) Fertilizer tank

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