

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: VI (New)	Term	: II	Academic Year	: 2016-17
Course No.	: IDE 365	Title	: Advanced Irrigation System Design		
Credits	: 2 (1+1)	Time	: 09.00 to 11.00	Total Marks	: 40
Day & Date	: Wednesday, 03.05.2017				

- 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 What is rotating head sprinkler system? Give classification of sprinkler system on the basis of portability.
- Q.2 Determine the system capacity for a sprinkler irrigation system to irrigate 16 ha. of Maize crop. Design moisture use rate is 5 mm per day. Moisture replaced in soil at each irrigation is 6 cm. Irrigation efficiency is 80 per cent. Irrigation period is 10 days in a 12 days interval. The system is to be operated for 8 hrs. per day.
- Q.3 What are the causes of clogging of emitters and laterals in drip irrigation system? Give their remedies.
- Q.4 What are the types of filters used in drip irrigation system? Explain the operation of gravel filter with neat sketch.
- Q.5 If the pressure at opposite ends of a sprinkler lateral are 3 kg/cm^2 and 2.6 kg/cm^2 , What would be the discharge of farthest sprinkler, provided the sprinkler at 3 kg/cm^2 end discharges 0.76 lit./sec. ?
- Q.6 What are the basic requirements of emitters?
Calculate the frictional head loss through a drip lateral for the following conditions:
Lateral length 50 m.; No. of emitters on lateral 32; Emitter discharge 4 lph; Lateral diameter 12 mm (wall thickness of lateral is 1.1 mm); Hazen-William constant 140. Outlet factor is 0.37 for 32 outlets.
- Q.7 The following data were obtained in a field test. Determine the emission uniformity (uniformity coefficient) of a drip irrigation lateral:
 $C_v = 0.07$, $q_{\min} = 4.5 \text{ litres / hr}$, $q_{\text{ave}} = 5.0 \text{ litres / hr}$, $N_e = 1$.
- Q.8 Define fertigation. What are its advantages over conventional methods of fertilizer application?
- Q.9 If 100 sample cans are uniformly spaced in the area covered by four sprinklers and the average depth of water caught in a given time is 1.25 cm. with the average variation from the mean 0.2 cm, what is the uniformity coefficient? Assuming the infiltration rate does not exceed and water does not penetrate below the root zone, what is the application efficiency?

(P.T.O.)

Q.10 Write short notes (Any Two):

- 1) Booster pump
- 2) Index for jet break-up
- 3) Pressure compensating dripper

SECTION "B"

Q.11 Fill in the blanks.

- 1) The application rate at which a sprinkler system is designed to apply water is less than _____ of the soil.
- 2) Venturi is the device which creates _____ which is used to suck the fertilizer solution in to the mainline.
- 3) _____ are used to connect the drip lateral to the submain.
- 4) The most common chlorinating material used in chlorination treatment is _____.

Q.12 State True or False.

- 1) In sprinkler system the drop size reduces as the pressure decreases or nozzle size increases.
- 2) Emitter should have a relatively large flow cross-section in order to reduce clogging problem.
- 3) Hydro-cyclone filters are used to remove organic materials and extremely fine materials that cannot be removed with sand filter.
- 4) On sloping ground the drip laterals are placed along the contours.

