MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	**: IV (New)**	**Term**	**: II**	**Academic Year**	**: 2011-12**
Course No.	**: IDE 242**	**Title**	**: Irrigation Engineering**		
Credits	**: 3 (2+1)**				
Day & Date	**: Friday, 27.04.2012**	**Time**	**: 14.00 to 17.00**	**Total Marks**	**: 80**

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) Enlist the factors affecting the rate of infiltration.

b) Determine the discharge capacity of an underground concrete pipe line from the following data; diameter of pipe 15 cm, length of pipeline 150 m, difference in elevation between water levels at pump stand and discharge point 2 m. Assume value of 'f' as 0.009.

Q.2 a) Define land grading. What are the advantages of land grading?

b) What is meant by soil texture? How does it affect the water holding capacity of soil?

Q.3 a) Describe advantages and limitations of check basin method of irrigation.

b) Explain the present status of development and utilization of different water resources of the country.

Q.4 Assume an earth channel on a grade of 0.10 per cent, depth of water 40 cm, bottom width 40 cm and side slopes 1.5:1. Calculate the velocity of flow and carrying capacity of the channel. Assume Manning's roughness coefficient as 0.025.

Q.5 a) Enlist various water measuring devices and explain any one of them in detail.

b) Wheat crop requires 45 cm of irrigation water during 120 days irrigating period. How much land can be irrigated with a flow of 20 litres per second for 22 hours a day?

Q.6 a) Explain the concept of field capacity and permanent wilting point.

b) Explain soil moisture characteristics curves.

Q.7 a) Explain kinds of soil water.

b) Using Franci's formula, compute the discharge of a rectangular weir 45 cm long with a head of 12 cm under, (i) With no end contraction, (ii) With one end contraction, (iii) With two end contraction, conditions.

Q.8 What is the importance of irrigation efficiency in irrigation planning? Describe different irrigation efficiencies?

Q.9 Enlist different methods of estimating evapotranspiration from climatological data. Describe modified Penman method in detail.

(P.T.O.)

Q.10 The following data were obtained in determining the soil moisture content at successive depths in the root zone prior to applying irrigation water:

Depth of sampling	Weight of moist sample, gm	Over dry weight of soil sample, gm
0-25	134.60	126.82
25-50	136.28	127.95
50-75	122.95	115.32
75-100	110.92	102.64

The bulk density of the soil in the root zone was 1.5 gm/cc. The available moisture holding capacity of the soil was 17.8 cm/m depth. Determine (i) the moisture content at the different depths in the root zone, (ii) moisture content in the root zone at the time of irrigation, (iii) net depth of water to be applied to bring the moisture content to field capacity, and (iv) gross irrigation requirement at estimated field irrigation efficiency of 70 per cent.

SECTION "B"

Q.11 State True or False.

1) The buffer pond is created during measurement of infiltration rate of soil.
2) The width of border usually varies from 5 to 15 m depending on size of irrigation stream.
3) Irrigation frequency is a function of crop, soil and climate.
4) Furrow irrigation requires proper land grading.
5) The moisture content at which the wilting is complete and the plants die is called as wilting point.
6) Parallelism of advance and recession curves ensures uniform distribution of water throughout the border.
7) Net irrigation requirement is the amount of irrigation water required to bring the soil moisture level in the effective rootzone to the field capacity.
8) The Blanney-Criddle formula generally gives sufficiently accurate estimates of seasonal consumptive use owing to the inclusion of locally developed crop coefficient factor.

Q.12 Fill in the blanks.

1) Capillary water is held between tensions of about _____ atm to _____ atm.
2) The vertical distance from the weir crest to the bottom of the weir pond is known as _____.
3) Piche evaporimeter is a device used for measurement of _____.
4) The moisture tension of soil at field capacity ranges from _____ to _____ atmospheres.
5) One hectare -cm = _____ litres.
6) When water is to be taken from lateral channel into a field distribution channel or from channel into a field, _____ is used.
7) The size of parshall flume is determined by _____.
8) The useful limit of most tensiometer is at about _____.

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