

KERALA AGRICULTURAL UNIVERSITY
B.Sc. (Hons.) Agriculture – 2009 Admission
1st Semester Final Examination - March 2010

Cat. No. : Engg 1101

Title : Fundamentals of Soil, Water and
Conservation Engineering (1+1)

Max. marks: 80

Time : 3 hours

I (a). Fill up the blanks

[20 X 0.5 = 10]

1. One litre is equal to ----- cubic meter.
2. The velocity of water in a stream can be measured directly using a -----.
3. Best discharging rectangular channel has depth ----- the breadth.
4. The cost of a drip irrigation system depends on the ----- of the crop.
5. A cheap fertigation equipment is the -----.
6. On sloping lands intensive farming can be adopted only with -----.
7. To locate a point by ----- method two distances need to be known.
8. A ----- is a fixed reference point of known elevation.
9. ----- levelling determines the elevations of points at known distances apart along a given line.
10. In triangulation, sides of a triangle are computed from a ----- line measured directly.

I (b). Match the following

- | | |
|--------------------|---------------------|
| 1. Culvert | a. Irrigation |
| 2. Siphon tubes | b. Rectangular weir |
| 3. $V=C\sqrt{RS}$ | c. 100 ft |
| 4. Cipoletti weir | d. Channel crossing |
| 5. Engineers chain | e. 250 ft |
| | f. Chezy's formula |
| | g. Darcy's formula |
| | h. Trapezoidal weir |

I (c). State True or False

1. Duty is the ratio between the irrigated area and the quantity of water used.
2. Evaporation losses can be reduced by having deeper ponds
3. Suppose the scale of a plan is 4m to 1cm then 0.25mm on the paper will be equal to 100 cm on the ground
4. The optical square is less accurate than a cross staff
5. The bench marks established with precision all over the country are called arbitrary bench marks.

II. Write answers in a sentence

[10 X 1 = 10]

1. Give Manning's formula for open channel flow with units.
2. Define unsteady flow of water.
3. What is meant by infiltration opportunity time?
4. What is the main component of a drip irrigation system?
5. What are back sights, foresights, and intermediate sights in levelling?
6. Compare between collimation system and rise and fall system of reduction of levels.
7. When are oblique offsets taken in chain survey?
8. What are the obstacles usually encountered while chaining?
9. Differentiate between hydraulic radius and hydraulic slope of a channel
10. What is reciprocal levelling?

III. Write short answers.

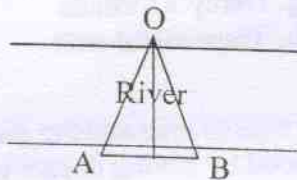
[10 X 2 = 20]

1. What are the stages of gully development?
2. What are the major factors of USLE?
3. What are the characteristics of contour lines?
4. The observed reading on a staff held at A was 3.695m. The staff was found to be 15cm off the vertical through to bottom. Find the correct staff reading on A
5. A lateral has 12 sprinklers spaced 14 m apart. The laterals are spaced 20 m on the main line. Determine the amount of fertilizer to be applied at each setting when the recommended fertilizer dose is 80kg/ha.
6. What are the different surface irrigation methods and give their crop suitability.
7. What are the materials used for lining of water courses and field channels?
8. A persian wheel with an average discharge of 230litres per minute irrigates 1 hectare wheat crop in 50 hours. What is the average depth of irrigation?
9. What are the design parameters of a contour bund?
10. What are the common agronomic measures of soil conservation?

IV. Answer any Four

[4 X 5 = 20]

1. Assume an earth channel on a grade of 0.10 percent, depth of water 1.2m, bottom width 60 cm and side slopes 1:1. Calculate the velocity of flow and the carrying capacity of the channel assuming 'n' as 0.04
2. What are the general rules followed in selection of number of offsets in varying field conditions
3. A and B can be two points 150 m apart in the nearer bank of a river, which flows east and west. The bearings of the tree on the other bank of a river as observed from A and B are $N 30^{\circ}E$ and $N 45^{\circ}W$. Find the width of the river.



4. What are the different types of sprinkler systems?
5. With the help of a neat sketch explain in detail the essential components of a fertigation cum drip system of irrigation.

V. Answer any two

[2 X 10 = 20]

1. What are the commonly used devices for measuring water in farms. Explain their suitability discharge measuring formulae and conditions for installation
2. The following consecutive readings were taken with a dumpy level. The instrument was shifted after the fourth and eighth reading.
3.824 1.643 2.896 3.016 0.954 0.692
0.582 0.251 1.532 0.996 2.135
The first reading was taken on the staff held on the bench mark of R.L 820.765. How would the level field book entries be made? Calculate the R.L's of the point with usual checks and the difference of level between the first and last points
3. What are the different efficiencies that have to be considered for proper design of an irrigation system? Explain.