Module 108 Drainage Hydrology Activity Questions

Activity 1 Questions

1. What is the purpose of drainage?

2. What factors cause poor drainage?

3. Name three cases where drainage should not be considered unless additional measures are undertaken.
   a. 
   b. 
   c. 

(Refer to page 38 in Module 108 for Solutions to Activity 1)
Activity 2 Questions

1. Using the Cypress Creek formula \( Q = CM^{5/6} \) for computing discharge capacity for drainage desired based on removal rate using a drainage coefficient:

   a. Define each variable in the formula and give the English units.

   b. Determine drainage capacity of an outlet channel for a 1280 acre cultivated Delta field using drainage curves.
   \((\text{Refer to page 13 in Module 108 for Figure 2, Curve 2 for “C” value})\)

   c. Determine drainage capacity for a 320 acre field drain at the same site.
   \((\text{Refer to page 13 in Module 108 for Figure 2, Curve 2 for “C” value})\)

2. State four conditions where the outlet capacity influences the selection of drainage design.

3. Determine the rainfall excess \((R_e)\) for a watershed with a drainage coefficient \((C)\) of 40.
   \((\text{Refer to page 18 in Module 108 for Figure 4 or page 17 to solve using Stephen and Mills method})\)

4. For the following watershed, determine the required capacity below the junction to the two drainage channels. The needed drainage coefficient has been determined to be \( C = 45 \).

   Given: Watershed drainage areas:

   Main = 500 ac's

   Lateral = 400 ac's (tributary)

   Total = 900 ac's at junction

   \((\text{Refer to 20-40 rule in “Computing Ditch Size at Junctions” section on page 20 of Module 108 to determine which Case applies})\)

5. You have been asked for design assistance for a drainage improvement on a 1000 acre site. The existing capacity of the surface drain has been determined to be 60 cfs (capacity below the established hydraulic gradeline). The outlet for this particular site has a drainage coefficient \( C = 35 \). What is your recommendation?
   \((\text{Refer to Cyprus Creek Formula on page 16 of Module 108})\)

   \((\text{Refer to pages 39-42 in Module 108 for Solutions to Activity 2})\)
Activity 3 Questions

1. Name three different techniques for providing an instantaneous peak discharge for flatlands.
   a. 
   b. 
   c. 

2. The removal rate for a watershed has been determined to be 50 cfs. The drainage area of the site is 1000 acres.
   a. What is the peak flow?
   b. What is the removal rate of excess rainfall (R) in inches?
      *(Refer to Cyprus Creek Formula on page 16 of Module 108)*

*(Refer to page 43 in Module 108 for Solutions to Activity 3)*
Test

Circle T for true or F for false

1. T or F Drainage is the removal and disposal of excess water.

2. T or F Drainage generally implies improvements associated with land lacking sufficient slope to cause water to flow to an outlet.

3. T or F Surface wetness is a visual indication of inadequate drainage.

4. T or F Analysis of outlet conditions is a waste of time because they do not have anything to do with surface drainage.

5. T or F NRCS has no interest or policy concerning wetland protection.

6. T or F A field where agricultural crops are grown, or are attempted to be grown cannot be called a wetland because it does not have hydrophytic vegetation.

7. T or F Potential changes in downstream stages are of no concern.

8. The Cypress Creek formula can be written as:
   a. \( Q = CM^{5/6} \)
   b. \( Q = CM^{0.835} \)
   c. a or b

9. A 100 acre field drain sized for a C of 45 should have a capacity in cfs of:
   a. 2086
   b. 7
   c. 10

10. A "C" value of 45 implies about what runoff rate (in inches):
    a. 4.5
    b. 2
    c. 1
    d. 3