Continuing Education Course #212
A Comparison of Runoff Estimation Techniques

1. Runoff is made up of rainfall minus which of the following?
- a. Evapotranspiration.
- b. Infiltration.
- c. Surface storage.
- d. All of the above.

2. Runoff generally travels faster over impervious surfaces than over natural areas.
- a. True.
- b. False.

3. Storms of varying durations can be considered to be 100 year storms.
- a. True.
- b. False.

4. In order to use the Rational Method, which of the following must be true?
- a. The time of concentration must be greater than the duration of the peak rainfall.
- b. The time of concentration must be less than the duration of the peak rainfall.
- c. The time of concentration must be less than 0.5 hours.
- d. The time of concentration must be greater than 0.5 hours.

5. Using the Rational Method, calculate the peak 10 year runoff from a drainage area of 2.5 acres having a runoff coefficient of 0.40 and a rainfall intensity of 3 inches per hour.
- a. 2.0 CFS.
- b. 3.0 CFS.
- c. 4.0 CFS.
- d. 5.0 CFS.

6. What is the time of concentration?
- a. It is the time it takes for a design storm to recur.
- b. It is the duration of the design storm.
- c. It is the time required for runoff to travel from the most hydraulically distant point in the watershed to the point of interest.

7. In the Rational method, what does the runoff coefficient represent?
- a. It is the flow that occurs over impervious surfaces.
- b. It is the proportion of rainfall that is converted to runoff.
- c. It is the total runoff, in inches.
- d. It is peak rainfall intensity, in inches per hour.

8. Which land cover has a higher ‘c’ value, brick pavement or lawns in Sandy soil?

- a. Brick pavement.
- b. Lawns in sandy soil.
- c. There is no difference in ‘c’ value between the two.
- d. It depends on the rainfall intensity.

9. The Modified Rational method can only be used to calculate the peak runoff.
- a. True.
- b. False.

10. What are the standard shapes of Modified Ration method hydrographs..
- a. A triangle or a trapezoid.
- b. A triangle or a square.
- c. They are always triangles.
- d. They are always trapezoids.

11. In the Modified Rational Method, what is the critical storm duration?
- a. It is the storm duration that equals the time of concentration.
- b. It is the storm duration for a 100 year storm.
- c. It is the storm duration that will produce the maximum flood storage volume within the detention basin.
- d. it is the storm duration that causes the hydrograph to take a trapezoidal shape.

12. The SCS runoff curve number has a linear relationship with the total runoff, just as the runoff coefficient in the Rational Method does.
- a. True.
- b. False.

13. For a CN value of 80, what is the S value?
- a. 12.5.
- b. 2.5.
- c. 22.5.
- d. 0.25.

14. Using the SCS method, what is the peak runoff of a watershed with a drainage area of 25 acres, with no swamps, or ponds, a direct runoff of 3.5 inches, and a unit peak discharge of 400 csm./in?
Drainage area = 25 acres, ?
- a. 61.9CFS.
- b. 23.5CFS.
- c. 54.7CFS.
- d. 35,000CFS.

15. A soil in Hydrologic Group A will allow less runoff than a soil in Hydrologic Group D.
- a. True.
- b. False.

16. Below what CN value should the SCS method not be used, especially if the rainfall amount is small?
- a. CN=30.
- b. CN=40.
- c. CN=50.
- d. it can be used no matter what the CN value is.

17. If a 100 acre drainage area in B soil is comprised of 30 acres of meadow with CN=58, 30 acres of woods with a CN of 55, and 40 acres of Urban District with a CN value of 92. What is the weighted CN value?

○ a. 55.
○ b. 58.
○ c. 80.
○ d. 71.

18. If the CN value is 60 and the 25 year, 24 hour rainfall is 5.2 inches, what is the direct runoff, in inches?
○ a. 2.44”.
○ b. 3.17”.
○ c. 1.42”.
○ d. 5.2”.

19. What is the Manning’s roughness coefficient for a fallow field with no crop residue.
○ a. 0.05.
○ b. 0.17.
○ c. 0.41
○ d. 0.80.

20. Using the Mannings Equation find the velocity of the flow through a channel with the following parameters.
n=0.02
Area = 5 SF
Wetted Perimeter =10 Feet
Slope = 0.01
○ a. 1.7FPS.
○ b. 2.7FPS.
○ c. 3.7FPS.
○ d. 4.7FPS.

21. What is the hydraulic radius of a channel?
○ a. It is equal to the area.
○ b. It is equal to wetted perimeter.
○ c. It is the cross sectional area divided by the wetted perimeter.
○ d. It is the wetted perimeter divided by the cross sectional area.

22. What is the minimum time of concentration (Tc) values that should be used in the SCS Method?
○ a. 10 minutes.
○ b. 0.1 hours.
○ c. There is no minimum.
○ d. It depends on the CN value.

23. What Method does the SCS use to construct an entire hydrograph?
○ a. The Rational method
○ b. The Unit Peak Discharge Method.
○ c. The Tabular Hydrograph Method.

24. What is the shape of an SCS Method hydrograph?
○ a. A triangle.
○ b. A trapezoid.
○ c. A triangle or a trapezoid.
○ d. It has a more complex shape.

25. Does the Stankowski Method make use of a runoff coefficient?

- ○ a. Yes.
- ○ b. No