1. What is runoff?

a) Water collected from rainfall only
b) Water that flows over the land surface
c) Water absorbed by soil and vegetation
d) Water stored in underground aquifers

Answer: b) Water that flows over the land surface

Explanation: Runoff refers to the water that flows over the land surface and eventually reaches streams, rivers, and other bodies of water, rather than being absorbed into the ground.

2. What are the primary components of runoff?

a) Baseflow and overland flow
b) Interception and infiltration
c) Evaporation and transpiration
d) Percolation and groundwater recharge

Answer: a) Baseflow and overland flow

Explanation: Baseflow represents the slow, continuous flow of water from groundwater sources, while overland flow refers to the more rapid movement of water over the land surface during rainfall events.

3. Which factor does NOT affect runoff generation?

a) Soil type
b) Vegetation cover
c) Atmospheric pressure
d) Slope gradient

Answer: c) Atmospheric pressure

Explanation: Soil type, vegetation cover, and slope gradient all play significant roles in determining the amount and rate of runoff generation, while atmospheric pressure does not directly influence runoff.

4. What is Basin yield?

a) The volume of water evaporated from a watershed
b) The total water output from a drainage basin
c) The percentage of precipitation that becomes runoff
d) The maximum capacity of a reservoir

Answer: c) The percentage of precipitation that becomes runoff

Explanation: Basin yield represents the proportion of precipitation that is converted into runoff within a specific drainage basin, usually expressed as a percentage.

5. Which curve depicts the relationship between flow rate and the percentage of time it is exceeded?

a) Flow-duration curve
b) Flow mass curve

c) Hydrograph
d) Distribution graph

Answer: a) Flow-duration curve

Explanation: A flow-duration curve illustrates the percentage of time that a given flow rate is equaled or exceeded over a specified period, providing insights into flow variability.

6. What does a flow mass curve depict?

a) Cumulative flow volume over time
b) Hourly flow rates during a storm event
c) Average flow velocity in a river
d) Spatial distribution of flow within a basin

Answer: a) Cumulative flow volume over time

Explanation: A flow mass curve shows the cumulative volume of flow against time, providing a representation of total flow over a specific period.

7. What is a hydrograph?

a) A map showing the topography of a watershed
b) A graphical representation of streamflow over time
c) An instrument for measuring rainfall intensity
d) A calculation of potential evapotranspiration

Answer: b) A graphical representation of streamflow over time

Explanation: A hydrograph displays the variation of streamflow or discharge over time, typically in response to rainfall or snowmelt events.

8. What does the separation of hydrograph refer to?

a) Dividing a hydrograph into baseflow and overland flow components
b) Analyzing the spatial distribution of runoff within a watershed
c) Calculating the velocity of flow in a river channel
d) Estimating the sediment load transported by a river

Answer: a) Dividing a hydrograph into baseflow and overland flow components

Explanation: Hydrograph separation involves distinguishing between baseflow (groundwater-derived flow) and overland flow (surface runoff) components within a hydrograph.

9. What is the theory behind the unit hydrograph?

a) It is based on the assumption that the shape of a hydrograph remains the same for different storm events
b) It relies on the concept of hydraulic conductivity to predict flow rates
c) It considers the influence of atmospheric pressure on precipitation patterns
d) It correlates sediment transport with flow velocity

Answer: a) It is based on the assumption that the shape of a hydrograph remains the same for different storm events

Explanation: The unit hydrograph theory suggests that the shape of a hydrograph response to a unit input of rainfall remains constant, allowing for the prediction of hydrograph response

to any given rainfall event.

10. How is the unit hydrograph convolution equation derived?

a) By integrating the mass balance equation over time
b) By analyzing the spatial distribution of precipitation within a basin
c) By convolving the rainfall excess function with the unit hydrograph
d) By applying Fourier transforms to the rainfall and runoff data

Answer: c) By convolving the rainfall excess function with the unit hydrograph

Explanation: The unit hydrograph convolution equation is derived by convolving the rainfall excess (rainfall input) function with the unit hydrograph, representing the response of a watershed to a unit input of rainfall over time.

11. What does a synthetic unit hydrograph represent?

a) A hydrograph generated from actual streamflow measurements
b) A hydrograph derived from historical rainfall-runoff data
c) A theoretical hydrograph based on physical watershed characteristics
d) A graphical representation of groundwater recharge rates

Answer: c) A theoretical hydrograph based on physical watershed characteristics

Explanation: Synthetic unit hydrographs are hypothetical hydrographs constructed based on the physical characteristics of a watershed, often used in the absence of observed data.

12. What is an S-curve hydrograph?

a) A hydrograph representing the response of a watershed to a slow-moving storm
b) A hydrograph showing sediment transport rates in a river
c) A hydrograph displaying a gradual rise and fall in streamflow
d) A hydrograph depicting the influence of snowmelt on streamflow

Answer: c) A hydrograph displaying a gradual rise and fall in streamflow

Explanation: An S-curve hydrograph exhibits a gradual rise and fall in streamflow, typically associated with sustained rainfall events or snowmelt.

13. What is the primary use of a unit hydrograph?

a) Predicting flood magnitudes and timing
b) Estimating groundwater recharge rates
c) Analyzing sediment transport in rivers
d) Mapping the spatial distribution of precipitation

Answer: a) Predicting flood magnitudes and timing

Explanation: Unit hydrographs are commonly used in hydrology to predict the magnitude and timing of flood events, aiding in flood management and mitigation efforts.

14. What does a dimensionless unit hydrograph represent?

a) A hydrograph scaled to a specific basin size
b) A hydrograph normalized by its peak discharge
c) A hydrograph adjusted for variations in rainfall intensity
d) A hydrograph accounting for changes in land use

Answer: b) A hydrograph normalized by its peak discharge

Explanation: A dimensionless unit hydrograph is a hydrograph that has been normalized by its peak discharge, allowing for comparisons between different watersheds regardless of their size or characteristics.

15. What is the application of a distribution graph in hydrology?

a) Estimating the distribution of rainfall within a watershed
b) Analyzing the spatial distribution of soil moisture
c) Mapping the frequency distribution of streamflow
d) Predicting the distribution of sediment load in rivers

Answer: c) Mapping the frequency distribution of streamflow

Explanation: Distribution graphs in hydrology are commonly used to analyze the frequency distribution of streamflow, providing insights into the variability and occurrence of different flow rates within a watershed.

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