1. Which of the following is NOT an assumption of gradually varied flow in open channels?
a) Uniform flow velocity
b) Steady flow conditions
c) Negligible friction losses
d) Gradual change in flow depth

Answer: a) Uniform flow velocity
Explanation: Gradually varied flow assumes a gradual change in flow depth along the channel, but it does not assume uniform flow velocity.

2. What are the dynamic equations governing gradually varied flow primarily based on?
a) Bernoulli’s equation
b) Manning’s equation
c) Darcy-Weisbach equation
d) Navier-Stokes equations

Answer: a) Bernoulli’s equation
Explanation: The dynamic equations of gradually varied flow are primarily based on the application of Bernoulli’s equation along the streamline.

3. Which analysis is used to determine flow profiles in open channels?
a) Hydrostatic analysis
b) Hydraulic analysis
c) Characteristics analysis
d) Dynamic analysis

Answer: c) Characteristics analysis

Explanation: Characteristics analysis is utilized to compute flow profiles in open channels by considering the behavior of characteristic curves.

4. In rapidly varied flow, what phenomenon occurs when there is a sudden rise in flow depth followed by a significant decrease?
a) Hydraulic jump
b) Sediment transport
c) Backwater effect
d) Critical flow

Answer: a) Hydraulic jump
Explanation: A hydraulic jump occurs in rapidly varied flow when there is a sudden increase in flow depth followed by a significant decrease, often associated with energy dissipation.

5. What are the basic characteristics of a hydraulic jump in rectangular channels?
a) Decrease in flow velocity and increase in flow depth
b) Increase in flow velocity and decrease in flow depth
c) Constant flow velocity and depth
d) Reversal of flow direction

Answer: b) Increase in flow velocity and decrease in flow depth
Explanation: In a hydraulic jump, there is typically an increase in flow velocity and a decrease in flow depth, leading to energy dissipation.

6. Surges in open channels are primarily caused by:
a) Sudden changes in channel width
b) Changes in channel slope

c) Changes in flow velocity
d) Variations in sediment concentration

Answer: c) Changes in flow velocity
Explanation: Surges in open channels often occur due to sudden changes in flow velocity, leading to fluctuations in flow depth and discharge.

7. What is the primary purpose of channel flow routing?
a) Controlling sediment transport
b) Maintaining flow velocity
c) Predicting flow profiles
d) Managing floodwaters

Answer: d) Managing floodwaters
Explanation: Channel flow routing is primarily concerned with predicting and managing the movement of floodwaters through a channel system.

8. Which of the following is NOT a basic component of a venturi flume?
a) Converging section
b) Throat section
c) Diverging section
d) Rectangular cross-section

Answer: d) Rectangular cross-section
Explanation: A venturi flume typically consists of converging, throat, and diverging sections to measure flow rate accurately, but it does not have a rectangular cross-section.

9. What role does the throat section play in a venturi flume?

a) It accelerates the flow
b) It measures the flow rate
c) It dissipates energy
d) It provides a stable flow region

Answer: b) It measures the flow rate
Explanation: The throat section of a venturi flume is specifically designed to measure the flow rate accurately by causing a constriction in the flow.

10. Which equation is commonly used to calculate flow rate in a venturi flume?
a) Manning’s equation
b) Darcy-Weisbach equation
c) Chezy equation
d) Continuity equation

Answer: d) Continuity equation
Explanation: The continuity equation, which states that the product of cross-sectional area and velocity remains constant along a flow streamline, is commonly used to calculate flow rate in a venturi flume.