Objective type questions

1. The water surface profile for the flow d/s of a sluice gate in a channel with mild slope is
   a. M_1
   b. M_2
   c. M_3
   d. None of the above.
2. At the control section, the depth is known
   a. True
   b. False
3. Subcritical flow always occurs when the
   a. Depth of flow is less than the critical depth
   b. Slope is mild
   c. Depth is more than the critical depth
   d. None of the above.
4. The standard step method aims to solve
   a. The continuity equation
   b. The energy equation
   c. The momentum equation
   d. None of the above
5. When the depth of water increases in the direction of flow then the surface profile is classified as back water curve and when it decreases then it is called as draw down curve.
   a. True
   b. False
6. In a sustaining slope the bottom slope is always
   a) Zero
   b) Negative
   c) Positive
   d) Goes from positive to negative
7. When bottom slope is greater than critical slope the channel slope is termed as
   a) Horizontal
   b) Mild

c) Critical

d) Steep

Answers:-

1(c) 2(a) 3(c) 4(a) 5(a) 6(c) 7(d)

Subjective Questions:-

1) Derive an equation for flow equation $\Delta x = \frac{\Delta E}{S_0 - S_f}$
2) Explain the terms normal depth and critical depth in relation to open channel flow. Under what circumstances are these depths identical?
3) Distinguish between critical slope and normal slope.
4) Explain how slopes are classified as mild and steep
5) Differentiate between the back water and draw down curves.
6) Define the terms: (i) Afflux, and (ii) Back water curve.
7) Describe various methods of the computation of the length of flow profiles. State their relative merits and demerits.
8) Prove that the length of the backwater curve is given by, $L = \frac{E_2 - E_1}{S_0 - S_f}$
9) Where, L= length of back water curve, E_2 = specific energy at the end of the back-water curve, E_1= specific energy at the section where water starts rising, S_0 = Slope of bed, and S_f = slope of the energy gradient.
10) In a rectangular channel of width 10m and depth of flow 3m, the rate of water is 30 cumecs. If the bed slope of the channel is 1 in 4000, find the slope of the free water surface. Assume Chezy's constant C = 55. (*Ans.* 0.0000387)
11) A rectangular channel 10m wide carries a discharge of 30 cumecs. It is laid at a slope of 0.0001. If at a section in the channel the depth is 1.6m, compute the critical and normal depth and comment on the slope of channel. Assume N = 0.015. (*Ans. 0.972m; 2.97m*)

12) A wide channel laid to a slope of 1 in 1000 carries a discharge of 3.5 cumecs per meter width at a depth of 1.6m. Find the value of Chezy's constant C. consider the flow to be uniform. If the actual depth varies from 1.5m at an upstream location to 1.7m at a location 300m downstream or in other words the flow is gradually varied, what will be the value of Chezy's coefficient C? (*Ans. 74.65*)

13) In a rectangular channel 10m wide and 3.0m deep water is flowing with a velocity of 1.0m/s. The bed slope of the channel is 1 in 3500. If flow of water through the channel is regulated in such a way that energy line is having a slope of 0.000035, find the rate of change of water in the channel. (*Ans. 0.000258*)

References:-

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