CE8403 APPLIED HYDRAULIC ENGINEERING

Important 13 Mark Questions

Part-B

1. Explain the different types of flow in open channel
2. Explain the different properties of open channel flow
3. Find the velocity of flow and rate of flow of water through a rectangle channel of 6m wide and 3m deep when it is running full the channel having bed slope of 1 in 2000 take c=55
4. Derive the dynamic equation of the GVF
5. i) Explain the various types of channel slopes with neat sketch.
   (ii) Write down the various curves formed in each slope.
6. A rectangular flume 2m wide discharge at the rate of 2m3/s, the bed slope of the flume is 1 in 2500. At a certain section, the depth of the flow is 1m. Examine the distance of the section downstream where the depth of flow is 0.9m. Solve by single step method. Assume N=0.014
7. Write an expression for the length of Backwater Curve.
8. Derive the most economic rectangle channel section. The discharge of water through rectangle channel of width8m is 15m^3/s when the depth of flow of water is 1.2m. Calculate
   (i) specific energy
   (ii) critical depth and velocity
   (iii) minimum specific energy
9. The depth of flow of water at a certain section of rectangular channel 2m wide is 0.25m. The discharge through the channel is 1.8m3/s. Whether a hydraulic jump will occur and if so, determine its height.
10. Explain the classification of hydraulic jump. A Pelton wheel is required to develop 8825 kW when working under the head of 300m. The speed of the Pelton wheel is 540 rpm. The coefficient of velocity for the jet is 0.987, speed ratio is 0.46. Assuming the jet ratio as 10 and overall efficiency as 84%. Estimate the
    i. Number of jets
    ii. Diameter of the wheel
    iii. Quantity of water required

11. A Pelton wheel is to be designed for the following specification:
    i. Power (brake or shaft) = 9560kW
    ii. Head = 350 meters
    iii. Speed = 750 rpm
    iv. Overall efficiency = 85%
    v. Jet diameter = not to exceed 1/16th of the wheel diameter

    Find out the following:
    i. Wheel diameter
    ii. Diameter of the jet
    iii. Number of jets required
12. A Pelton wheel is to develop 13250 kW under a net head of 800m, while running at a speed of 600 rpm. If the coefficient of the jet is 0.97, speed ratio is 0.46, jet diameter is 1/15 of wheel diameter. Assuming overall efficiency as 85%, identify the
    (i) Diameter of the jet (3)
    (ii) Diameter of the wheel (3)
    (iv) Discharge (4)
    (v) Number of jets (3)
13. (i)Define Draft tube and write its function.
    (ii)Explain the various types of draft tubes.
14. The depth and velocity of flow in a rectangular channel are 1m and 1.5m/s respectively. If the rate of inflow at the upstream end is suddenly doubled, what will be the height and absolute velocity of the resulting surge and celerity of the wave.
15. Discuss the types of surges briefly.
16. A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 rpm works against a total head of 40 m. The velocity of flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40 degrees at outlet. If the outer diameter of the impeller is 500 mm and width at outlet is 50 mm. List the following
    i. Vane angle at inlet (4)
    ii. Work done by impeller on water per second (4)
    iii. Manometric efficiency (5)
17. A single acting reciprocating has a plunger diameter of 250mm and stroke length of 350 mm. The speed of the pump is 60 rpm and the discharge is 0.02 cumecs of water. List the following:
    1. The theoretical discharge (2)

2. Coefficient of discharge (2)
3. Percentage slip (3)

18. Discuss the construction details and working principles of a centrifugal pump.
19. Explain the working principle of multi stage centrifugal pump with a neat sketch
20. Explain air vessel with a neat sketch? State its function
21. Explain with a neat sketch construction detail and working of reciprocating pump.
22. Derive an expression for the power saved by fitting an air vessel to a single acting reciprocating pump.