**3220**
**BOARD DIPLOMA EXAMINATION, (C-09)**
**MARCH/APRIL - 2019**
* **DIPLOMA IN CIVIL ENGINEERING**
**HYDRAULICS**
**THIRD SEMESTER EXAMINATION**

Time: 3 Hours                                                                 Total Marks: 80

## PART - A          (10 x 3 = 30 Marks)

*Note 1:Answer all questions and each question carries 3 marks*

  *2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences*

1. Define the terms Capillarity, Dynamic viscosity. State their units

2. State the relation between atmospheric pressure, gauge pressure, vacuum pressure.

3. A Pitot static tube having a co-efficient of 0.98 is placed at the centre of a pipe line in which Benzene is flowing.  The Pitot tube shows a reading of 10 cm.  Calculate the velocity at the centre line of the pipe.

4. Find the time taken to empty a tank through a circular orifice of diameter 4cm fitted at the bottom of a balancing tank of plan dimension 40cm x 40cm.

5. Calculate the head over a rectangular notch, if the length of the notch is 1.6m and discharge is equal to $5m^3$/sec Take $C_d = 0.623$

6. Differentiate between sharp crested and broad crested weirs.

7. Explain the reason for connecting two tanks with a pipe in parallel?

8. Define the terms i) Hydraulic mean depth ii) Wetted perimeter.

9. Name the parts of a Reciprocating pump?

10. Sketch a typical hydro-electrical installation and name the parts.

## PART - B          (5 x 10 = 50 Marks)

*Note 1:Answer any five questions and each question carries 10 marks*

  *2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer*

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11. Each gate of a lock 8m x 2m wide and is supported on pivots situated 50cm from top and bottom. The angle between the gates when they are closed is $120^0$. If the depths of water on two sides are 6m and 3m respectively, find
    (i)    The magnitude of the thrust exerted by each of the gate.
    (ii)   The reaction of the pivots on the assumption that the gate reaction acts in the same horizontal plane as the resultant water pressure.

12. The diameter of pipe changes gradually from 150 mm at a point A to 100mm at point B which are situated at 20m and 16m respectively above the datum. The pressure at A is 0.2 N/mm$^2$ and velocity of flow at A is 1.1m/sec,neglecting losses between A and B, determine the pressure at B.

13. a) A re-entrant mouth piece of 0.085m is discharging water under constant head of 6 m. Determine the discharge through the mouth piece.
    b)  State the different types of mouth pieces.

14. A rectangular weir of crest length 30m is discharging under a head of 0.9m. Determine the discharge by considering both end contraction and velocity of approach, if $V_a$ is equal to 1.2m/sec. Use both Francis formula and Bazin's formula.

15. a) Determine the rate of flow of water through a pipe of diameter 20cm and length 50m when one end of pipe is connected through a tank and other end is opened. The pipe is horizontal and the height of water in the tank is 4m above the centre of pipe. Consider all minor losses and take f = 0.009.
    b) State the formula for loss of head at entrance.

16. Design a most efficient section of a trapezoidal channel to discharge 280 $m^3$ / minute. The bed slope is 1 in 1600. The side slopes are 1: 1, N = 0.01.

17. List the classification of turbines along with an example each

18A. An oil having kinematic viscosity of 21.4 stokes is flowing through a pipe of 300mm diameter. Find the type of flow, if the discharge through the pipe is 15 lit/s

 B. Most economical rectangular channel is discharging water at the rate of 15 cumecs with a velocity of 2.5m/s. Design the channel , if chezy's constant =70.

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