3506

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DME - IV SEMESTER EXAMINATION

HYDRAULICS & FLUID POWER SYSTEMS

Time : **3** Hours]   [Total Marks : **80**

PART - A   3×10=30

Instructions :   (1)   Answer **ALL** questions.

(2)   Each question carries **THREE** marks.

(3)   Answer should be brief and straight to the point.

1   Convert 6 bar pressure into equivalent.

(a)   Water head

(b)   Liquid height (specific gravity 0.8)

2   What is a pitot tube ? Write down the formula for finding the velocity of the flowing liquid.

3   Write the equation for power transmission through pipes and mention what for each letter stands and state their units.

4   Derive the expression for the force exerted by the jet when it strikes at the centre of fixed curved vane.

5   Draw the neat sketch of hydro-electric power plant and indicate the elements of the plant.

6   State the function of the following parts of the Pelton wheel

     (a)   Runner

     (b)   Breaking jet

7   State the equations for discharge and power of a single acting reciprocating pump.

8   State the purpose of the following fluid reservoir elements

     (a)   Filter

     (b)   Actuator

9   Briefly explain the working principle of pneumatically operated collect chuck.

10   State the advantages of hydro-pneumatic system.

PART - B   10×5=50

Instructions :   (1)   *Answer any **FIVE** questions.*

                        (2)   *Each question carries **TEN** marks.*

                        (3)   *Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.*

11   (a)   Calculate the specific weight, mass density and specific gravity of two liters of a liquid which weights 15 N.   3

     (b)   A fuel injection pump of 8 mm inner diameter is to be drawn against a pressure of 160 bar. At the time of closure, the fuel volume in the barrel is 2cc. Determine the distance moved by plunger before the delivery begins. Bulk modulus for fuel, $K = 1100 \times 10^6$ N/m^2.   7

12 Water flows through a vertical contraction from a pipe of diameter d to another diameter d/2. The velocity of flow at the inlet to contraction is 2m/sec and pressure 200 KN/m^2. The height of contraction is 2m. Find the pressure at the exit of contraction.

13 Two pipes of diameters 20 cm and 15 cm are in parallel and connect two reservoirs. The pipes are of equal length. The difference of water level in two reservoirs is 10 m. What is the ratio of the discharges due to the larger dia pipe to that of smaller dia pipe ? Assume f is same for both the pipes.

14 A 20 mm diameter jet of water moving with a velocity of 20 m/s strikes of flat vertical plate normally. Find the force exerted if the plate moves with a velocity of 5m/s in the direction of jet. Find also the work done and efficiency, specific weight of water is 9.81 KN/m^3 and g is

9.81 m/s^2.

15 Explain Kaplan turbine working with a neat sketch.

16 Explain the working principle and construction of centrifugal pump.

17 Explain the following spool type director control valves.

(a) Two way

(b) Four way

18 What are the essential elements of pneumatic circuit ? State their functions.

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