3506
BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL - 2019
DIPLOMA IN MECHANICAL ENGINEERING
HYDRAULICS & FLUID POWER SYSTEMS
FOURTH 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. State any two differences between compressible and incompressible fluids

2. What is a pitot tube? Briefly explain with sketch

3. Write Darcy's formula and mention what for each letter stands and their units.

4. A jet of water 10cm diameter moving with a velocity of 30m/s strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.

5. Explain the following terms in a hydraulic turbine
   a) Hydraulic efficiency
   b) Mechanical efficiency

6. Draw a neat sketch of Pelton wheel and name the various parts.

7. Define static and Manometric heads of a centrifugal pump ?

8. State the function of following components of a hydraulic system.
   a) Oil reservoir
   b) Filter
   c) Pump.

9. What is the necessity of safety circuits in pneumatic systems? Briefly explain.

10. Briefly explain air controlled hydraulic valve.

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*

11. Explain a differential manometer with a neat sketch and derive the expression for pressure head.

12. A circular pipe of 200mm diameter carries oil of relative density 0.75. The discharge through the pipe is of 70 lit/sec. At a section 1 m above the datum the pressure is vacuum of 3cm of mercury. What is the total head at the section in meters of oil ?

13. Water is to be supplied form a reservoir to a turbine. The turbine is situated 150 m below the reservoir level.The length of penstock is 1200m. Determine the smallest diameter of penstock to produce 500KW of power with a turbine efficiency 90% take f = 0.025.

14. A jet of oil 25mm diameter is moving with a velocity of 30m/s, the specific gravity of oil is 0.8. Find the force exerted by the jet, if
        a) The plate is fixed
        b) The plate is moving with a velocity of 12m/s in the direction of jet.

15. a) Write down the differences between impulses and reaction turbines.
b) A Kaplan turbine, operating under a head of 20m develops. 20000KW with an overall efficiency of 66%. The speed ratio is 2.0 and flow ratio of is 0.6. The hub diameter of the wheel is 0.35 times the outside diameter of wheel. Find the diameter and speed of turbine.

16. A single cylinder, single acting reciprocating pump has a plunger diameter 600mm, stroke 360mm, speed 75rpm, static lift 12m and discharge 6870 lit/min. Determine
a) Coefficient of discharge   b) Slip   c) Power required of pump efficiency is 80%.

17. a)What is a pressure intensifier ? Explain its working principle with a neat sketch. 6marks
b) State any four uses of an accumulator.   4 marks

18. Explain the working principle of following power operated holding devices with neat sketches
a) Pneumatically operated vice
b) Pneumatic collet chuck

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