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BOARD DIPLOMA EXAMINATION
MARCH/APRIL - 2019
DIPLOMA IN MECHANICAL ENGINEERING
HYDRAULICS AND FLUID POWER CONTROL SYSTEMS
FOURTH SEMESTER EXAMINATION

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

PART - A (3m x 10 = 30m)

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

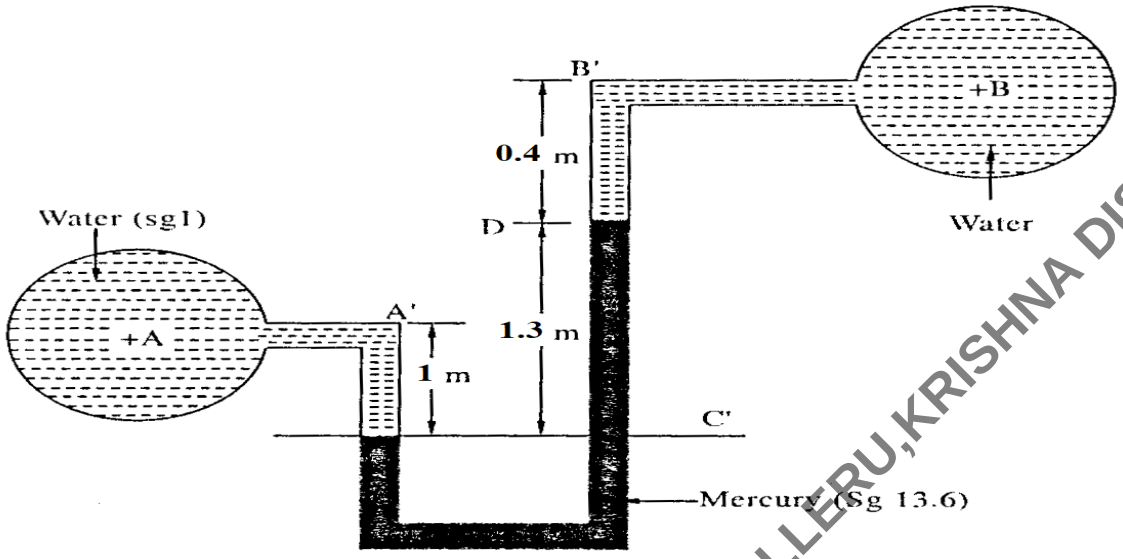
1. If 4 m^3 of oil weighs 34 kN, calculate its specific weight, specific volume, mass density and relative density
2. Define a) potential energy b) kinetic energy of a flowing fluid
3. Write the applications of siphon.
4. Write the equation for the normal force exerted by a jet on a moving inclined flat pate and explain the terms involved
5. What is the need of governing of water turbines?
6. Write about priming and cavitation in centrifugal pumps?
7. Mention the essential components of a hydraulic circuit
8. Differentiate between positive displacement and non-positive displacement type of pumps
9. List the characteristics needed for the seals used in pneumatic systems.
10. Write the basic components of pneumatic system.

PART - B (10m x 5 = 50m)

Note 1:Answer any five questions and each 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. **A U-tube differential manometer containing mercury is connected to two pipes as shown in the figure. The pipes are carrying water. Find the pressure difference between the two pipes.**



12. The diameter of a pipe changes from 30 cm at a section 6 m above the datum, to 10 cm at a section 3 m above the datum. The pressure of water at first section is 5 bar. If the velocity of water at first section is 1.5 m/sec. Find the intensity of pressure at the second section

13. Find the loss of head due to friction in a pipe of 1 m dia. 15 km long. The velocity of water in the pipe is 1 m/s. co-efficient of friction is 0.005

14. A jet of water 60 mm diameter strikes a flat fixed plate inclined at 60^0 to the axis of the jet. If the velocity of the jet is 30 m/s, find the normal force on the plate. Find also the force in the direction of the jet

15. At what angle the guide blades of Francis turbine be set to extract 7000 kW of power. The discharge is 20 m^3/sec when running at 200 rpm. The diameter of runner at inlet is 2m and breadth of opening at inlet is 0.8 m. Assume the discharge is radial at outlet

16. A single cylinder single acting reciprocating pump has the following specification

Plunger diameter	= 500 mm
Stroke	= 300 mm
Static lift	= 12 m
Speed	= 12 m
Discharge	= 3357 lit/min.

Determine a) co-efficient of discharge b) slip c) power required to drive the pump if the efficiency is 85%

17. Explain the working of pilot operated check valve with a neat sketch

18. Explain the working of a pneumatic collect with a neat sketch.

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