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BOARD DIPLOMA EXAMINATION, (C-16)

OCTOBER/NOVEMBER—2023

DME – FOURTH SEMESTER EXAMINATION

HYDRAULICS AND FLUID POWER CONTROL SYSTEMS

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

PART—A   3×10=30

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

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

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define Newton's law of viscosity.

2. What are meant by *(a)* mean velocity and *(b)* discharge?

3. Find the loss of head, due to friction, in a pipe of length 10 km and 1 m dia. The velocity of flow of water is 1 m/sec. use Chezy's formula and take f = 0·01 and Chezy's constant, C = 60.

4. A horizontal jet of water 15 cm dia, moving with a velocity of 20 m/sec strikes the fixed vertical plate. Calculate the force exerted by the jet on the plate.

5. A turbine develops 600 kW power. The net head available is 40 cm. if the overall efficiency of the turbine is 0·8, what is the discharge through the turbine.

6. What is priming? Why is it necessary?

7. Write the classification of valves.

8. Draw the sketch of a gear pump and label the parts.

9. Write the three applications of pneumatic power.

10. State the function of seals.

PART—B

10×5=50

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

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

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

11. Explain the working of Bourdon pressure gauge with neat sketch.

12. Oil flows through a horizontal venturimeter 15 cm inlet dia and 7·5 cm throat diameter. If the absolute pressure at inlet is 169·7 kpa and that of throat is 24·5 kpa. What is the discharge through the meter? Assume coefficient of meter as 0·96. Take specific gravity of oil as 0·8.

13. Explain the function of siphon and give reason for limiting the height of the pipes.

14. Derive an expression for the normal force and work done by jet impinging on a flat plate.

15. Draw a neat sketch of Kaplan turbine and explain its working.

16. A single acting reciprocating pump has its piston diameter 200 mm and stroke 300 mm. speed of crank is 60 rpm. The suction and delivery heads are 5 m and 16 m respectively. Determine, *(a)* discharge, *(b)* theoretical power required to drive the pump of its efficiency is 70%.

17. Explain the working of a pressure relief valve with neat sketches.

18. Write the differences between hydraulic and pneumatic power systems.

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