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BOARD DIPLOMA EXAMINATION, (C-16)

MAY/JUNE—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 the terms (a) weight density and (b) viscosity.
2. What is meant by the equation of continuity of flow?
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 Darcy's formula and take $f = 0.01$.
4. A jet of water 50 mm diameter strikes a flat stationary plate normally with a velocity of 60 m/sec. Find the force experienced by the plate.
- * 5. Write any three differences between Pelton wheel and Francis turbine.
6. Define slip and percentage of slip.
7. Write any three applications of fluid power.
8. State the classification of hydraulic actuators.
9. State the advantages of pneumatic system.
10. List out the materials used for seals.

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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 bourdon tube pressure gauge with a neat sketch.
- 12.** A horizontal Venturi meter 16 cm × 8 cm is used to measure the flow of an oil of sp.gr. 0.8. Determine the deflection of the oil mercury gauge, if the discharge of the oil is 50 lit/sec. Assume coefficient of the meter as 1.
- 13.** Find the maximum power that can be transmitted to a power station through a hydraulic pipe 3 km long and 20 cm diameter, when the pressure at the power station is 600 kN/m². Take $f = 0.0075$.
- 14.** Derive an expression for work done and efficiency when the jet strikes series of vanes fixed on the rim of a wheel.
- 15.** Draw a neat sketch of Francis turbine and explain its working.
- 16.** Explain the working principle of centrifugal pump with a neat sketch.
- 17.** Explain the pressure compensated flow control valves with a neat sketch.
- 18.** Explain the following directional control valves with neat sketches :
- (a) 2/2 valve
- (b) 4/2 valve

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