

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

FLUID MECHANICS AND PNEUMATICS

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

I. (Answer **all** the questions in one or two sentences. Each question carries 2 marks)

1. State Pascal's law.
2. Define 'fluid kinematics.'
3. List the causes of 'water hammer.'
4. Draw the hydraulic circuit symbol of hydraulic pump.
5. Define electro-pneumatics.

(5 x 2 = 10)

PART – B

Maximum marks: 30

II. (Answer any **five** of the following questions. Each question carries 6 marks)

1. Differentiate between simple manometer and differential manometer.
2. Define the terms 'Dynamic viscosity' and 'kinematic viscosity'.
3. Water is flowing in a pipe of 160 mm diameter with an average velocity of 2m/s. determine the rate of discharge of water in liters/second. Find out the velocity of water at the other end of the pipe, at the section where the diameter of pipe is gradually reduced to 100 mm.
4. Briefly explain following terms.
(a) Steady flow (b) uniform flow (c) laminar flow.
5. Define the terms flash point and fire point.
6. Briefly explain the functions of hydraulic fluids.
7. List the advantages of pneumatic system.

(5 x 6 = 30)

PART – C

Maximum marks: 60

(Answer **one full** question from each unit. Each full question carries 15 marks)

UNIT – I

- III.** (a) Define the terms mass density, specific weight, specific volume and specific gravity of a fluid.

(8)

- (b) A horizontal pipe contains oil of specific gravity 0.82. A differential manometer is connected at two points A & B of the pipe shows a difference in mercury level as 220mm. Find the difference in pressure between two points A & B. (7)

OR

- IV. (a) Determine the absolute pressure and gauge pressure at a point 4m below the free surface of a liquid of specific gravity 1.3, if the atmospheric pressure is equivalent to 750 mm of Hg. (8)
- (b) Briefly explain the conditions of three equilibrium states of a floating body. (7)

UNIT - II

- V. (a) Explain different forms of energy possessed by fluid particles. (8)
- (b) An orifice-meter of diameter 120 mm is inserted in a pipe of diameter 240 mm to measure the rate of flow of a liquid of specific gravity 0.88. The differential manometer connected between the upstream and downstream sides shows a mercury level difference of 400 mm. If the co-efficient of discharge of meter is 0.65, determine the rate of flow of oil. (7)

OR

- VI. (a) Water is flowing through a pipe of 250mm in diameter and 100m long with a velocity of 2.5 m/s. Find the head loss due to friction using Darcy's formula and Chezy's formula. Assume co-efficient of friction (f) as 0.005 and Chezy's constant, C = 55. (8)
- (b) Find the discharge over a triangular notch of angle 60° when the head over the triangular notch is 0.4 m. Assume co-efficient of discharge as 0.6. (7)

UNIT - III

- VII. (a) List any eight important properties that hydraulic oil should possess. (8)
- (b) Briefly describe working of spring loaded accumulator with figure. (7)

OR

- VIII. (a) List the functions of control valves used in hydraulic system. Enumerate how control valves are classified. (8)
- (b) With help of a neat figure, explain working of vane pump. (7)

UNIT - IV

- IX. (a) With neat figure, explain the components of pneumatic system. (8)
- (b) Compare hydraulic system and pneumatic system. (7)

OR

- X. (a) With neat sketch explain the working of power operated chuck. (8)
- (b) Describe the working of non-relieving pressure regulator. (7)
