

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2023**

**FLUID MECHANICS AND PNEUMATICS**

[Maximum Marks: **100**]

[Time: **3 Hours**]

**PART-A**

[Maximum Marks: **10**]

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

1. Name three types of control valves used in hydraulic system.
2. State the equation of continuity.
3. What is vena contracta?
4. List the main components of pneumatic system.
5. State Pascal's law.

(5 x 2 = 10)

**PART-B**

[Maximum Marks: **30**]

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

1. Explain water hammer.
2. Explain the working of an external gear pump.
3. List the limitations of Bernoulli's theorem.
4. Explain Absolute, Atmospheric, Gauge and Vacuum pressure.
5. What are the basic components of hydraulic system?
6. Explain mufflers used in pneumatic system.
7. Define mass density, specific volume, and viscosity.

(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. Calculate the specific weight, mass density and specific gravity of a liquid having a volume of  $6 \text{ m}^3$  and weight 40 kN. (7)
- b. Explain the properties of fluids surface tension and capillarity. (8)

**OR**

- IV. a. Explain the Bourden tube pressure gauge. (7)
- b. A pipe contains an oil of specific gravity 0.8. A differential manometer is connected at two points M and N of the pipe shows a difference in mercury level as 200 mm. Find the difference of pressure at two points. (8)

**UNIT – II**

- V. a. State Bernoulli's theorem and the assumptions in it. (7)
- b. A pitot tube was connected to a pipe of 150 mm diameter to measure the velocity of water. If the water rises in the tube is 160 mm, find the discharge.  
Take mean velocity = 0.8 x central velocity and  $C_v = 0.98$ . (8)

**OR**

- VI. a. Explain the advantages of triangular notch over rectangular notch. (7)
- b. A reservoir has been built 4 km away from a college campus having 5000 inhabitants. Water is to be supplied from the reservoir to the campus. It is estimated that each inhabitant will consume 180 litres of water per day, and that half of the daily supply is pumped within a time of 10 hours. Calculate the size of the supply main, if the loss of head due to friction in the pipe is 18 meters. Take  $f=0.01$ . (8)

**UNIT- III**

- VII. a. Explain the advantages of Fluid power. (7)
- b. Explain the working of weight loaded accumulator. (8)

**OR**

- VIII. a. Explain the working of a lobe pump. (7)
- b. Explain the hydraulic circuit for robotic arm with a neat diagram. (8)

**UNIT - IV**

- IX. a. Compare hydraulic and pneumatic system. (7)
- b. Explain pneumatic collet chuck. (8)

**OR**

- X. a. What are the applications of pneumatic system? (7)
- b. Explain hydro pneumatic system and its applications. (8)

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