N22-09241

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2022

FLUID MECHANICS & 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 specific gravity.

3. List two applications of Bernoulli's theorem.

4. Write the purpose of accumulator in a hydraulic circuit.

5. Draw the pneumatic symbols for pressure gauge and check valve.   (5 x 2 = 10)

PART – B

Maximum marks : 30

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

1. Define (i)Absolute Pressure (b) Gauge Pressure (c) Vacuum Pressure.

2. State the limitations of the Bernoulli's Theorem.

3. Define hydraulic gradient line and total energy line.

4. List any six properties of a hydraulic oil.

5. Explain the working of a two way solenoid valve with neat sketch.

6. List applications of fluid power systems.

7. Explain the working of Duplex cylinder with sketch.   (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) Discuss the working of a U-tube Differential manometer with neat sketch.   (8)

(b) Calculate the specific weight, density and specific gravity of a liquid having a

volume of $2.27m^3$ and weight 44KN   (7)

OR

IV.(a) A rectangular plane surface is 2m wide and 3m deep is immersed vertically in water in such a way that its 2m side is parallel to water surface and its top edge is 2.5m below the free surface. Find the total pressure on the plane surface. (8)

(b) Explain the term metacentre and metacentric height. (7)

UNIT-II

V. (a) Explain the working principle of a Venturimeter with neat sketch. (8)

(b) Find the total energy of 3kg of water flowing with a velocity of 5m/sec under a pressure of 4 bar at a height of 10m above the ground level. (7)

OR

VI. (a) A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and throat is 20cm of mercury. Determine the rate of flow. Take $C_d = 0.98$. (8)

(b) List and explain different types of fluid flow. (7)

UNIT-III

VII.(a) Draw and Explain the working of a direct pressure relief valve. (8)

(b) Explain the working of a lobe pump with neat sketch. (7)

OR

VIII.(a) Explain the working of a Hydraulic Intensifier with neat sketch. (8)

(b) Explain the working of a Diaphram type separating accumulator with neat sketch. (7)

UNIT-IV

IX.(a) Draw and explain the working of a FRL unit in a pneumatic system. (8)

(b) Compare pneumatic system with hydraulic system. (7)

OR

X. (a) Explain the basic components of a pneumatic system. (8)

(b) Describe the working of a Pneumatic chuck with neat sketch. (7)

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