TED (15) – 3022 Reg. No.....

(REVISION – 2015) Signature .....

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY — APRIL, 2017

FLUID MECHANICS AND PNEUMATICS

(Common for ME and TD)

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. Define total pressure.
2. Mention the purpose of piezometer and orifice meter.
3. State water hammer effect.
4. Define Pilot operated relief valve.
5. Write any two disadvantages of pneumatic system. (5 × 2=10)

PART — B

(Maximum marks : 30)

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

1. A ship floating in sea water displaces 108 m^3 of water. Determine the weight of the ship, if sea water has a specific gravity of 1.1.
2. Define Absolute pressure, Gauge pressure and Atmospheric Pressure and state the relation.
3. State the function of nozzle and derive the exit velocity.
4. Illustrate Hydraulic gradient line and Total energy line.
5. Briefly explain the working of Hydraulic Gear Pump.
6. Interpret the accumulator and intensifier.
7. Name the various types of pneumatic control valves. Write their function.

(5 × 6 = 30)

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Define and mention the unit of each (i) specific weight (ii) specific volume and (iii) specific gravity. 6

(b) The right limb of a simple U-tube manometer containing mercury is open to atmosphere while the left limb is connected to pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe, if the deflection of mercury in the two limb is 20cm. 9

OR

IV (a) Determine the pressure in KPa, if the equivalent head is measured as 400mm of (i) mercury (ii) water (iii) oil of specific weight 7.9 KN/m^3. 6

(b) A circular plate 4m in diameter is immersed in sea water having specific gravity 1.01 such that its circular surface makes an angle of 30 degree with the free surface of water and its top edge is 1.2m below it. Find the total pressure. 9

UNIT — II

V (a) Distinguish between the following :

(i) Laminar and turbulent flow (ii) Uniform and non-uniform flow
(iii) Steady and unsteady flow. 6

(b) Water flows through a pipe having diameter 300mm and 200mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm^2 and the pressure at the upper end is 9.81 N/cm^2. Determine the difference in datum head, if the rate of flow through the pipe is 40 lit/s. 9

OR

VI (a) Define hydraulic coefficients, state the relationship between them. 6

(b) Find the diameter of a pipe of length 2000m when the rate of flow of water through the pipe is 200 lit/s and the head loss due to friction is 4m. Take the value of C=50 in Chezy's formulae. 9

UNIT — III

VII (a) Enumerate the application of fluid power. 6

(b) Demonstrate the hydraulic intensifier and its working. 9

OR

Marks

VIII (a) Differentiate between hydraulic cylinders and hydraulic motors. 6

(b) Write important properties of liquids used in power hydraulics and describe (i) Lubricity (ii) Neutralisation number (iii) Flash and fire point 9

UNIT — IV

IX (a) Mention various applications of hydro pneumatic system. 6

(b) Describe the working of pneumatic chuck with the help of a circuit diagram. 9

OR

X (a) Differentiate between air filter and air lubricator. 6

(b) Compare hydraulic, pneumatic and hydropneumatic system. 9
