

TED (10)–3037
(REVISION—2010)

Reg. No.
Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—OCTOBER, 2011

FLUID MECHANICS AND PNEUMATICS
(Common for ME and TD)

[Time : 3 hours

(Maximum marks : 100)

PART—A

Marks

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

1. Differentiate between simple manometer and differential manometer.
2. What do you mean by absolute pressure ?
3. Differentiate between laminar flow and turbulent flow.
4. Define flash point and fire point.
5. What is an air cylinder ?

(5×2=10)

PART—B

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

1. Define the terms :
 - (a) Specific gravity
 - (b) Pressure head
 - (c) Surface tension.
2. Explain 'total pressure' and 'centre of pressure'. Write the expression to find out the total pressure on an immersed surface and also explain each term in the expression.
3. Briefly explain the different types of energies possessed by a flowing liquid.
4. Explain Vena contracta, co-efficient of velocity and Darcy's formula for loss head in pipes.
5. Explain the following properties of a hydraulic fluid :
 - (a) Rust prevention
 - (b) Pour point
 - (c) Lubricity.
6. Explain the function of pressure control valves, flow control valves and direction control valves in a hydraulic circuit.
7. List any six advantages of hydropneumatic system.

(5×6=30)

PART—C

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

UNIT—I

- III 1. The intensity of pressure of water at a point is 320 kPa. Express the pressure in terms of :
- Head of water
 - Head of Mercury (Specific gravity of Mercury is 13.6)
2. A U-tube Mercury manometer is connected to two pipes A and B. The pipe B is 60 mm below pipe A. The specific gravity of liquid in pipe A and B are 1.5 and 0.88 respectively. Mercury level in the left limb is 80 mm below the centre of pipe A. Find the pressure difference between the two pipes if the mercury level difference in the two limbs of the manometer is 120 mm.

OR

- IV 1. Find the gauge pressure and absolute pressure at a point 5m below the free surface of a liquid of specific gravity 1.3. Assume atmospheric pressure as equivalent to 740 mm of mercury.
2. A rectangular plane surface 2 m wide and 5 m deep lies in an oil of specific gravity 0.8 in such a way that its plane makes an angle of 30° with the free surface of oil. Determine the total pressure when the upper edge is 2.5 m below the free surface of oil.

UNIT—II

- V 1. The diameter of a pipe is gradually reduced from 600 mm to 250 mm over a length of 1.2 m. If the discharge through the pipe is 360 litre/s, find the velocity of flow at both ends.
2. A rectangular channel 2 m wide carries a maximum discharge of 300 litre/s and a minimum of 150 litre/s. It discharges through a 120° angle V-notch. If the maximum depth of water is not to exceed 1 m, find the position of the apex of the notch from the bed of the channel. What is then the minimum depth of water in the channel? Assume value of co-efficient of discharge as 0.60.

OR

- VI 1. List any four differences between an Orifice and a Notch.
2. A town having a population of 1 lakh is to be supplied with water from a reservoir located at a distance of 5 km. It is stipulated that one half of the daily supply of 150 litre per person should be delivered within 8 hours. What must be the size of the pipe to furnish the supply, if the head available is 12 m? Take $C = 45$ in Chezy's formula.

UNIT—III

- VII 1. Draw block diagram of a hydraulic system and mark the components.
2. (a) What is an accumulator?
(b) Explain the working of weight loaded accumulator with a simple sketch.

OR

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| VIII | 1. With the help of a neat sketch explain the working of a lobe pump. | 7 |
| | 2. Draw the hydraulic circuit for automatic cylinder reciprocation (retraction circuit) and explain its functioning. | 8 |

UNIT—IV

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| IX | 1. Explain air lubricator with a sketch. | 6 |
| | 2. Describe the working of Pneumatic chuck with the help of a circuit diagram. | 9 |

OR

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| X | 1. With the help of a diagram explain the cushioning effect of air in hydraulic system. | 7 |
| | 2. Describe the working of a manually operated two way direction control valve with a neat figure. | 8 |

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