

TED (10)–3037

(REVISION—2010)

Reg. No.

Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—MARCH, 2012

FLUID MECHANICS AND PNEUMATICS

(Common for ME and TD)

[Time : 3 hours

(Maximum marks : 100)

Marks

PART—A

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

1. What do you mean by total pressure and centre of pressure ?
2. What is capillarity ?
3. Name the hydraulic coefficients and state the relationship between them.
4. Define flash point and fire point.
5. Why mufflers are used in pneumatic systems ? (5x2=10)

PART—B

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

1. Explain Dynamic viscosity, Kinematic viscosity and Newton's law of viscosity.
2. Differentiate between : (i) Liquid and gas (ii) Real fluid and ideal fluid.
3. Explain the different energies possessed by a liquid in motion.
4. State Bernoulli's theorem and write the assumptions made for its derivation.
5. Define the term fluid power and list the functions of control valves in a hydraulic circuit.
6. Explain two way spool type direction control valve with a simple sketch.
7. Write short notes on : (i) Air cylinders (ii) Air motor.

(5x6=30)

PART—C

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

UNIT – I

- III (a) Calculate the specific weight, specific mass, specific volume and specific gravity of a liquid of 3 m^3 volume weighing 27 kN. 6
- (b) Convert an intensity of pressure 45.45 kPa into the corresponding pressure head in terms of : (i) Kerosene (ii) Water. Relative density of Kerosene is 0.8. 4
- (c) The left limb of a simple U-tube Mercury manometer is connected to a pipe flow having vacuum pressure. The specific gravity of the fluid in the pipe is 0.87. Find the vacuum pressure in the pipe if the difference of mercury level is 400 mm and the height of the fluid in the left limb from the centre of pipe is 120 mm below. 5

OR

- IV (a) State and explain Pascal's law with an application. 4
- (b) (i) A circular plate 3m diameter is submerged in water in such a way that its greater and least depth is 2 m and 1 m respectively. Find the total pressure on the surface of the plate. 6
- (ii) Show the relationship between absolute pressure, atmospheric pressure, gauge pressure and vacuum pressure with the help of a diagram. 5

UNIT – II

- V (a) What is an orifice ? Explain the classification of orifices. 5
- (b) The head of water over an orifice of diameter 30 mm is 8m. Find the actual discharge and actual velocity of the jet at vena-contracta. Take $C_d = 0.64$ and $C_v = 0.97$. 5
- (c) What is a pitot tube ? A pitot tube is connected to a pipe of 300 mm diameter to measure velocity of water. If the water rise in the tube is 150 mm, find the velocity of water. If the mean velocity is $0.9 \times$ Central velocity, find the discharge through the pipe. Assume $C_v = 0.98$. 5

OR

- VI (a) Differentiate between an orifice and a notch. 5
- (b) Daily record of the rainfall over a catchment area is 300 million litres. If 65% of the rain reaches the reservoir and then passes over a notch, find the length of the notch in order that the head over the notch is limited to 600 mm. Take $C_d = 0.64$. 5
- (c) Find the power transmitted through a pipe 900 m long and 150 mm diameter discharging $0.15 \text{ m}^3/\text{s}$ water. The pressure at the supply end is 6 N/mm^2 . Take $f = 0.0075$. 5

UNIT - III

- VII (a) Explain the working of a simple check valve with the help of a figure. 5
(b) With the help of a neat sketch explain the working of lobe pump. 5
(c) What is an accumulator? Explain spring loaded accumulator with simple sketch. 5

OR

- VIII (a) With the help of a neat sketch explain the working of vane pump. 6
(b) Draw a hydraulic circuit for extension stroke of automatic cylinder reciprocation and explain its working. 9

UNIT - IV

- IX (a) Explain the working of an air lubricator with a sketch. 6
(b) Describe the working of Pneumatic collect chuck with the help of a circuit diagram. 9

OR

- X (a) Compare hydraulic system with pneumatic system. (Any six points). 6
(b) Explain the principle of working of an air controlled hydraulic valve with the help of a diagram. 9
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