DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

FLUID MECHANICS AND MACHINERY

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. Define kinematic viscosity.
2. State continuity equation in fluid flow.
3. Define suction head and delivery head of a centrifugal pump.
4. What is slip of a reciprocating pump ?
5. Define fire point of a fluid. (5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. Explain the capillarity of fluids.
2. What are the different methods of pressure measurement ?
3. List the advantages of triangular notch over rectangular notch.
4. Explain the use of Venturimeter with a sketch.
5. Explain cavitation in pumps.
6. List the different types of air cylinders.
7. Explain the working of a simple check valve with a sketch. (5 × 6 = 30)

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) State and explain Newton's law of viscosity. 6

(b) A simple manometer containing mercury is connected to a pipe in which a liquid of Sp. Gravity 0.8 is flowing. The right limb is open to atmosphere. The difference of mercury level in both limbs is 150mm. The level of mercury in the right limb is 90mm above the centre of the pipe. Find the pressure of oil in the pipe. 9

Or

Marks

IV (a) Distinguish between mass density and weight density, specific weight and specific volume. 6

(b) Determine the total pressure on a plane rectangular surface of 2m wide and 5m deep, when its upper edge is horizontal and (i) coincide with water surface (ii) 3m below the free surface of water. 9

UNIT — II

V (a) What are the assumptions in Bernaulli's theorem ? 6

(b) A horizontal venturimeter is provided in a pipeline 150mm diameter carrying water. The differential manometer gives a reading of 150mm of mercury. The throat diameter is 80 mm. Find the discharge. Assume coefficient of discharge as 0.95. 9

OR

VI (a) Explain how Chezy's formula can be used for finding the head loss due to friction in pipes. 6

(b) A pipe carries oil of specific gravity 0.8 flows with a velocity of 3.5 m/s at section of 300 mm diameter. At another section of the same pipe, the diameter is 250mm. Find the velocity and mass flow rate of oil at this section. 9

UNIT — III

VII (a) Explain with a sketch the working of single acting reciprocating pumps. 6

(b) A centrifugal pump is required to lift 0.05m³/s of water from a well of depth 40m. If rating of the pump motor is 32kW, find the overall efficiency of the pump. 9

OR

VIII (a) Explain the functions served by air vessels in a reciprocating pump. 6

(b) Explain the different types of impeller casings of centrifugal pumps. 9

UNIT — IV

IX (a) Explain the different properties of hydraulic fluids. 6

(b) Describe the working of a double acting air cylinder with a sketch. 9

OR

X (a) Explain any six advantages of pneumatic power system. 6

(b) Explain the working of a pneumatic system with simple diagram. 9