

TED (10) – 3052

(REVISION — 2010)

Reg. No.

Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN AUTOMOBILE
ENGINEERING — MARCH, 2015

FLUID MECHANICS AND MACHINERY

[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 density of a fluid.
2. Define kinematic viscosity.
3. List the types of notches.
4. Write note on priming of centrifugal pump.
5. Write note on oxidation stability of fluids.

(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 phenomenon.
2. Explain the types of fluids.
3. Explain the two equations used for the calculation of loss of head due to friction.
4. Describe the types of centrifugal pump casing.
5. Explain slip and significance of negative slip of a reciprocating pump.
6. Explain a butterfly valve used in hydraulic system.
7. Draw any six symbols used in pneumatic circuits.

(5×6=30)

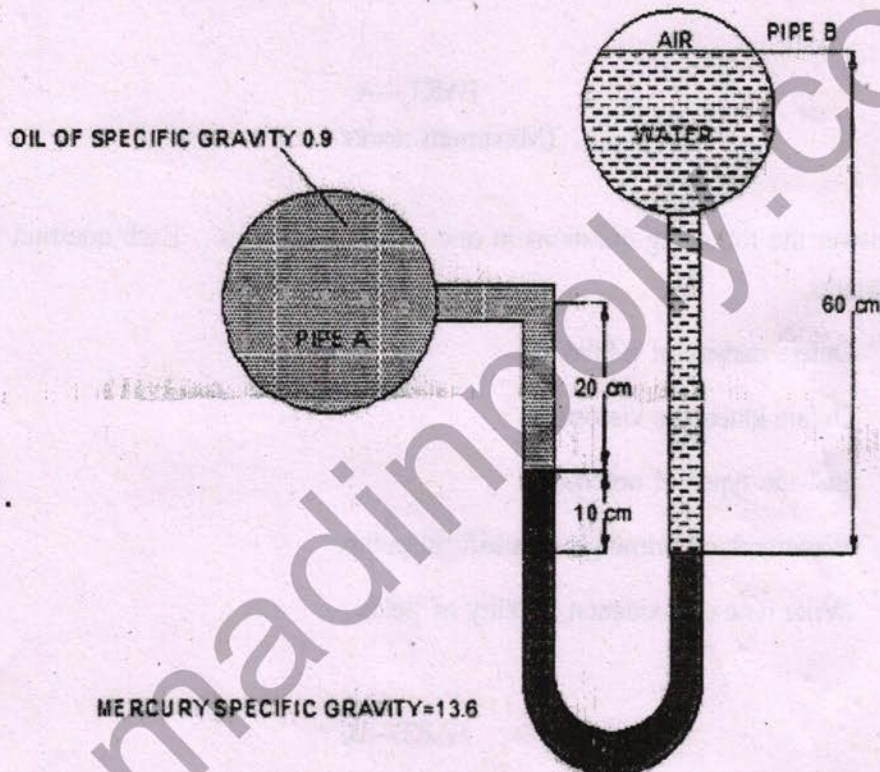
PART—C

(Maximum marks : 60)

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

UNIT—I

- III (a) State and explain the Pascal's law. 7
- (b) A differential manometer is connected at the two points A and B as shown below. Find the absolute pressure at A, if the absolute pressure at B is 9.81 N/cm^2 .



8

OR

- IV (a) Derive an expression for the force exerted on a sub-merged vertical plane surface by the static liquid. 7
- (b) A rectangular plane surface 3 m wide and 4 m deep lies in water such a way that its plane makes an angle of 30° with the free surface of water. Determine the total pressure force, when the upper edge is 2 m below the free surface. 8

UNIT—II

- V (a) A 30 cm diameter pipe, conveying water, branches in to two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s. Find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s. 7
- (b) A horizontal venturimeter has a main diameter of 300 mm and a throat diameter of 200 mm. The discharge is 10000 litres of water per minute when the difference of pressure heads between the inlet and throat is 1.5 m of water. Find the coefficient of the venturimeter. 8

OR

- VI (a) Find the discharge through a trapezoidal notch which is 1.5 m wide at the top and 0.5 m at the bottom and is 500 mm in height. The head of water on the notch is 250 mm. Assume C_d for rectangular portion as 0.62 and 0.6 for triangular portion. 7
- (b) Calculate the discharge through a pipe of diameter 200 mm when the difference of pressure head between the two ends of a pipe 500 m apart is 4 m of water. Take coefficient of friction $f = 0.009$. 8

UNIT—III

- VII (a) A centrifugal pump is required to lift water to a total head of 30 meters at the rate of 12.5 litres per second. Find the power required for the pump, if its overall efficiency is 74%. 7
- (b) Compare reciprocating pump and centrifugal pump. 8

OR

- VIII (a) A single acting reciprocating pump has a speed of 60 rpm. It has a plunger diameter of 200 mm and a stroke of 300 mm. The suction and delivery heads are 5 m and 16 m respectively. Determine the actual power required to drive the pump, if the efficiency of the pump is 70%. 7
- (b) Describe a gear pump with a neat sketch. 8

UNIT—IV

- IX (a) Explain the classification of hydraulic cylinder. 7
- (b) Explain the working of a 2-way sliding spool type direction control valve with a neat sketch. 8

OR

- X (a) Explain the elements of a pneumatic circuit with a neat diagram. 7
- (b) Describe the working of a pneumatically operated power chuck, with a neat sketch. 8