

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

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 the term surface tension.
2. Write the use of venturimeter.
3. State the function of hydraulic actuators.
4. List the types of directional control valve based on the number of ports.
5. State the Pascal's law.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Explain the following terms :
 - (a) Specific mass
 - (b) Specific weight
 - (c) Specific gravity
2. Explain the method of measuring the negative gauge pressure using U - tube manometer.
3. State the Bernoulli's theorem. Write down the assumptions made in the Bernoulli's equation.
4. Explain different energy losses in pipes.
5. List the components of a centrifugal pump, write the functions of each.
6. Illustrate the function of air vessels used in reciprocating pumps.
7. Explain the classification of air cylinders used in pneumatic systems.

(5×6 = 30)

PART — C

Marks

(Maximum marks : 60)

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

UNIT — I

- III (a) Explain different types of fluids. 8
- (b) A differential manometer is used to measure the difference of pressure of oil of specific gravity 0.75 contained in two pipes at the same level. The difference of the mercury level in U-tube is 120 mm. Find the difference of pressure of oil in the two pipes. 7

OR

- IV (a) Explain the method of measuring the pressure difference between two points using Inverted U-tube differential manometer. Assume that two pipes are at different level. 8
- (b) A rectangular plane surface 1.5m wide and 2.5m deep lies in water in such a way that its plane makes an angle of 30° with the free surface of water. Determine the total pressure on the surface when the upper edge is 2m below the free water surface. 7

UNIT — II

- V (a) A pipe of diameter 250 mm conveys 3000 liters of water per minute and has a pressure of 20kN/m^2 at a certain section. Find the total energy head with respect to a datum 5 meters below the pipe. 8
- (b) Describe the term Vena contracta. Write short notes on hydraulic coefficients. 7

OR

- VI (a) Calculate the discharge over a triangular notch of angle 60° when the head over the triangular notch is 0.3 meter. Assume C_d as 0.6. 8
- (b) Water flows through a pipe 150 mm diameter 70 meter long with a velocity of 3 m/s. Find the head lost in friction using Darcy's formula. Take friction factor as 0.005. 7

UNIT — III

- VII (a) A double acting reciprocating pump has a stroke 300 mm, piston diameter 150 mm, delivery head 25 meter and suction head 5 meter. If the pump is working at 60 rpm, find actual and theoretical power required to drive the pump. Efficiency of the pump is 75%. 8
- (b) Explain the working of an external gear pump with a neat sketch. 7

OR

- VIII (a) A centrifugal pump is required to lift water to a total head of 30 meters at the rate 10 liters per second. Find the power required for the pump, if its overall efficiency is 70%. 8
- (b) Explain the working of a rack and pinion type actuator with a neat sketch. 7

UNIT — IV

- IX (a) Explain the working of a three way spool type direction control valve with a neat figure. 8
- (b) Write any seven advantages of pneumatic system. 7

OR

- X (a) Explain the working of disc type poppet valve with a neat figure. 8
- (b) Explain the working of air lubricator with a neat figure. 7