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**THIRD SEMESTER DIPLOMA EXAMINATION IN
MECHANICAL ENGINEERING - NOVEMBER 2017**

FLUID MECHANICS & PNEUMATICS

MODEL QUESTION PAPER

[Time : 3 hours]

(Maximum Marks : 100)

PART - A

(Maximum marks : 10)

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

1. Define Capillarity
2. What do you mean by Vena Contracta
3. Define Water hammer
4. Define viscosity index
5. What is FRL Unit

(5 x 2 = 10)

PART - B

(Maximum marks : 30)

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

1. Define density, specific weight, specific Volume & Specific gravity?
2. Explain Absolute, gauge, atmospheric and vacuum pressure?
3. Explain Bernoulli's theorem and its limitation
4. Classify Major losses and minor losses of head in a pipeline?
5. What are the applications of hydraulic power
6. What are the functions of accumulators explain different types of accumulators?
7. Explain different type of air cylinders

(5 x 6 = 30)

PART - C

(Maximum marks : 60)

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

MODULE - I

- III**
- a) Sketch and Explain Bourden tube pressure gauge (7)
 - b) A rectangular plane surface 2m wide and 3m deep is 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 1.5m below the free water surface (8)

OR

- IV**
- a) Explain Metacentre and Metacentric height (6)
 - b) A U-tube Mercury manometer is connected to two pipes A & B. Pipe B is 60mm below pipe A. The specific gravity of liquid in Pipe A and B is 1.6 and 0.85 respectively. Mercury level in the left limb is 80mm below the centre of pipe A. Find the pressure difference between two

pipes in which. If the level difference of mercury in the two limbs of the manometer is 120mm. (9)

MODULE – II

- V a) Explain the terms hydraulic mean depth, hydraulic gradient line and total energy line? (7)
- b) A Ventury meter 200 x 100mm is used to measure the flow of water. Its axis is horizontal. The pressure at inlet is 170kpa and vacuum pressure at the throat is 250mm of mercury. Determine the rate of flow. Take Co-efficient of venturimeter $C_d=0.95$ (8)

OR

- VI a) Explain the energies possessed by a liquid particle and define total energy. (7)
- b) Water supply to a college campus having 3000 students from a reservoir which is built 5km away from Campus. Each student requires 200 litres of water/day. Half of the daily requirement is pumped in 8 hours. The diameter of the water supply pipe is 120mm. Determine the loss of head due to friction if Darcy's constant is 0.008. (8)

MODULE – III

- VII a) With sketch explain basic element of hydraulic system. (8)
- b) With sketch explain hydraulic circuit for Robotic arm. (7)

OR

- VIII a) What are the properties a hydraulic fluid should have? (7)
- b) Sketch and explain three way spool type directional control valve. (8)

MODULE – IV

- IX a) Compare pneumatic system with hydraulic system (8)
- b) With sketch explain the operation of manually operated three way valve (7)

OR

- X a) Draw the pneumatic symbols for the following (8)
- i) Air Oil reservoir
 - ii) Pressure source
 - iii) Air receiver
 - iv) Air drier
 - v) Silencer
 - vi) 3/2 way valve
 - vii) Regular
- b) With sketch explain power operated chuck (7)