

Course Code: ME-2301

Course Title: **Fundamental of Mechanical Engineering**

Time: 1 hour 30 minutes

Full Marks: 30

(i) Answer all the questions. The figures in the right-hand margin indicate full marks.

(ii) Course Outcomes (COs) and Bloom's Levels are mentioned in additional Columns.

Course Outcomes (COs) of the Questions	
CO1	Provide current knowledge, ideas and the conceptual framework of Mechanical engineering.
CO2	Demonstrate proficiency in solving basic mechanical Engine design problems.
CO3	Design of basic Mechanical Engine for application-specific troubleshooting, identifying the problem and providing a solution for the sustainable development of the society.

Bloom's Levels of the Questions						
Letter Symbols	R	Un	Ap	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

1) a) Differentiate between a fan, a blower and a compressor with their functions and applications. CO1 An 5

1) b) Calculate the density and specific weight of one liter of Diesel, which has an specific gravity of 0.85. CO1 C 5

2) a) Develop a pressure head equation for the diagram of Figure 2.1 and determine the height of water equivalent to the pressure of 0.6 MN/m^2 . CO1 C+E 5

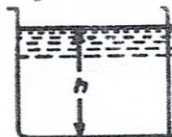


Figure: 2.1

2) b) The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of sp. Gr. 0.89 is flowing. Find the pressure of fluid in the pipe. CO1 E 5

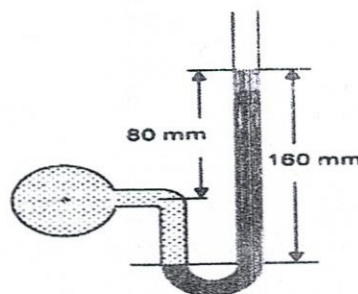


Figure: 2.2

- 3) a) Bernoulli states that "The speed of a moving fluid increases (liquid or gas), the pressure within the fluid decreases". Prove the statement from Euler's differential equation. CO1 E 5
- 3) b) The diameter of a pipe changes from 35cm at a section 3m above the datum to 120mm at a section 6m above the datum. The pressure of water in the first section is 0.8MPa. If the velocity of flow in the first section is 2.5 m/s, Determine the intensity of pressure in the second section. CO1 E 5

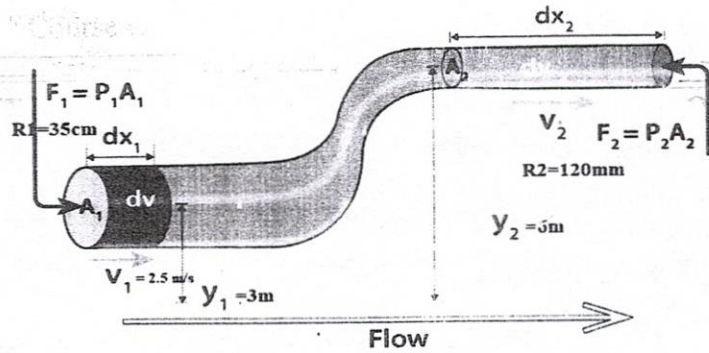


Figure 3.1

OR

- 3) a) State Continuity Equation. Justify the statement for a liquid flow through an irregular shape pipe. CO1 E 5
- 3) b) A pipe MN branches into two pipes O and P as shown in figure 3.1. The pipe has a diameter of 700mm at M, 65cm at N, 400mm at O, and 35cm CO1 E 5

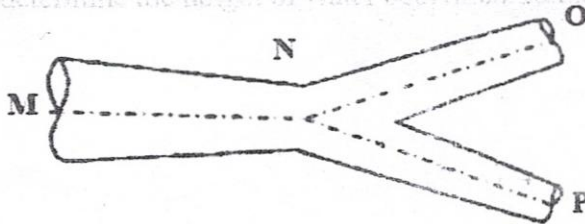


Fig: 3.1

at P. Determine the discharge at N if the velocity of water at N is 3.5m/s. Also determine the velocities at M and P if the velocity at O is 4.5m/s.