



Instruction

Duratio

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Part III

Answer any **Two(02)** Questions

01.

- I Express how did the experiments of Boyle, Charles, and Avogadro lead to the formulation of the perfect gas equation of state .
- II How many moles of gas (air) are in the lungs of an average adult with a lung capacity of 3.8 L?
(Assume that the lungs are at 1.00 atm pressure and a normal body temperature of 37 °C)
- III A 1.50 L steel container at 90 °C contains 5.50 g of H₂, 7.31 g of N₂, and 2.42 g of NH₃.
What are the partial pressures of each gas and the total pressure in the container?
- IV Assume that you have a cylinder with a movable piston. What would happen to the gas pressure inside the cylinder if you were to do the following?
 - a) Triple the Kelvin Temperature While Maintaining a constant Volume
 - b) Reduce the amount of gas by one-third while maintaining a Constant Temperature and Constant Volume
 - c) Decrease the volume by 45% at constant temperature

02

- I Give three (03) examples of chemical changes that also change the physical properties of a substance
- II Define Surface Tension
- III A needle has a length of 3.2 cm. When it is placed on a surface of the water ($\gamma = 0.073 \text{ Nm}^{-1}$), this needle will float if it is not too heavy. What is the weight of the heaviest needle that can be used in this demonstration?
- IV A student, produces a soap bubble whose radius is 1.0 mm using a circular loop of wire and a pan of soapy water. The surface tension of the soapy water is (γ) $2.5 \times 10^{-2} \text{ Nm}^{-1}$.
 - (a) Determine the pressure difference between the inside and outside of the bubble
 - (b) The same soapy water is used to produce a spherical droplet whose radius is one-half that of the above bubble. Find the pressure difference between the inside and outside of the droplet.

- I State the Bernoulli's principle
- II Explain the Bernoulli's equation for the flow of an ideal fluid in stream line motion.
- III Mention any two applications of Bernoulli's theorem
- IV Suppose that a huge tank of 50 m height and filled with water is open to the atmosphere. One side of the tank is hit with a bullet ,allowing water to flow out.The hole is 2 m above from the ground.If the hole is very small compared to the size of the tank,Calculate the velocity of water flow
- V Through a refinery, fuel ethanol is flowing in a pipe at a velocity of 1 ms^{-1} .The pressure at point A is 101300 Pa. However process need a pressure of 202600 Pa on a Point B. What is the height difference between point A and Point B ? .

