

ideas the attention they deserved. By the time those ideas gained traction, he passed away. Avogadro's law proved so critical to the advancement of chemistry, chemist Jean Baptiste Perrin named the number in his honor.

2. What is the Loschmidt's number? How is it related to Avogadro's number?

Type your response here: Loschmidt's number is the number of molecules in one cubic centimeter of an ideal gas at standard temperature and pressure, equal to  $2.687 \times 10^{19}$ . The value of the Avogadro constant was first indicated by Johann Loschmidt who estimated the average diameter of the molecules in air by a method that is equivalent to calculating the number of particles in a given volume of gas.

3. The mole and Avogadro's number are now almost synonymous with each other. We say that one mole of a substance is the amount that contains Avogadro's number of particles. However, both concepts were developed independently at different times. Analyze the theories and definition of both these concepts. Then, explain why it is correct to define a mole in terms of Avogadro's number and vise ferse.

Type your response here: Avogadro's number was first defined as the number of atoms in one gram of molecular hydrogen. It was recognized that this described one mole of the hydrogen atoms and that any a omic or molecular weight expressed in grades would contain the mole and have the same number of particles to, in describing a reaction, you know what the proportions atoms or molecules there are to react with. This is the very basis of the concept of a mole.

## Task 2: The mystery of the unknown substance

A prominent automotive businessman has been murdered in New York. The Crime Scene Investigation (CSI) team finds a bottle with some clear liquid at the scene of the crime. The label on the bottle has fallen off. The detectives believe that this bottle belongs to the killer, who dropped it there in a hurry to get away. Their suspects include the victim's business rival, his lawyer, and a theatre actress. The detectives think that if the CSI team can identify the liquid, they might be able to narrow down the suspects.

One of the CSI technicians has analyzed the liquid using a mass spectrometer and found that the compound has a molar mass of 58.0714 g. Further analysis has also revealed that the compound consists of 18 g of carbon, 3 g of hydrogen, and 8 g of oxygen.

Now, help the CSI team nab the killer. Answer the following questions to find the identity of the unknown substance.

1. What is the percent composition of all the components in the liquid?