Sriram Pendyala

Science Bowl

Chemistry Questions: Set #2: 30 Short Answer Questions CH 5,6

1. Chemistry: Short Answer: Calculate the pressure a pinhead applies to your skin if it pressed into your skin with a force of 20 N and the area at the tip of the pin is 1 square micron?

ANSWER: 20 million Pascals, 20 Megapascals

1. Chemistry: Short Answer: What is the name of the scientist who invented the barometer, a device to measure atmospheric pressure, in 1641 after experimentation with mercury and gases?

Answer: Toricelli

1. Chemistry: Short Answer: According to Boyle’s Law, a graphical plot of P (in mm Hg) versus V (in in3) will yield what type of curve?

ANSWER: Hyperbola

1. Chemistry: Short Answer: Deviations from Boyle’s law become greater exponentially when what factor is increased greatly?

ANSWER: Pressure

1. Chemistry: Short Answer: In 1787, it was found that extrapolation backwards on the x-axis for this law predicted an absolute zero temperature.

ANSWER: Charles Law

1. Chemistry: Short Answer: An ideal gas is a gas that is said to obey what gas law without inconsistencies?

ANSWER: Boyle’s Law

1. Chemistry: Short Answer: Name all the necessary attributes of a sample of gas for one to know its state.

ANSWER: Pressure, Volume, Number of Moles, Temperature

1. Chemistry: Short Answer: What is the name of the volume occupied by one mole of an ideal gas at Standard Temperature and Pressure?

ANSWER: Molar Volume

1. Chemistry: Short Answer: The molar mass of an ideal gas can be calculated using the ideal gas law. What is the necessary attribute of a gas that needs to be known at STP to calculate its molar mass?

ANSWER: Density

1. Chemistry: Short Answer: What law describing the function and behavior of gases essentially implies that, for a mixture of ideal gases, the total number of moles and not the identity or composition of gas particles is most important?

ANSWER: Dalton’s Law of Partial Pressures

1. Chemistry: Short Answer: To find the partial pressure of a particular component of a gaseous mixture, given the total pressure that mixture, one would need what measure of the concentration of that particular component?

ANSWER: Mole Fraction

1. Chemistry: Short Answer: According to the Kinetic Molecular Theory, what is the only factor that affects the average kinetic energy of gas particles?

ANSWER: Kelvin (absolute) temperature

1. Chemistry: Short Answer: Using the KMT model for gases, find the average kinetic energy of the gas molecules of oxygen gas if the gas is at a temperature of 1000 K.

ANSWER: 120 J

1. Chemistry: Short Answer: What is the name for the average distance a gas particle travels between collisions in a particular gas sample?

ANSWER: Mean free path

1. Chemistry: Short Answer: What is the name of the term used to describe the rate of mixing of gases when a barrier between gases is first removed?

ANSWER: Diffusion

1. Chemistry: Short Answer: A real gas exhibits behavior that is closest to an ideal gas at what range of temperatures and pressures?

ANSWER: Low pressures and High Temperatures

1. Chemistry: Short Answer: What was the name of the physicist that worked at the University of Amsterdam and was awarded a Nobel Prize in 1910 for his work on ideal gases?

ANSWER: Johannes van der Waals

1. Chemistry: Short Answer: In his real gas equation, van der Waals introduced correction factors to what to attributes of gases found in the ideal gas law?

ANSWER: Pressure and Volume

1. Chemistry: Short Answer: What is the name of the end product of the process where nitrogen oxides that result from the burning of fossil fuels accumulate in air to create ozone and reactive OH radicals?

ANSWER: Photochemical smog

1. Chemistry: Short Answer: What is a measure of the sum of the kinetic and potential energies of each particle in a particular system?

ANSWER: E, the internal energy

1. Chemistry: Short Answer: What is the name of the specific conditions that determine the way that energy transfer is divided between work and heat, for example, in a certain apparatus?

ANSWER: Pathway

1. Chemistry: Short Answer: A system which does work on its surroundings is undergoing what type of process relative to its internal energy?

ANSWER: Exothermic

1. Chemistry: Short Answer: If 5000 Joules of heat flow into a system from its surroundings, and that system then does 20 Kilojoules of work on its surroundings, what is its change in internal energy?

ANSWER: -15000 J, -15 kJ

1. Chemistry: Short Answer: If the internal energy of the surroundings decrease, what can be said of the change of the internal energy of the system?

ANSWER: It will be positive.

1. Chemistry: Short Answer: If one compresses a cylinder of gas with 16 atmospheres of constant external pressure that causes the 1 m2 piston to go down 0.25 meters, what is the work done on the system?

ANSWER: 4 Joules

1. Chemistry: Short Answer: For a process carried out at a constant pressure and where the only work allowed is that from a volume change, what thermodynamic function is defined as the heat flow in or out of the system?

ANSWER: Change in Enthalpy ΔH

1. Chemistry: Short Answer: If a student is doing a constant pressure calorimetry experiment, and observes the temperature in his apparatus to decrease after commencement, what can be said about the ΔH for that reaction?

ANSWER: It is positive.

1. Chemistry: Short Answer: What is defined as the heat required to raise the temperature of one mole of a substance by 1 °C?

ANSWER: Molar Heat Capacity

1. Chemistry: Short Answer: What is the name of the law that states that Enthalpy is a state function whose sign can be reversed if a reaction is reversed?

ANSWER: Hess’s Law

1. Chemistry: Short Answer: At what temperature and pressure is the standard enthalpy of formation of a molecule measured?

ANSWER: 1 atm and 25 °C