



calculus educational consults

MOTTO: BRINGING KNOWLEDGE TO YOUR DOORSTEP

CHM103: INTRODUCTORY PHYSICAL CHEMISTRY I

A ____ is a ratio that is equal to 1.

unit factor

____ are basically used for determining the melting points of substances.

Melting point tubes

The ____ thermometer is used as the Beckman's apparatus for determining the freezing point of a substance

Beckman

____ is used for measuring the strength of an acid or base

pH meter

____ is used for measuring pressure and can be found useful in Barometric method of measuring vapour pressure

barometer

____ is used for measuring the viscosity of a substance

An Ostwald viscometer

The formation of a solid from a solution is called **precipitation**.

____ is the process of separating a pure solid from a solution

Crystallisation

____ refers to a process in which the solid directly evaporates without it melting

sublimation

At high temperature and low pressure, gases tend to _____

expand

the S.I unit of pressure is _____

pascal (Pa)

The relationship between the volume and the pressure of a given mass of a gas at a given temperature is known as _____

Boyle's law

when the pressure is likely to vary linearly with the temperature. This observation describes what is called _____

Charles' law

the unit of temperature is called _____

kelvin

$pV=nRT$, the equation is known as _____

the equation of state for an ideal gas

The gas that obeys the gas laws exactly for all conditions of pressure and temperature is referred to as an _____

ideal gas

The individual pressure of a gas in a mixture of gases is called its _____
partial pressure.

Effusion is the passage of a gas through a small opening into an evacuated chamber

Graham's law states that the rates at which gases effuse are inversely proportional to the square root of their densities or molar masses under similar conditions of temperature and pressure

The central idea that gas molecules are in continuous motion is called a theory termed _____
kinetic theory of gas.

pressure is the _____
force per unit area

_____ is defined as the number of molecules of a gas in unit volume. We can obtain number density by rearranging the equation
Number density

The real gases obey ideal gas laws only at low pressures, and _____ temperatures
high

$$(P + \frac{a}{V^2})(V - nb) = nRT$$

this equation is referred to as _____

Van der Waals equation

when real gas that is subjected to high pressure and sufficiently low temperatures, the gas will liquefy but the temperature above which the gas will not liquefy no matter what pressure is applied. This temperature is called the **critical temperature (T_c)** of the substance

The pressure that is required to liquefy a gas at its critical temperature is called its **critical pressure (P_c)**

The volume occupied by one mole of a fluid at its critical temperature and pressure is called _____
critical volume (V_c)

Liquefaction is a process of making a gas or solid to become liquid

According to _____ effect when a gas under high pressure is to expand into a region of low pressure, its temperature falls

Joule-Thompson

Polar molecules can attract each other electrostatically. During this attraction the positive end of one molecule is close to the negative end of the adjacent molecule, such attraction is called _____
dipole-dipole interaction

_____ can explain the attractive forces between polar molecules at ordinary temperatures whereas at high temperatures it cannot

Dipole-Induced Dipole Interaction

The ability of a species to undergo electronic distortion is described in terms of _____
polarisability

Polar molecules have higher melting and boiling points than the non-polar molecules of similar molecular size

the solids can be of two types- Crystalline and _____
Amorphous.

Those solids, which are formed due to regular repetition of identical building blocks. are called _____
crystals

there are solids which do not appear to have any regular internal arrangement in every part and thus do not show regular shape: these are called **amorphous solids**

Lattice is defined as an arrangement of geometrical points in a definite pattern in space The **unit cell** is the fundamental unit in a crystal

Crystal planes are represented by certain numbers is known as _____
Miller indices

The structure of a **bcc crystal** can be defined in terms of unit cell-edge length and two unique positions in the cell.

In **molecular crystals**, the molecules are held together due to Van der Waals interaction

Semiconductors are solids which are insulators under normal conditions but become conductors when heated or doped with impurities.

The electrical conductivity of a semiconductor increases with **temperature** the

semiconductors can be classified into **two** types which are _____
Intrinsic Semiconductors
Extrinsic Semiconductors

Semiconductors with impurities are called _____ semiconductors
extrinsic

When a semiconductor is doped with an impurity having more valence electrons than those in the semiconductor, a _____ semiconductor is produced
n-type

The presence of a surface in a liquid gives rise to the phenomenon of **surface tension**

Some of the factors, which influence the magnitude of surface tension, are _____
Molecules having strong hydrogen-bonds have high surface tension
Metallic bonding also leads to high surface tension.

The dispersion forces are quite significant in molecules with large atoms and are often more important than **dipole-dipole forces**

Intermolecular forces give rise to capillary action.

The _____ forces are the intermolecular forces among the molecules of a liquid
cohesive

The amount of heat required at constant pressure to convert one mole of a solid into liquid at its melting point is called _____
molar enthalpy of fusion

the amount of heat required at constant pressure to convert one mole of a liquid into its vapour at its boiling point is called the _____

molar enthalpy of vaporization

The escape of molecules from the liquid surface to form vapour is called _____

vaporization or evaporation

As the temperature of a liquid **increases**, the average kinetic energy of the molecules also **increases**

The temperature at which the vapour pressure of a liquid equals the external pressure is called its _____
boiling point

At _____, the vapour produced in the interior of the liquid results in continuous bubble formation that is characteristic of boiling.

boiling point

The boiling point **increases** as external pressure **increases** and the boiling point **decreases** as external pressure **decreases**

The ratio of molar enthalpy of vaporization of a liquid to its boiling point is approximately _____
85 J mol⁻¹ K⁻¹

Gases and liquids are _____

isotropic

Smectic Liquid crystals have molecules arranged in parallel layers or planes.

Nematic Liquid Crystals have all the molecules within the same orientation

Cholesteric liquid crystals have a multiple layer structure. but each successive layer is inclined or twisted slightly

A **phase** is a homogeneous part of a system which is susceptible to change on certain conditions

Factors affecting Solubility of Gases are _____

Temperature

Pressure

Nature of the gas and the solvent

The partial vapour pressure of any volatile component in a solution is equal to the product of the vapour pressure of the pure component and its mole fraction in the solution is referred to as _____

Raoult's Law

A solution that obeys Raoult's law at all concentrations and at all temperatures is called an _____

ideal solution.

_____ are solutions that do not obey Raoult's law

Non Ideal Solutions

The vapour pressure of a solution containing 0.012 kg of a solute dissolved in 0.100 kg of water at 300 K is 3.50 x 10³ Pa. Calculate the molar mass of the solute, if the vapour pressure of water at 300 K is 3.70 x 10³ Pa.

0.040 kg mol⁻¹

In _____ method, the solvent or the solution is heated to its boiling point by passing the vapours of the solvent through them.

The Landsberger Method

The **number of components** (c) in a system is the smallest number of substances in terms of which the composition of all the phases in the system can be described separately

The **number of degrees of freedom** (F) or variance of a system is the smallest number of intensive variables, such as pressure, temperature and composition, which are to be specified to describe the state of the system completely

One of these is not a factor which affects the solubility of gases

Ans: concentration of solvent

Which of these is not correct about gaseous molecules

Ans: at very low pressures or high temperatures, the gases obey ideal gas equation and their z value is nearly equal to unity

When two liquids A and B are mixed completely there are three possibilities

Ans: Liquid A and liquid B vapourises in to vapour saturated all proportions

Which of these followings would lead to an increase in the internal energy of a system?

Ans: Work done on the system

Which of the following statements about enthalpy is incorrect?

Ans: Enthalpy and internal energy of a system are always identical

One of these is correct about common-ion effect

Ans: reduces ionization

the number of moles of the solute present in 1 dm³ of the solution refers to as _____

Ans: Molarity

"The _____ of a solute in a solution is the ratio of the number of moles of a solute to the total number of moles of the solute and the solvent in a solution

Ans: mole fraction

According to _____ the partial vapour pressure of any volatile component in a solution is equal to the product of the vapour pressure of the pure constituent and its mole fraction in the solution

Ans: Raoult's law

The process in which the solid directly evaporates without it melting is known as _____

Ans: sublimation

What does it mean if the ΔH value for a chemical reaction is positive?

Ans: reactants have less potential energy than products

Which of these is not an intermolecular force?

Ans: electrovalent bonding

The process of obtaining liquid from solid or gas through melting or condensation processes is appropriately described as

Ans: Liquefaction

The temperature above which the gas will not _____ no matter what pressure is applied is termed the critical temperature

Ans: liquefy

Ethanol has higher boiling point than butane although the latter has higher relative molecular mass because of"

Ans: hydrogen bonding existing between oxygen and hydrogen atoms of the ethanol functional group

In a reaction in which the rate of the reverse reaction is equal to the rate of the forward reaction, a state of _____ is attained.

Ans: dynamic equilibrium

Solids which are formed due to regular repetition of identical building blocks are called crystals

Ans: Crystalline solids

The electrical conductivity of a semiconductor increases with _____."

Ans: temperature

Which of the following involves a decrease in entropy?

Ans: the freezing of liquid water into ice

The pressure necessary to liquefy a gas at its critical temperature is called its _____"

Ans: critical pressure

The temperature at which the Joule-Thomson coefficient is zero for a gas is called _____"

Ans: inversion temperature

Which of these instruments measures the strength of acids and base

Ans: pH meter

Which of these is not correct about adiabatic expansion

Ans: internal energy increases

The _____ is defined as the temperature above which a substance can exist only in the gaseous state" Ans: critical temperature

All are basic physical quantities except _____"

Ans: Density

_____ state that a certain amount of gas at a constant pressure, its volume (V) is directly proportional to its absolute temperature (T)

Ans: Charles's law

If the initial volume of a gas was 500 mL at a pressure of 760 torr, when the volume is compressed to 450 mL, what is the pressure?

Ans: 844 torr

The rest of the universe around a system is described as"

Ans: Surroundings

The balloon used by Charles in his historic flight in 1783 was filled with about 1300 mole of H_2 . If the outside temperature was $21^\circ C$ and the atmospheric pressure was 750 mm Hg, what was the volume of the balloon?

Ans: 3.2×10^4 L

A sample of H_2 was prepared in the laboratory by the reaction: $Mg(s) + 2 HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$. 456 mL of gas was collected at $22.0^\circ C$. The total pressure in the flask was 742 torr. How many moles of H_2 were collected? The vapor pressure of H_2O at $22.0^\circ C$ is 19.8 torr.

Ans: 0.0179 mole

One of the following pair cannot constitute suitable pair for n-type conductor?

Answer: Antimony: Arsenic

One of the following is not true about n-type conductor

Answer: There is no chemical but physical interaction between the impurity and the semi conductor

One of the following is not a right pair for p-type semi conductor

Answer: Aluminium: indium

One of the following is not associated with the conductivity of semi conductors due to doping

Answer: o-type

One of the following is not a class of crystal solids

Answer: Hydrogen bonded

One of the following does not describe the crystal structure of metallic solid

Answer: Trigonal-close packing

The unit of one of the following quantity is a derived unit

Answer: Momentum of electron

When iron metal corrodes, its colour changes to _____

Answer: Brown

One of the following is not a chemical instrument

Answer: Filter paper

The pressure exerted by 0.5 cm³ of gas is 1 Pa at 273 K. If the temperature of the gas changes to 546 K and its pressure to 3 Pa, what will be the new volume of the gas

Answer: 0.3 cm³

One of the following combination does not match for gas law

Answer: Gay-Lussac law : Constant volume

If 3.00 litre sample of gas at 1.00 atm is compressed to 0.600 litre at constant temperature. Calculate the final pressure of the gas

Answer: 5.0 atm

Calculate the volume which 6.00 litres of gas at $0^\circ C$ will occupy at $125^\circ C$ at constant pressure

Answer: 8.75 litres

Calculate the volume occupied by 32 g of oxygen at stp

Answer: 44.8 dm³

One of the following is not correct

Answer: 1 atm = 1 Pa

Calculate the volume occupied by 0.0660 kg of carbon (IV) oxide gas at a temperature of 300.2 K and a pressure of 9.41×10^5 Pa assuming ideal behaviour

Answer: 0.0398 m³

Hydrogen bonding may not affect the physical properties of one of the following molecules

Answer: CsF

Which of the following pair does not agree with the kinetic theory of gases

Answer: Temperature = Average collision

The length of one axis of a cubic crystal is 0.05 cm. What is the length of the next minimum axis?

Answer: 0.05 cm

Which of the following is not true about Graham's law

Answer: Diffusion rate is proportional to density

Use Dalton's law to calculate the total vapour pressure exerted by a mixture of A and B if the following data were obtained; $X_A = 0.40$, $X_B = 0.60$, $P_A^0 = 1710$ mm/Hg and $P_B^0 = 127$ mm/Hg

Answer: 760 mm/Hg

Which of the following pair does not match?

Answer: Hexagonal: K₂O

Which of the following pair does not match?

Answer: Hexagonal: $a=b=c$

Which of the following salts can form a precipitate

Answer: AgCl

The value of the gas constant R is often expressed as $1.987 \text{ cal mol}^{-1} \text{ K}^{-1}$. Obtain its value in SI units (Given $1 \text{ cal} = 4.184 \text{ J}$)

Answer: 8.314 J/mol/K

16 g of oxygen gas occupies a volume of 22.4 dm³. Calculate the density of the gas

Answer: 0.000714 g/dm³

The concentration of an acid in a sample can be estimated by _____

Answer: Titration

Consider four gases whose densities are (i) 0.2, (ii) 0.4, (iii) 0.6 and (iv) 0.8 g/cm³. The order of diffusion will be

Answer: i > ii > iii > iv

The pressure of air in a system is 10 Pa and the volume occupied is 4 m³. If the volume is increased to 16 m³, what will be the new pressure

Answer: 2.5 pa

The order of intermolecular distance among the three state of matter is _____

Answer: Gas>liquid>solid

The product of pressure and volume of a gas at 300 K is 500 Pam³. Calculate the number of moles of the gas

Answer: 0.2

2 moles of water was mixed with 3 moles of ethanol. The ratio of the mole fraction of ethanol to that of water is _

Answer: 1.5

An ideal gas will not obey one of the following law

Answer: Van der waal

A real gas will obey one of the following law

Answer: Van der waal law

A solute was dissolved in two separate immiscible solvent. If 2.0g of the salt dissolve in the first solvent and 4.0g dissolved in the second solvent. Calculate the partition coefficient if the two solution are combined together

Answer: 0.5

Modern approach to chemistry deals with equilibrium properties, ability to change and _____

Answer: Structure

Physical Chemistry is concern with two major aspects, namely ability to change and ••••••••_____

Answer: Equilibrium properties

International system of unit or systeme internatwnale can be written as an acronym _____

Answer: SI unit

Temperature, length, time and mass are examples of _____

Answer: basic quantities

Meter, kelvin, second and kilogram are examples of _____

Answer: Basic units

A skilful process of identifying, substituting and using correct apparatus appropriately in the laboratory is called _

Answer: Instrumentation

Apparatus that are basically used for determining the melting points of substances are called _____

Answer: melting point tubes

FBQ8: The Beckman thermometer is used in the Beckman's apparatus for determining _____ of a substance

Answer: Freezing point

_____ is an instrument that can be used to measure the strength of an acid or a base

Answer: pH meter

A homogenous materials that contain only one substance is called a _____

Answer: pure substance

Constituents in a solution can be separated by applying the principle of _____

Answer: Equilibrium

The process of separating a pure substance from a solution is called _____

Answer: crystallization

In a gas, the molecules on the average are separated by large _____ distances

Answer: Intermolecular

_____ is a state of matter that does not have a definite shape nor volume

Answer: Gas

At constant temperature, the gas law that is most suitable is called _____ law

Answer: Boyle's

At constant pressure, properties of gases that undergo changes are _____

Answer: volume and temperature

A gas that obeys all the gas laws is called an _____

Answer: ideal gas

At high temperature and low pressure, gases tend to undergo phenomena that is called _____

Answer: Expansion

At low temperature and high pressure, gases tend to _____

Answer: Contract

The temperature, above which a substance can exist only in gaseous state is called _____

Answer: Critical temperature

The mathematical equation for Boyle's law can be written as _____

Answer: $PV = \text{constant}$

The mathematical equation for Charles law can be written as _____

Answer: $V/T = \text{constant}$

A plot showing the variation of volume with temperature at constant pressure is called _____

Answer: An isobar

An expression for the combined gas law can be expressed as _____

Answer: $PV/T = \text{constant}$

The equation of ideal gas can be expressed as _____

Answer: $PV = nRT$

Numerical value of the universal gas constant is _____ J/K/mol

Answer: 8.314

The volume occupied by 1 mole of oxygen gas at s.t.p. is _____ dm³

Answer: 22.4

The individual pressure of a gas in a mixture of gases is called _____

Answer: Partial pressure

The gas law that considers the total pressure of a gas as a function of the pressures exerted by the individual gases that make up the mixture is _____

Answer: Dalton law of partial pressure

For 1 mole of an ideal gas, a plot of PV against T will give a straight line whose slope is equal to _____

Answer: 8.314

The rate at which gases diffuse is inversely proportional to the square root of their _____

Answer: Densities

The gas law that explains the effusion of gas is _____

Answer: Graham law

Gas molecules confined to a container are in a state of _____ motion

Answer: Constant

At relatively low pressure, there are no _____ forces between gas molecules

Answer: Intermolecular

_____ of a gas is proportional to the mean kinetic energy of the molecules in a gas

Answer: Absolute temperature

The electrical conductivity of a semiconductor increases with _____.

Answer: Temperature

When the temperature is lowered, gases tend to _____

Answer: Contract

The gas that obeys the gas laws exactly for all conditions of pressure and temperature is referred to as an _____

Answer: Ideal gas

Which law does the mathematical expression represent, $PV = nRT$,

Answer: Ideal gas law

The total pressure exerted by a mixture of two different gases is equal to the sum of the individual pressures of the two different gases. Which gas law is this?

Answer: Dalton's Law of Partial Pressures or Dalton's Law

_____ is the passage of a gas through a small opening into an evacuated chamber

Answer: Effusion

The diffusion depends greatly on the _____ of the gas molecules.

Answer: Masses

The absolute temperature of a gas is proportional to the mean kinetic energy of the molecules present in it. TRUE or FALSE

Answer: TRUE

One application of Graham's law is the gaseous diffusion method of separating _____

Answer: Isotopes or Isotope

If the _____ is reduced sufficiently, the boiling point of a liquid may even fall below the melting point of a solid whereby the substance is said to be sublime

Answer: Pressure

The _____ rule with reference to phase study is that phase with the lowest chemical potential, is the stable phase

Answer: Golden

The number _____ of a system is the smallest number of intensive variables which are to be specified to describe the state of the system completely

Answer: Degrees of freedom or Variance

Intensive property is one whose magnitude is independent of the _____ of the system

Answer: Size

An _____ is one whose magnitude is additive for subsystems

Answer: Extensive property

The _____ in a system is the smallest number of substances in terms of which the composition of all the phases in the system can be described separately

Answer: Number of components

Lowering of vapour pressure is not a colligative property. TRUE or FALSE

Answer: FALSE

According to _____ law relative lowering of vapour pressure is equal to the mole fraction of the solute

Answer: Raoult's

The _____ of the solution containing a non-volatile solute is higher than that of the pure solvent.

Answer: Boiling point

The addition of a non-volatile solute to a solvent _____ the vapour pressure of the solvent

Answer: Decrease

The temperature at which the solubility becomes complete is referred to as the _____

Answer: Consolute temperature or Critical solution temperature

A pair of immiscible liquids boils at a temperature lower than the _____ of any of the liquids

Answer: Boiling points

Water and carbon tetrachloride are miscible in all proportion. TRUE or FALSE

Answer: FALSE

The _____ is a process of purifying organic liquids which have high boiling points and are immiscible with water

Answer: Steam distillation

Non-ideal solutions do not obey Raoult's law. TRUE or FALSE

Answer: FALSE

A _____ is a homogeneous part of a system which is susceptible to change on certain conditions

Answer: Phase

the ratio of molar enthalpy of a liquid to its boiling point is known as _____

Answer: Trouton's rule

_____ is the name given to the theoretical frame that throws light on the baseline of the experiment.

Answer: Theory

_____ is the process of separating a pure solid from a solution.

Answer: Crystallization

The constant bombardment of gas molecules against the walls of the container gives rise to _____

Answer: Pressure or Gas pressure

Convert 24 °C to Kelvin _____

Answer: 297.15 K

Find the volume occupied by 0.0660 kg of carbon (IV) oxide gas at a temperature of 300.2 K and a pressure of 9.41 x 10 Pa assuming ideal behaviour. _____

Answer: 0.0398

The mass of the solute that can be dissolved in 0.100 kg of a solvent to form a saturated solution at a given temperature is called its _____.

Answer: Solubility

In the band theory of metals, a crystalline metallic solid is considered as a _____.

Answer: Single giant molecule

_____ is defined as the number of moles of solute present in one kilogram of solvent.

Answer: Molality

The escape of molecules from the liquid surface to form vapour is called _____.

Answer: Evaporation or Vaporization

A unit factor is a ratio that is equal to _____

Answer: 1

Which of these apparatus is basically used for determining the points at which a solid substance turns to a liquid substance?

Answer: Melting point tube

vapour pressure can be measured using one of the following apparatus

Answer: Barometer

_____ is for the measurement of the strength of an acid or base

Answer: pH meter

mixtures are separated using appropriate techniques which depend on all of the following except:

Answer: Percentage purity of the substance

One of these is not a main separation process for separating mixtures

Answer: sieving

The process in which the solid directly evaporates without it melting is known as _____

Answer: sublimation

Which of these techniques is not a separation techniques for separating mixtures?

Answer: electroanalytical

One of these substances cannot undergo sublimation

Answer: CaCl_2

A substance which has mass and occupies space is appropriately described as _____

Answer: Matter

The _____ is defined as the temperature above which a substance can exist only in the gaseous state.

Answer: critical temperature

A sample of H_2 was prepared in the laboratory by the reaction: $\text{Mg(s)} + 2 \text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$. 456 mL of gas was collected at 22.0°C and the total pressure in the flask was 742 torr. How many moles of H_2 were collected? The vapour pressure of H_2O at 22.0°C is 19.8 torr.

Answer: 0.0179 mole

The relationship between the volume and the pressure of a given mass of a gas at a given temperature is known as _____

Answer: Boyle's law

For a certain amount of gas at a constant pressure, its volume (V) is directly proportional to its absolute temperature (T). The relationship between temperature and volume describes _____

Answer: Charles law

_____ states that the rates at which gases effuse are inversely proportional to the square root of their densities or molar masses under similar conditions of temperature and pressure

Answer: Graham's law

One of these statements is incorrect about the postulate of kinetic theory of gas

Answer: At relatively low pressure, there are strong intermolecular forces between the molecules

Which of these is a vector quantity?

Answer: Velocity

One of these is not an intensive variables

Answer: Volume

One of these is not correct about Colligative properties

Answer: Colligative properties are dependent of the nature of the solute

Determination of Boiling Point Elevation may be done using one of the methods listed below:

Answer: Landsberger Method

Determination of vapour pressure lowering can be achieved by one of the methods

Answer: Dynamic Method

The temperature at which a pair of partially miscible liquid becomes completely miscible is called _____

Answer: critical solution temperature

The distribution or partition coefficient, K , of the solute between the two solvents, depends on all the following except;

Answer: Pressure

One of the following is incorrect about purification process of an impure compound by steam distillation.

Answer: Must be miscible in water

An _____ solution is one which can be formed from two constituents with no evolution or absorption of heat and whose volume is the sum of the volumes of each of the constituents

Answer: ideal binary

_____ states that the partial vapour pressure of any volatile component in a solution is equal to the product of the vapour pressure of the pure constituent and its mole fraction in the solution

Answer: Raoult's law

Which of these is not a characteristic properties of liquids?

Answer: Closely packed and very orderly crystal structure

All are factors affecting solubility of gases except

Answer: concentration

One of the following pair cannot constitute suitable pair for n-type conductor?

Answer: Antimony: Arsenic

A gas sample contains 4.0 g of CH_4 and 2.0 g of He; the volume of the sample at STP is _____ dm^3 . ($C = 12$, $H = 1$, $\text{He} = 4$, $G.M.V = 22.4 \text{ dm}^3$)

Answer: 5.6

One of the following is not associated with the conductivity of semi conductors due to doping

Answer: o-type

Calculate the volume occupied by 0.0660 kg of carbon (IV) oxide gas at a temperature of 300.2 K and a pressure of $9.41 \times 10^5 \text{ Pa}$ assuming ideal behaviour

Answer: 0.0398 m^3

If 3.00 litre sample of gas at 1.00 atm is compressed to 0.600 litre at constant temperature. Calculate the final pressure of the gas

Answer: 5.0 atm

The pressure exerted by 0.5 cm^3 of gas is 1 Pa at 273 K. If the temperature of the gas changes to 546 K and its pressure to 3 Pa, what will be the new volume of the gas

Answer: 0.3 cm^3

One of the following is not a class of crystal solids

Answer: Hydrogen bonded

The temperature above which a gas will not liquefy no matter what pressure is applied is known as

Ans: Critical temperature

The plot of solubility against temperature is called the _____

Ans: Solubility curve

_____ is the fundamental unit in a crystal.

Ans: Unit cell

In Charles' law, the volume of a gas _____ when the temperature decreases

Ans: decreases

The escape of molecules from the liquid surface to form vapor is called

Ans: Evaporation Or Vaporization _____

In fractional distillation, the process of successive vaporization and condensation is carried out in a _____

Ans: Fractionating column

A liquid that has high viscosity flows slowly, true or false?

Ans: true

In the kinetic molecular theory of gas behavior, collisions between them are _____ (elastic/inelastic)

Ans: elastic

According to the kinetic theory, the kinetic energy of a gas is a measure of its

Ans: temperature

_____ is used for measuring the viscosity of a substance.

Ans: Ostwald viscometer

A temperature of 125 °C is the same as _____ K.

Ans: 398

The SI unit for energy is _____

Ans: Joule

A gas sample contains 4.0 g of CH_4 and 2.0 g of He; the volume of the sample at STP is _____ dm^3 . (C = 12, H = 1, He = 4, G.M.V = 22.4 dm^3)

Ans: 5.6

Air as a mixture of gases. Thus it is a _____ phase system

Ans: Single

The entropy of vaporization is almost the same value for various kinds of liquids at their boiling point. This statement is known as _____

Ans: Trouton's rule

The rates at which gases effuse are inversely proportional to the square root of their densities or molar masses under similar conditions of temperature and pressure. This is _____

Ans: Boyle's

_____ is used to measure the strength of an acid or base.

Ans: pH meter

According to _____ law, when the pressure of a gas increases at constant temperature, its volume decreases.

Ans: Boyle's

At STP, the number of moles of helium that would occupy 1 dm^3 is _____ moles.

Ans: 0.0446

The type of bond that exists in water and hydrogen fluoride is _____

Ans: Hydrogen bond

The SI unit of temperature is _____

Ans: Kelvin

The gas molecules confined to a container are in a state of constant rapid random motion. True or false?

Ans: true

_____ is a regular periodic arrangement of points in space.

Ans: Lattice

A thermometer is usually filled with _____

Ans: mercury

Number of moles present per dm^3 of a substance is called _____

Ans: Molarity or molar concentration

The solubility of a gas in a liquid is measured in terms of _____

Ans: Absorption coefficient or Bunsen coefficient

The amount of heat required at constant pressure to convert one mole of a liquid into its vapor at its boiling point is

called the _____

Ans: Molar enthalpy of vaporization.

The opposite of vaporization is called _____

Ans: condensation

When a solute present in a solution is in very minute amounts, the concentration is usually expressed in _____

Ans: Parts per million (ppm)

_____ is defined as the number of solute present in 1 L of the solution.

Ans: Molarity

Electric resistance is measured in _____

Ans: Ohm

An ideal solution obeys _____ law at all temperatures.

Ans: Raoult's

A solid becomes liquid by _____

Ans: Melting

The formation of a solid from a solution is called _____

Ans: Precipitation

Crystal planes are represented by certain numbers known as _____

Ans: Miller indices

_____ is formed when atoms are attached regularly to each lattice point.

Ans: Crystal

The valence bond approach corresponds to the _____

Ans: Bond model

Real gases obey ideal gas laws only at _____ pressures and high temperatures.

Ans: Low

The temperature at which the vapor pressure of a liquid equals the external pressure is called its _____

Ans: Boiling point

The process of separating a pure solid from a solution is known as _____

Ans: Crystallization

The pressure that is required to liquefy a gas at its critical temperature is called its _____

Ans: Critical pressure

The stable form of sulphur at ordinary temperature and under one atmospheric pressure is _____ sulphur

Ans: Rhombic

_____ is the ratio of molar enthalpy of a liquid to its boilingpoint. Ans:

Trouton's rule

_____ is defined as the number of moles of solute present in one kilogram of solvent.

Ans: Molality

_____ is a physically distinct and homogenous part of the system that is mechanically separable from other parts of the system.

Ans: A phase

The translational energy of an ideal gas is independent of the type and pressure of the gas. True or false?

Ans: true

Which is more effective, Claude's method or Linde's method of liquefaction of gases? Ans:

Claude's method

In the band theory of metals, a crystalline metallic solid is considered as a _____

Ans: Single giant molecule

The mass of the solute that can be dissolved in 0.100 kg of a solvent to form a saturated solution at a given temperature is called its _____

Ans: solubility

The rates at which gases effuse are inversely proportional to the square root of their densities or molar masses under similar conditions of temperature and pressure. This is a statement of _____

Ans: Graham's law of effusion

The SI unit for frequency is _____

Ans: Hertz

Velocity is a vector quantity. True or false?

Ans: true

The separation methods which is based on the difference in boiling points of liquids is _____

Ans: distillation or fractional distillation

At relatively low pressure, there are no intermolecular forces between the molecules. True or false?

Ans: true

Ideal solutions can be separated into two fractions by _____

Ans: Fractional distillation

The unit of temperature is used in gas law calculations is _____

Ans: Kelvin or K

The volume of a gas with a pressure of 1.2 atm increases from 1.0 L to 4.0 L; the final pressure of the gas, assuming constant temperature, is _____

Ans: 0.3 atm or 0.3 atmospheres

A liquid will "wet" a surface if: _____

Ans: the forces between the molecules and the surface are greater than the forces between the molecules of the liquid

Which of the following statements is false?

Ans: Molecules of CH₄(g) at high pressures and low temperatures have no attractive Forces between each other.

The Henry's law constant for helium gas in water at 30 °C is 0.00037 M/atm. When the partial pressure of helium above a sample of water is 0.650 atm, the concentration of helium in the water is _____ M.

Ans: 0.000241

A solution is prepared by dissolving calcium chloride in water and diluting to 500.0 mL. If this solution contains 44 ppm chloride ions, the concentration of calcium ions is _____ ppm.

Ans: 22

Which of the followings will not diffract X-rays?

Ans: Gas

According to the kinetic theory of gases, a gas can be compressed much more than a liquid or solid because

Ans: the particles of a gas are very far apart

A mixture of iron filings and copper filings could best be separated by ...

Ans: magnetic separation

Which of these alkanes is expected to have the highest viscosity?

Ans: Decane

Which one of the following statements most accurately relates the properties of a liquid at room temperature with its intermolecular forces?

Ans: A liquid with Strong intermolecular forces will probably have a high surface tension and a high boiling point

Which measurement describes the pressure of a gas?

Ans: 725 mm Hg

What is the average speed (actually the root-meansquare speed) of a neon atom at 27 °C?

Ans: 610 m/s

An atom on the face-centre of a unit cell is shared by _____ unit cells

Ans: Two

Which of the followings is not a characteristic of an ideal solution?

Ans: It must be colourless

Distillation can be used to separate

Ans: a liquid from a solution

An ideal gas differs from a real gas in that the molecules of an ideal gas _____.

Ans: have no attraction for one another

Ethanol dissolved in water would be an example of _____

Ans: a solution between two miscible liquids

A sample of oxygen occupies 47.2 liters under a pressure of 1240 torr at 25 °C. What volume would it occupy at 25 °C if the pressure were decreased to 730 torr?

Ans: 47.8 L

The concentration of KBr in a solution prepared by dissolving 2.21 g of KBr in 897 g of water is _____ molal.

Ans: 0.0207

The vapor pressure of pure ethanol at 60 °C is 0.459 atm. Raoult's Law predicts that a solution prepared by dissolving 10.0 mmol naphthalene (nonvolatile) in 90.0 mmol ethanol will have a vapour pressure of _____ atm.

Ans: 0.413

In fractional distillation, a mixture of liquids is separated based on their

Ans: boiling points

Which of the following is not a colligative property?

Ans: Increase in latent heat

Which statement is true?

Ans: As temperature goes up, the solubility of solids goes up.

Which of these terms is not used to describe a solid which remains behind during a separation process?

Ans: residue

Which of these is not true of a lattice?

Ans: Lattice is present only in ionic solids

Which of these is not true about semiconductors?

Ans: They conduct under normal conditions

Which of the following descriptions is correct?

Ans: a suspension contains particles which will not settle out if the suspension is left standing

An ideal gas is contained in a volume V at temperature T. If the volume is doubled at constant pressure, the temperature will be _____.

Ans: Doubled

Which one of the following statements is not consistent with the kinetic-molecular theory of gases?

Ans: The average kinetic energies of different gases are different at the same temperature.

Which statement is false?

Ans: The density of a gas is constant as long as its temperature remains constant.

A sample of an ideal gas is held at constant temperature. If the pressure is decreased to $\frac{1}{2}P$, the volume will be _____.

Ans: Increased to 2V

A sample of nitrogen occupies 5.50 liters under a pressure of 900 torr at 25°C. At what temperature will it occupy 10.0 liters at the same pressure?

Ans: 269 °C

A sample of a salt and water solution is homogeneous throughout. Is this sample a mixture or a pure substance?

Ans: a mixture, because it can have a variable composition

Which of the following is a pure substance made up of one type of atoms?

Ans: An element

When a liquid is in equilibrium with its vapor in a closed container:

Ans: the rate at which molecules from the liquid phase enter the gas phase exactly equals the rate at which molecules from the gas phase pass into the liquid phase

In order to dissolve the greatest amount of sugar in a cup of water, you should _____.

Ans: use sugar crushed into small pieces, and heat the water

Which of the following is not true of a liquid's viscosity?

Ans: It increases with temperature

The kinetic energy of gas molecules is directly proportional to temperature in _____.

Ans: Kelvin

A separation technique which involves charging particles and then attracting them to oppositely charged metal plates is called _____ separation

Ans: electrostatic

Which of these is a derived physical quantity?

Ans: Area

Which of the following does not influence the magnitude of surface tension?

Ans: Ionic bonding

Which of the following statements is true about compounds and mixtures?

Ans: Unlike compounds, very little or no exchange of energy occurs during the formation of mixtures.

What is a compound?

Ans: A substance which is made up of two or more elements chemically joined together

Which of these is an amorphous solid?

Ans: Glass

Which of these mixtures is not a nearly ideal liquid mixture?

Ans: water and ethanol

Which of these is not crystalline

Ans: Polythene

A liquid that has high viscosity flows _____.

Ans: slowly

A container with volume 71.9 ml contains water vapor at a pressure of 10.4 atm and a temperature of 465°C. How many grams of the gas are in the container?

Ans: 0.222 g

Which one of the following can be separated by adding water, stirring and filtering?

Ans: Sulfur and sugar

A mixture of graphite and diamond constitutes _____ phases

Ans: two

The molarity of urea in a solution prepared by dissolving 16 g of urea (MW = 60.0 g/mol) in 39 g of H₂O is _____ M. The density of the solution is 1.3 g/mL.

Ans: 6.3

The mole fraction of He in a gaseous solution prepared from 4.0 g of He, 6.5 g of Ar, and 10.0 g of Ne is _____.

Ans: 0.6

Which of these describes what happens when water freezes?

Ans: all of the above

In filtration, the term 'filtrate' refers to _____

Ans: the liquid that drains through the filter paper.

A gas occupies a volume of 2.4 L at 14.1 kPa. What volume will the gas occupy at 84.6 kPa?

Ans: 0.40 L

The gaseous mixture is a _____ phase system.

Ans: one

Standard temperature and pressure (STP) refers to which conditions?

Ans: 273 K and 1 atm

Fractional distillation cannot be used to _____

Ans: test the purity of a substance

The density of a crystal depends on all the following except

Ans: its geometry

Which of these assumes the shape of its container?

Ans: Liquid

One of the followings is not true of liquids.....

Ans: The inability of a liquid to flow enables it to assume the shape of the container

surface tension _____ with _____ in temperature

reduces/increases

the phenomenon of surface tension is as a result of the presence of _____ in a liquid surface

_____ is the temperature at which vapour pressure of a liquid equals the external pressure
boiling point

which of these is not true of a semiconductor?

they are just insulators

an increase in temperature of a liquid _____ the average kinetic energy of the molecules

increases

a semi empirical equation that describes the relationship between temperature and vapour pressure for pure component is _____ equation

Antoine

electrical conductivity of a semiconductor _____ with temperature

increases

which of these has a higher surface tension at 298 K?

mercury

the valence electrons of the impurity used for doping is less than that of the semi-conductors, the impurity can _____ to/from valence bond of the semiconductor

accept electrons

solids are different from gases in that they _____

have definite shape

if a quarter of an atom belongs to one unit cell, then the atom is the _____ of a unit cell

edge center

which of these is not true of an amorphous substance?

has regular shape

the arrangement of geometrical points in a definite pattern in space best describes a _____

lattice

the density of a crystal is dependent on the following with respect to the unit except _____

number of neutrons

crystal planes are represented by certain numbers called _____

Miller indices

centers of three adjacent corners and a corner is characteristic of a _____

fcc structure

ionic bond, II. covalent, III. van der Waals attraction. Which of these chemical bonds is associated with the valence electrons of the atoms in a crystal?

I, II, III

the radioactive decay is a _____ order reaction

first

the state of a substance in which the neighbouring particles' movement is restricted with respect to its neighbours is called _____

solid state

an atom on the face-center of a unit cell is shared by _____ unit cell(s)

2

Convert 82 cm to its equivalent value in SI unit.

Answer: 0.82 m

The Bragg equation is useful in the _____ studies of X-rays by crystals.

Answer: Diffraction

Which of the following is correct?

Answer: 293 K

The SI unit of a physical quantity should be/have _____.

Answer: space between the magnitude and the unit symbol of a physical unit

Suppose 15.0 g of substance Y occupies a volume of (37 cm^3) , what will be its density in SI units?

Answer: (405.40 kg/m^3)

The following are dimensions of gas constant except _____.

Answer: mass of substance

Electrical conductance can be said to be _____ proportional to electric resistance.

Answer:inversely

Which of these is the odd one out?

Answer:Volume

Temperature is _____ related to heat.

Answer:directly

The SI unit for Luminous intensity is _____.

Answer:candela