

CHE201 MID TERM PAST PAPER
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- 1) Describe le chatlier principle in change of temperature ,concentrations and pressure?
- 2) .Water is universal solvent due to **polarity**
- 3) Enthalpy is a **state.....function**
- 4) Two systems that are each found to be in thermal equilibrium with a third system will be found to be in thermal equilibrium with each other is **Zeroth**..... law.
- 5) **Thermodynamics** ----- is the study of heat, work, energy, and the changes they produce in the states of systems.
- 6) Homogeneous part of a system is called **Phase**
- 7) Freezing point is aproperty **colligative property**
- 8) The proportional relation in Charles law is between the V and the ... **P...**
- 9) Enthalpy is a state function when **pressure is constant**
- 10) **Surface tension** is the energy required to increase the surface area of a liquid by a unit amount.
- 11) When atoms in a molecule share electrons unequally, they create what is called a **dipole moment**
- 12) If a dynamic equilibrium is disturbed by changing the conditions, the position of equilibrium moves to counteract the change is called... **Le Chatelier's Principle**
- 13) Measurement of the relative amount of the products and reactants in a reaction at given time is called... **The Reaction Quotient**
- 14) Gibbs free energy is ... **state function** Of a system.
- 15) .Oxydation of gold is example of ... **nonspontaneous**..... reaction.
- 16) Fugacity Measures ... **Nonideality**.....of a Gas.
- 17) Thermochemistry study **chemical properties**.
- 18) Calorimetry is study of change I **heat and temperature**
- 19) Charls law of gas at constant pressure **absolute temperature**
- 20) Measurment of relative amount of product present In a given time is called..... **reaction quotient**
- 21) Water is universal solvent due to-----? **polarity**

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- 22) Oxidation of gold is -----? **Non spontaneous process**
- 23) Two systems that are each found to be in thermal equilibrium with a third system will be found to be in thermal equilibrium with each other. law? **Zeroth law**
- 24) In calorimetry we study the change in? **heat**
- 25) Freezing point is aProperty? **colligative**
- 26) The magnitude of force that controls the shape of the liquid is called? **Surface tension**
- 27) Best example of dipole moment is found in? **Water**
- 28) The amount needed to increase the temperature of one mole of a substance is called? **Molar heat capacity**
- 29) Gibbs free energy is a? **state function**
- 30) Fugacity Measuresof a Gas. **Non ideality**
- 31) $Pv = nRT$? **Ideal gas equation.**
- 32) Two thermodynamics systems in equilibrium have same -----? **Temperature**
- 33) If we bring any change at equilibrium the system compensate for change this is called? **Le Chatelier's Principle**
- 34) The mass/volume percentage is express the-----? **Concentration of a solution**
- 35) The quantitative study of heat changes is called-----? **Thermochemistry**
- 36) The system in which heat change is positive ? **Exothermic**
- 37) **What is chemical system?**
A chemical system can be studied from either a microscopic or a macroscopic viewpoint. The microscopic viewpoint is based on the concept of molecules.
- 38) **What is Gibbs free energy?**
The Gibbs free energy of a system at any moment in time is defined as the enthalpy of the system minus the product of the temperature times the entropy of the system. $G = H - TS$
- 39) **Difference between open, closed and isolated system?**
The macroscopic part of the universe under study in thermodynamics is called the System The parts of the universe that can interact with the system are called the surroundings. **Open system** is one where transfer of matter between system and surroundings can occur. **Closed system** is one where no transfer of matter can occur between system and surroundings. **Isolated system** is one that does

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not interact in any way with its surroundings. An isolated system is obviously a closed system, but not every closed system is isolated.

40) Applications of equilibrium constant?

1 The magnitude of the equilibrium constant, K , indicates the extent to which a reaction will proceed: If K is a large number, it means that the equilibrium concentration of the products is large. In this case, the reaction as written will proceed to the right (resulting in an increase in the concentration of products)

If K is a small number, it means that the equilibrium concentration of the reactants is large. In this case, the reaction as written will proceed to the left (resulting in an increase in the concentration of reactants). Knowing the value of the equilibrium constant, K , will allow us to determine: The direction a reaction will proceed to achieve equilibrium The ratios of the concentrations of reactants and products when equilibrium is reached

2. Predicting the Direction of a Reaction

If $Q = K_c$, then the system is already at equilibrium

If $Q > K_c$, then essentially we have too much product and the reaction will proceed to the left (to reduce the concentration of product and increase the concentration of reactant)

If $Q < K_c$, then essentially we have too little product and the reaction will proceed to the right (to produce more product and decrease the concentration of reactant)

41) Why ideal gas equation failure? Also describe corrections?

we get the ideal gas equation: $pV = nRT$ for ideal gas it is assumed as Ideal gas particles occupy negligible volume Ideal gas has negligible intermolecular interactions Ideal gas equation shows deviations from Avogadro's Hypothesis Boyle's Law Charles' Law So it's called Failures of ideal gas equation So van der Waals in 1873 modified the ideal-gas equation to give the van der Waals equation for real gases Van der Waals: Modified from ideal gas equation Accounts for: Non-zero volumes of gas particles (repulsive effect) Attractive forces between gas particles (attractive effect) Attractive effect Pressure = Force per unit area of container exerted by gas molecules

Dependent on:

Frequency of collision

Force of each collision

Both factors affected by attractive forces

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Each factor dependent on concentration (n/V)

Hence pressure changed proportional to $(n/V)^2$

Letting a be the constant relating p and (n/V) Pressure term, p , in ideal gas equation becomes $[p + a(n/V)^2]$

42) Describe le chatelier principle?

Le Châtelier's principle states that any change to a system at equilibrium will adjust to compensate for that change.

Le Chatelier's principle describes what happens to a system when something momentarily takes it away from equilibrium. We focus on three ways in which we can change the conditions of a chemical reaction at equilibrium:

- (1) changing the concentration of one of the components of the reaction
- (2) changing the pressure on the system
- (3) changing the temperature at which the reaction is run.

43) Viscosity

Viscosity is defined as a liquid's resistance to flow. Viscosity is also often referred as the thickness of a fluid.

44) bomb calorimetry

process takes place at constant volume, the reaction vessel must be constructed to withstand the high pressure resulting from the combustion process, which amounts to a confined explosion. The vessel is usually called a "bomb", and the technique is known as bomb calorimetry

45) Define physical chemistry?

Physical chemistry is the study of the underlying physical principles that govern the properties and behavior of chemical systems

46) Van der waal equation for real gasses?

As the ideal gas equation deviates from gas laws So van der Waals in 1873 modified the ideal-gas equation to give the van der Waals equation for real gases

Van der Waals: Modified from ideal gas equation

Accounts for: Non-zero volumes of gas particles (repulsive effect)

Attractive forces between gas particles (attractive effect) Attractive effect

Pressure = Force per unit area of container exerted by gas molecules

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Both factors affected by attractive forces

Each factor dependent on concentration (n/V)

Hence pressure changed proportional to $(n/V)^2$

Letting a be the constant relating p and (n/V)

Pressure term, p , in ideal gas equation becomes

$[p + a(n/V)^2]$

Repulsive effect: Gas molecules behave like small, impenetrable

spheres Actual volume available for gas smaller than volume of

container, V Reduction in volume proportional to amount of gas, n Let

another constant, b , relate amount of gas, n , to reduction in volume

Volume term in ideal gas equation, V , becomes $(V - nb)$ Combining

both derivations...

We get the Van der Waals Equation

$$\left[p + a \left(\frac{n}{V} \right)^2 \right] [V - nb] = nRT$$

OR

$$\left[p + \frac{a}{V_m^2} \right] [V_m - b] = RT$$

remember me in your prayers
thanks