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| Division | 11th |
| Subject | Chemistry |
| Chapter | Equilibrium |
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| Category | 2 |

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| If the value of an equilibrium constant for a particular reaction is , then at equilibrium the system will contain  (2018) |
| all reactants |
| mostly reactants |
| mostly products |
| similar amounts of reactants and products |
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| For a reaction  ˃˃  So, mostly the product will be present in the equilibrium mixture. |
| Equilibrium in physical processes |

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| If the equilibrium constant for is , the equilibrium constant for will be,  (2015) |
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| k |
| K2 |
| a |
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| We can find equilibrium constant for the required reaction with the help of mentioned equilibrium constant in the problem.  Given, equilibrium constant for the reaction,  Let equilibrium constant for the reaction,  i.e.,  On squaring both sides  On comparing Eqs. (i) and (ii), we get |
| Equilibrium in physical processes |

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| For the reaction, , the equilibrium constant is . The equilibrium constant is for the reaction, . What is for the reaction, ?  (2019) |
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| b |
| Equilibrium in chemical processes |
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| Equilibrium in chemical processes |

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| If the concentration of ions in the reaction,  is decreased by times, then equilibrium concentration of will increase by  (2007) |
| 8 times |
| 16 times |
| 64 times |
| 4 times |
| c |
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| To maintain equilibrium constant, let the concentration of is increased times, on decreasing the concentration of by times  By dividing eq. (ii) by (i) we get  times |
| Equilibrium in chemical processes |

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| The value of equilibrium constant of the reaction,  is 8.0.  The equilibrium constant of the reaction,  will be  (2012) |
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| b |
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| From Eqs. (i) and (ii) |
| Dynamic nature of equilibrium |

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| The equilibrium constants of the following are  The equilibrium constant of the reaction  , will be  (2017) |
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| b |
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| *Given, ...i)*  *...(ii)*  *...(iii)*  *To calculate,*  *On reversing the equation (i) and multiplying the equation (iii) by 3 , we get*  *Now, add equation. (ii), (v) and (vi), we get the resultant equation. (iv).* |
| Law of mass action |

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| In the two gaseous reactions (i) and (ii) at  (i)  (ii) the equilibrium constants and are related as  (2016) |
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| c |
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| For equation (i),  Now, on reversing equation (i), we get, |
| Law of mass action |

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| For the equilibrium,  which of the following expressions is correct  (2001) |
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| a |
| In heterogeneous system, and are not depend upon the concentration or pressure of solid substance |
| In heterogeneous system, and are not depend upon the concentration or pressure of solid substance. Hence, at equilibrium their concentration or pressure are assumed as one. |
| Equilibrium constant |

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| The equilibrium constants for the reaction, at and are and . The given reaction is |
| exothermic |
| slow |
| endothermic |
| fast |
| b |
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| For the reaction,  The value of equilibrium constant is very less and hence, the product concentration is also very less. So, the reaction is slow. |
| Factors affecting equilibrium |

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| can be prepared from as per reaction,  The reaction can go to completion by removing ions by adding  (2021) |
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| c |
| are generated from weak acid , and a weak acid (like should be used to remove it. |
| Since, are generated from weak acid , and a weak acid (like should be used to remove it. Because if we add strong acid like it reverses the reaction. increases the concentration of , thus again shifts the reaction in backward side. combines with to give carbonate which is easily removed.  reacts with water to give strong acid, so it cannot be used. |
| Factors affecting equilibrium |

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| For a reversible reaction, if the concentrations of the reactants are doubled, the equilibrium constant will be  (2011) |
| one-fourth |
| halved |
| doubled |
| the same |
| d |
| For this reaction, |
| Consider a hypothetical change,  For this reaction,  For the above reaction if concentration of reactants are doubled then the rate of forward reaction increases for a short time but after sometime equilibrium will established. So, concentration has no effect on equilibrium constant. It remains unchanged after increasing the concentration of reactants. |
| Postulates of Le Chatelier’s principle |

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| The reaction quotient for the reaction,  is given by  .  The reaction will proceed towards right side, if  (2013) |
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| a |
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| For the reaction,  At equilibrium is equal to but for the progress of reaction towards right side, |
| Postulates of Le Chatelier’s principle |

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| Which one of the following information can be obtained on the basis of Le-Chatelier's principle?  (2002) |
| Dissociation constant of a weak acid |
| Entropy changes in a reaction |
| Equilibrium constant of a chemical reaction |
| Shift in equilibrium position on changing value of a constant |
| d |
| Postulates of Le Chatelier’s principle |
| Le-Chatelier's and Braun French chemists made certain generalisations to explain the effect of changes in concentrations, temperature or pressure on the state of system in equilibrium. When a system is subjected to a change in one of these factors, the equilibrium gets disturbed and the system re-adjusts itself until it returns to equilibrium. |
| Postulates of Le Chatelier’s principle |

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| A weak acid, , has a of . If 0.1 mole of this acid is dissolved in one litre of water, the percentage of acid dissociated at equilibrium is closest to  (2007) |
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| b |
| , |
| At equilibrium  of acid dissociated |
| Ionic equilibrium |

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| What is the molar solubility of in solution? Given that, solubility product of  (2019) |
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| Concentration of substance in a saturated solution is defined as its solubility . Its value depends upon the nature of solvent and temperature. |
| Concentration of substance in a saturated solution is defined as its solubility . Its value depends upon the nature of solvent and temperature. For reaction, |
| Ionic equilibrium |

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| Ionisation constant of is and concentration of ions is . Then, find out initial concentration of molecules.  (2020) |
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| D |
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| Given that, for  is weak acid, so in it  is equal to initial  concentration. Hence, |
| Ionization of acids and bases |

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| Conjugate base for Bronsted acids and is  (2019) |
| and |
| and |
| and |
| and |
| a |
| An acid on losing a proton produces a species which has the tendency to accept . |
| An acid on losing a proton produces a species which has the tendency to accept .  It is called conjugate base of that acid.      Water is amphoteric in nature and thus act both as an acid and base. e.g. |
| Ionization of acids and bases |

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| Which is the strongest acid in the following?  (2013) |
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| C |
| The strength of oxyacid can also be decided with the help of the oxidation number of central atom. Higher the oxidation number of central atom, more acidic is the oxyacid. |
| The strength of oxyacid can also be decided with the help of the oxidation number of central atom. Higher the oxidation number of central atom, more acidic is the oxyacid.    Order of acidic nature  Since, in , oxidation number of is highest, is the strongest acid among the given acids. |
| Differences between strong and weak electrolytes |

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| What is the degree of ionization (α) for a weak acid or base?  (2016) |
| The concentration of the undissociated species |
| The ratio of the concentration of dissociated ions to the initial concentration of the compound |
| The molar mass of the compound |
| The degree of solubility |
| b |
| Reflects the ratio of the concentration of dissociated ions |
| The degree of ionization (α) is a measure of how well a weak acid or base ionizes or dissociates in water. It represents the extent to which the compound breaks apart into its constituent ions when it is dissolved in a solution. |
| Degree of ionization |

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| Which of these is least likely to act as a Lewis base  (2004) |
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| c |
| The Lewis acid-base theory |
| BF₃ is considered a Lewis acid because it can accept a pair of electrons from a Lewis base to form a coordinate covalent bond. In the Lewis acid-base theory, a Lewis acid is defined as an electron pair acceptor, while a Lewis base is an electron pair donor. |
| Degree of ionization |

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| Which of the following molecules acts as a Lewis acid?  (2009) |
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| a |
| The presence of an empty orbital |
| (CH₃)₃B, also known as trimethylborane, acts as a Lewis acid due to the presence of an empty orbital on the boron atom. In the Lewis acid-base theory, a Lewis acid is defined as an electron pair acceptor. |
| Ionization of poly basic acids |

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| The hydride ion is stronger base than its hydroxide ion . Which of the following reactions will occur if sodium hydride is dissolved in water?  (2015) |
|  |
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| No reaction |
| None of the above |
| b |
| or  aq) |
| Sodium hydride dissolved in water as or  aq) In the above reaction hydride ion take proton from water molecule and hydrogen gas is evolved. |
| Acid strength |

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| The strongest conjugate base is  (2008) |
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| D |
| Weak acid forms strong conjugate base. In and , |
| Weak acid forms strong conjugate base. In and ,  is weakest acid, so its  conjugate base is strongest. |
| Acid strength |

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| The of dimethyl amine and of acetic acid are 3.27 and 4.77 respectively at . The correct option for the of dimethyl ammonium acetate solution is  (2021) |
| 8.50 |
| 5.50 |
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| Dimethyl ammonium acetate  is a salt of weak acid and weak base . pH of dimethyl ammonium acetate salt solution can be calculated using formula:  of acetic acid  of dimethyl amine |
| Concept of pH |

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| Identify the correct order of solubility of and in aqueous medium  (2002) |
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| d |
| Alkali metal salts are usually more soluble |
| Alkali metal salts are usually more soluble than the salts of transition metals. Also, is less soluble than because of configuration of . Therefore, solubility order is |
| Hydrolysis of salts |

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| The solubility product of at is . The solubility of in solution of at is approximately  (2012) |
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| d |
| For binary electrolyte |
| For binary electrolyte  where, = solubility in  S=1×10-8  Normality of solutiuon  Here change is one  or for solution  Solubility of in solution |
| Hydrolysis of salts |

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| of a saturated solution of is 12 . The value of solubility product of is  (2012) |
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| b |
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| of  =14-12=2  We know that  dissolves in water as |
| Buffer solution |

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| A buffer solution is prepared in which the concentration of is and the concentration of is . If the equilibrium constant, for equals , what is the of this solution?  (2021) |
| 9.43 |
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|  |
| 9.08 |
| a |
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|  |
| Buffer solution |

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| What is in of a solution that is in and 0.1 M in CH3COOH ?  for  (2010) |
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| d |
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| (weak acid) and (conjugated salt) form acidic buffer and for acidic buffer, |
| Henderson Equation |

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| If of a saturated solution of is 12 , the value of its is  (2017) |
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|  |
| d |
| of  So, |
| of  So, |
| Solubility product |

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| The molar solubility of ( in solution of will be  (2020) |
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| c |
| Ksp of caF2= [ca2+] [ F- ]2 |
| Let the solubility of in is ' ' Ionic Equilibrium |
| Common ion effect |

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| Concentration of the ions in a saturated solution of is solubility product of is  (2015) |
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| d |
| Ag2C2O4(s) ⇌ 2Ag+(aq) + C2O42-(aq) |
|  |
| Common ion effect |