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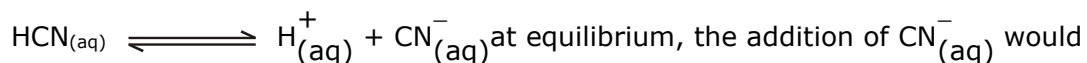
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Q.1 Consider the reaction:

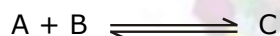


- A)** Increase equilibrium constant
- B)** Decrease $\text{HCN}_{(\text{aq})}$ concentration
- C)** Decrease H^{+} ion concentration
- D)** Increase H^{+} ion concentration

Q.2 Which will change the value of equilibrium constant for a reaction between hydrogen gas and iodine gas?

- A)** Addition of catalyst
- B)** Addition of solvent
- C)** Increase in pressure
- D)** Increase in temperature

Q.3 For the following reaction:



The equilibrium constant unit is:

- A)** $\text{dm}^3 \text{ mol}^{-1}$
- B)** mol dm^{-3}
- C)** mol dm^3
- D)** $\text{mol}^2 \text{ dm}^{-3}$

Q.4 The value of K_c and K_p are same for the reaction:

- A)** Synthesis of NH_3 from N_2 and H_2
- B)** Formation of SO_3 from SO_2 and O_2
- C)** Dissociation of HI
- D)** Dissociation of PCl_5

Q.5 What happens if pressure is applied to the equilibrium Ice $\rightleftharpoons$ Water?

- A) More amount of water is formed
- B) More amount of ice is formed
- C) Water changes to vapours
- D) No change

Q.6 Which of the following statements is correct?

- A) if ionic product $> K_{sp}$, solution is unsaturated
- B) if ionic product $= K_{sp}$ solution is super saturated
- C) if ionic product $< K_{sp}$ solution is unsaturated
- D) K_{sp} term is used for the solution which has molar concentration greater than 0.1

Q.7 Solubility product of PbF_2 at $25^\circ C$ is 4×10^{-9} what is the value of molar concentration of lead ion in the aqueous solution:

- A) $2 \times 10^{-3} \text{ mol.dm}^{-3}$
- B) $1 \times 10^{-3} \text{ mol.dm}^{-3}$
- C) $3 \times 10^{-6} \text{ mol.dm}^{-3}$
- D) $4 \times 10^{-6} \text{ mol.dm}^{-3}$

Q.8 The equation used to calculate the pH of an acidic buffer is:

- A) $pH = pK_a + \log \frac{[Salt]}{[Acid]}$
- B) $pOH = pK_b + \log \frac{[Salt]}{[Base]}$
- C) $pH + K_a = \log \frac{[Salt]}{[Acid]}$
- D) $pOH = K_a + \frac{[Salt]}{[Base]}$

Q.9 Le-Chatelier's principle is applied in order to:

- A)** Determine the rate of reaction
- B)** Predict the direction of reaction
- C)** Determine extent of reaction
- D)** Find best condition favorable for shifting the position of equilibrium

Q.10 Dissociation of H_2S in water is suppressed by the addition of HCl because:

- A)** H_2S weaker acid than HCl
- B)** H_2S is stronger acid than HCl
- C)** HCl reacts chemically with H_2S
- D)** Size of H_2S smaller than HCl

Q.11 The molar solubility of $\text{Ca}(\text{OH})_2$ in water in term of its K_{sp} can be written as:

- A)** $S = (K_{sp})^{1/2}$
- B)** $S = (K_{sp})^{1/3}$
- C)** $S = (K_{sp}/4)^{1/3}$
- D)** $S = (K_{sp}/6)^{1/3}$

Q.12 To prepare a buffer with pH close to 9.0, you could use a mixture of:

- A)** NH_4OH and NH_4Cl
- B)** CH_3COOH and CH_3COONa
- C)** HNO_2 and NaNO_2
- D)** $\text{NaHCO}_3 + \text{H}_2\text{CO}_3$

Q.13 1 mole of N_2O_4 was decomposed according to the given equation in 1 dm^3 contain



At equilibrium "x" mole of N_2O_4 have dissociated. What is the value of K_c ?

A) $\frac{2x}{(1-x)}$

B) $\frac{4x}{(1-x)}$

C) $\frac{2x}{(1-x)^2}$

D) $\frac{4x^2}{(1-x)V}$

Q.14 The units of the rate constant for a first order reaction.

A) sec^{-1}

B) mol dm^{-3}

C) $\text{mol dm}^{-3} \text{ sec}^{-1}$

D) $\text{mol}^{-1} \text{ dm}^3 \text{ sec}^{-1}$

Q.15 The order of reaction $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \rightleftharpoons \text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH}$.

A) Pseudo first

B) Two

C) Three

D) Zero

Q.16 Which of the following statement is true?

- A)** In the beginning instantaneous rate is smaller than average rate
- B)** In the beginning average rate is smaller than instantaneous rate
- C)** At the end instantaneous rate is greater than the average rate
- D)** All

Q.17 If during a reaction there is volume change then rate of this reaction is determined by:

- A)** Optical rotation method
- B)** Spectrometry method
- C)** Dilatometric method
- D)** Conductivity method

Q.18 For a chemical reaction to take place what conditions should be fulfilled?

- A)** Molecules should have activation energy
- B)** Proper orientation
- C)** Effective collision
- D)** All

Q.19 The half life period for 3rd order reaction is:

- A)** $[t_{1/2}] \propto 1/a^0$
- B)** $[t_{1/2}] \propto 1/a^1$
- C)** $[t_{1/2}] \propto 1/a^2$
- D)** $[t_{1/2}] \propto 1/a^3$

- Q.20** With increase of 10°C temperature the rate of reaction doubles. This increase in rate of reaction is due to:
- A)** Decreases in activation energy of reaction
 - B)** Decrease in the number of collisions between reactant molecules
 - C)** Increase in activation energy of reactants
 - D)** Increase in number of effective collisions
- Q.21** For the reaction $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$. Equilibrium concentration of H_2 , I_2 and HI are 8, 3 and 24 mol/dm³ respectively. K_c of the reaction is
- A)** 24
 - B)** 1
 - C)** 26
 - D)** 9
- Q.22** In Haber process, equilibrium mixture contains _____ NH_3 by volume
- A)** 20%
 - B)** 70%
 - C)** 55%
 - D)** 35%
- Q.23** Catalyst used in Haber's process for manufacturing of NH_3 is
- A)** Fe(MgO , Al_2O_3 , SiO_2)
 - B)** Al_2O_3
 - C)** MgO
 - D)** SiO_2

Q.24 Basic buffer solution is

- A) HF / NaF
- B) H_2CO_3 / Na_2CO_3
- C) $(\text{COOH})_2$ / $(\text{COONa})_2$
- D) $\text{NH}_4\text{OH}/\text{NH}_4\text{Cl}$

Q.25 For acidic buffer, $\text{pH} < \text{pK}_a$ if

- A) $[\text{salt}] = [\text{acid}]$
- B) $[\text{salt}] > [\text{acid}]$
- C) $[\text{salt}] < [\text{acid}]$
- D) $[\text{salt}] > [\text{base}]$

Q.26 When HCl gas is passed through saturated solution of rock salt, the solubility of NaCl

- A) Increases
- B) Decreases
- C) May increase or decrease
- D) None of these

Q.27 An excess of silver nitrate is added to the aqueous barium chloride and the precipitate is removed by filtration. What are the main ions in the filtrate

- A) Ag^+ and NO_3^- only
- B) Ag^+ and NO_3^- and Ba^{+2} only
- C) NO_3^- and Ba^{+2} only
- D) Cl^- and NO_3^- and Ba^{+2} only

Q.28 Ionization of KClO_3 is suppressed by

- A) Increasing temperature
- B) Adding NaNO_3
- C) Adding KCl
- D) Decreasing temperature

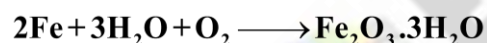
Q.29 If ionic product is equal to K_{sp} then the solution is

- A) Unsaturated
- B) Supersaturated
- C) Ideal
- D) Saturated

Q.30 The solubility product is only applicable for those substance whose molar concentrations is

- A) Equal to 0.1M
- B) Equal to or Less than 0.01
- C) Equal to 1
- D) Greater than 0.1

Q.31 Which one of the following is correct about following reaction if iron is not 100% pure



- A) Very fast reaction
- B) Very slow reaction
- C) Moderately reaction
- D) Not predicted

Q.32 Which of the following reactions are usually slow?

- A) Neutralization of acids and bases
- B) Explosive reaction of O_2 and H_2
- C) Organic substitution reaction
- D) Photochemical reactions

Q.33 The increase in reaction rate as a result of increase in temperature from 10K to 100K is

- A) 512
- B) 614
- C) 400
- D) 112

Q.34 By increasing the concentration of reactants, the rate of reaction_____

- A) Decreases
- B) Increases
- C) Remains constant
- D) Not predicted

Q.35 The 2nd order reaction becomes 1st order when

- A) One of the reactants is limiting
- B) One of the reactants is in large excess
- C) None of the reactants is in large excess
- D) Both reactants in large excess

Q.36 The half-life time for a 1st order decomposition of a substance dissolved in CCl₄ is 2.5 hours at 30°C. The amount of substance left after 10 hours if the initial weight of the substance is 160g

- A) 5g
- B) 10g
- C) 15g
- D) 20g

Q.37 Hydrolysis of ethyl acetate into acetic acid and ethanol in the presence of mineral acid is

- A) Fractional order reaction
- B) Pseudo 1st order reaction
- C) 1st order reaction
- D) 2nd order reaction

Q.38 For a chemical reaction $A \longrightarrow B$, the rate of reaction doubles when the concentration of A is increased four times. The order of reaction for A is

- A) Zero
- B) One
- C) Two
- D) Half

Q.39 For the reaction $A + B \longrightarrow C + D$, doubling the concentration of both the reactants increases the reaction rate by 8 times and doubling the initial concentration of only B simply doubles the reaction rate. The rate law for the reaction is

- A) $\text{Rate} = k[A][B]^2$
- B) $\text{Rate} = k[A][B]$
- C) $R = k[A]^{1/2}[B]^2$
- D) $\text{Rate} = k[A]^2[B]$

Q.40 The half-life period of zero order reaction is equal to

- A) $\frac{0.693}{K}$
- B) $\frac{a}{2K}$
- C) $\frac{1}{Ka}$
- D) $\frac{1.5}{Ka^2}$