



CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

IONIC EQUILIBRIUM

Example

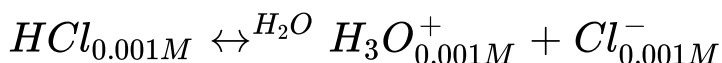
1. Identify the lewis acid and the lewis base in the following reactions. $Cr^{3+} + 6H_2O \rightarrow [Cr(H_2O)_6]^{3+}$

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2. Calculate the concentration of OH^- in a fruit juice which contains $2 \times 10^{-3} M, H_3O^+$ ion. Identify the nature of the solution.

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3. Calculate the pH of 0.001M HCl solution



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4. Calculate pH of $10^{-7} M$ HCl

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5. A solution of 0.10 M of a weak electrolyte is found to be dissociated to the extent of 1.20% at $25^{\circ}C$. Find the dissociation constant of the acid.

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6. Calculate the pH of 0.1M CH_3COOH solution. Dissociation constant of acetic acid is 1.8×10^{-5} .

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7. Find the pH of a buffer solution containing 0.20 mole per litre sodium acetate and 0.18 mole per litre acetic

acid, K_a for acetic acid is 1.8×10^{-5} .

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8. What is the pH of an aqueous solution obtained by mixing 6 gram of acetic acid and 8.2 gram of sodium acetate and making the volume equal to 500ml. (Given: K_a for acetic acid is 1.8×10^{-5})

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9. Calculate

the hydrolysis constant

(ii) degree of hydrolysis

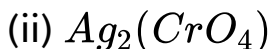
(iii) pH of 0.1M CH_3COONa solution

(pK_{af} or CH_3COOH is 4.74)



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10. Establish a relationship between the solubility product and molar solubility for the following



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Textbook Evaluation Choose The Correct Answer

1. Concentration of the Ag^+ ion in a saturated solution of $Ag_2C_2O_4$ is $2.24 \times 10^{-4} mol L^{-1}$ solubility product of $Ag_2C_2O_4$ is

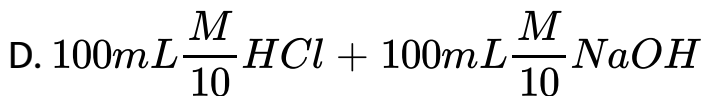
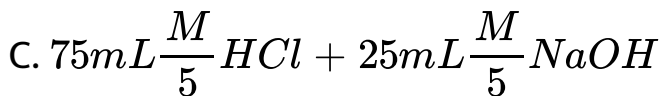
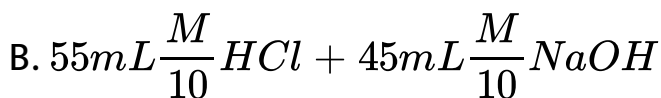
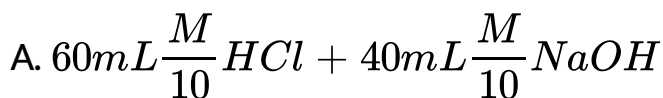
- A. $2.42 \times 10^{-8} mol^3 L^{-3}$
- B. $2.66 \times 10^{-12} mol^3 L^{-3}$
- C. $4.5 \times 10^{-11} mol^3 L^{-3}$
- D. $5.619 \times 10^{-12} mol^3 L^{-3}$

Answer:



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2. Following solution are prepared by the mixing different volumes of NaOH of HCl different concentrations.



Answer:



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3. The solubility of $BaSO_4$ in water is $2.42 \times 10^{-3} gL^{-1}$ at 298 K. The value of its solubility product (K_{sp}) will be.....

A. $1.08 \times 10^{-14} mol^2 L^{-2}$

B. $1.08 \times 10^{-12} mol^2 L^{-2}$

C. $1.08 \times 10^{-10} mol^2 L^{-2}$

D. $1.08 \times 10^{-8} mol^2 L^{-2}$

Answer:



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4. pH of a saturated solution of $Ca(OH)_2$ is 9. The solubility product (K_{sp}) of $Ca(OH)_2$

A. 0.5×10^{-15}

B. 0.25×10^{-10}

C. 0.125×10^{-15}

D. 0.5×10^{-10}

Answer:



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5. Conjugate base for bronsted acids H_2O and HF are.....

A. OH^- and H_2FH^+ respectively

B. H_3O^+ and F^- respectively

C. OH^- and F^- , respectively

D. H_3O^+ and H_2F^+ , respectively

Answer:



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6. Which will make basic buffer?

A. 50 mL of 0.1 M NaOH+25 mL of 0.1 M CH_3COOH

B. 100 mL of 0.1 M CH_3COOH + 100mL of 0.1 M

NH_4OH

C. 100 mL of 0.1 M HCl+200mL of 0.1 M NH_4OH

D. 100 mL of 0.1 M HCl+100mL of 0.1 M NaOH

Answer:



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7. Which of the following fluoro-compounds is most likely to behave as a Lewis base?

A. BF_3

B. PF_3

C. CF_4

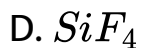
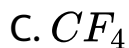
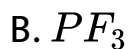
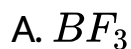
D. SiF_4

Answer:



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8. Which of these is not likely to act as lewis base?

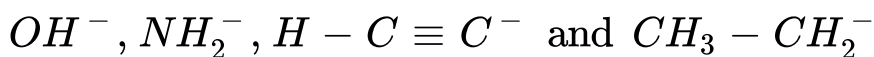


Answer:

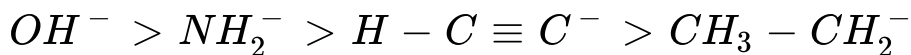


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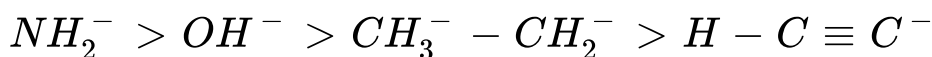
9. What is the decreasing order of strength of bases?



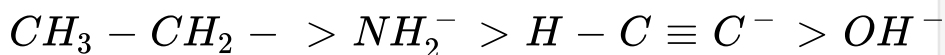
A.



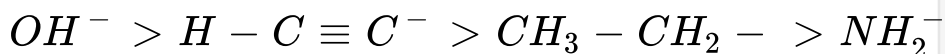
B.



C.



D.



Answer:

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10. The aqueous solution of sodium formate, anilinium chloride and potassium cyanide are respectively.....

- A. acidic,acidic,basic
- B. basic,acidic,basic
- C. basic,neutral,basic
- D. none of these

Answer:

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11. The percentage of pyridine (C_5H_5N) that forms pyridinium ion (C_5H_5NH) in a 0.10 M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is.....

A. 0.006 %

B. 0.013 %

C. 0.77 %

D. 1.6 %

Answer:



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12. Equal volumes of three acid solutions of PH 1,2 and 3 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

A. 3.7×10^{-2}

B. 10^{-6}

C. 0.111

D. none of these

Answer:



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13. The solubility of $\text{AgCl}(s)$ with solubility product 1.6×10^{-10} in 0.1 M NaCl solution would be

A. $1.26 \times 10^{-5} M$

B. $1.6 \times 10^{-9} M$

C. $1.6 \times 10^{-11} M$

D. Zero

Answer:



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14. If the solubility product of lead iodide is 3.2×10^{-8} , its solubility will be.....

A. $2 \times 10^{-3} M$

B. $4 \times 10^{-4} M$

C. $1.6 \times 10^{-5} M$

D. $1.8 \times 10^{-5} M$

Answer:



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15. Using Gibb's free energy change

$\Delta G^\circ = 57.34 kJ mol^{-1}$ for the reaction

$X_2Y_s = 2X^+ + Y^{2-} (aq)$ Calculate the solubility

product of X_2Y in water at 300 K

A. 10^{-10}

B. 10^{-12}

C. 10^{-14}

D. can not be calculated from the given data

Answer:



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16. MY and NY_3 are insoluble salts and have the same K_{sp} values of 6.2×10^{-13} at room temperature. Which statement would be true with regard to MY and NY_3 ?

- A. The salts MY and NY_3 are more soluble in $0.5M$ KY than in pure water
- B. The addition of the salt of KY to the suspension of MY and NY_3 will have no effect on their solubility
- C. The molar solubilities of MY and NY_3 in water are identical
- D. The molar solubility of MY in water is less than of NY_3

Answer:



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17. What is the PH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed?

- A. 2.0
- B. 3
- C. 7.0
- D. 12.65

Answer:

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18. The dissociation constant of weak acid is 1×10^{-3} .
In order to prepare a buffer solution a pH=4, the

[Acid]/[Salt] ratio should be.....

A. 4 : 3

B. 3 : 4

C. 10 : 1

D. 1 : 10

Answer:



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19. The pH of 10^{-5} M KOH solution will be.....

A. 9

B. 5

C. 19

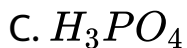
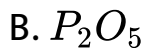
D. none of these

Answer:



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20. $H_2PO_4^-$ the conjugate base of.....



Answer:

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21. Which of the following can act as lowery- Bronsted acid well as base?



Answer:

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22. The pH of an aqueous solution is Zero. The solution is.....

- A. Slightly acidic
- B. Strongly acidic
- C. Neutral
- D. basic

Answer:



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23. The hydrogen ion concentration of a buffer solution consisting of a weak acid and its salts is given by.....

A. $[H^+] = \frac{K_a[acid]}{[salt]}$

B. $[H^+] = K_a[salt]$

C. $[H^+] = K_a[acid]$

D. $[H^+] = \frac{K_a[salt]}{[acid]}$

Answer:



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24. Which of the following relation is correct for degree of hydrolysis of ammonium acetate?

$$\text{A. } h = \sqrt{\frac{K_b}{C}}$$

$$\text{B. } h = \sqrt{\frac{K_a}{K_b}}$$

$$\text{C. } h = \sqrt{\frac{K_h}{K_a \cdot K_b}}$$

$$\text{D. } h = \sqrt{\frac{K_a \cdot K_b}{K_h}}$$

Answer:



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25. Dissociation constant of NH_4OH is 1.8×10^{-5} the hydrolysis constant of NH_4Cl would be

A. 1.8×10^{-19}

B. 5.55×10^{-10}

C. 5.55×10^{-5}

D. 1.80×10^{-5}

Answer:



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Textbook Evaluation Answer The Following Question

1. What are lewis acids and bases? Give two examples for each.

Lewis acid:

(ii) Lewis bases:

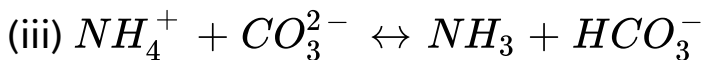
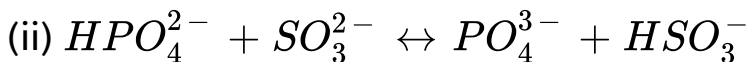
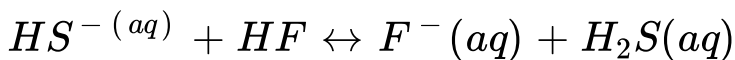


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2. Discuss the lowry-Bronsted concept of acids and bases.

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3. Identify the conjugate acid base pair for the following reaction in aqueous solution

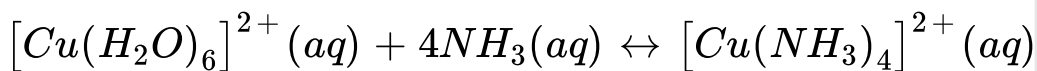


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4. Account for the acidic nature of $HClO_4$ In terms of Bronsted-Lowry Theory, Identify its conjugate base.

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5. When aqueous ammonia is added to $CuSO_4$ solution, the solution turns deep blue due to the formation of tetramine copper (II) complex.



among H_2O and NH_3 which is stronger lewis base.

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6. the concentration of hydroxide ion in a water sample is found to be $2.5 \times 10^{-6} M$. Identify the nature of the solution.

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7. A lab assistant prepared a solution by adding a calculated quantity of HCl gas $25^{\circ} C$ to get a solution with $[H_3O^+] = 4 \times 10^{-5} M$. Is the solution neutral (or) acidic (or) basic.

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8. Calculate the pH of 0.04 M HNO_3 solution.

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9. Define solubility product.

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10. Define ionic product of water. Given its value at room temperature.

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11. Explain common ion effect with an example.

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12. Derive an expression for Ostwald's dilution law.

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13. Define pH.

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14. Calculate the pH of $1.5 \times 10^{-3} M$ solution of $Ba(OH)_2$.

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15. 50 ml of 0.05 M HNO_3 is added to 50 ml of 0.025 M KOH. Calculate the pH of the resultant solution.

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16. The K_a value for HCN is 10^{-9} . What is the pH of 0.4 M HCN solution?

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17. Calculate the extent of hydrolysis and the pH of 0.1 M ammonium acetate Given that $K_a = K_b = 1.8 \times 10^{-4}$

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18. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of strong acid and weak base.

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19. Solubility product of Ag_2CrO_4 is 1×10^{-12} . What is the solubility of Ag_2CrO_4 in 0.01 M $AgNO_3$ solution?



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20. Write the expression for the solubility product of $Ca_3(PO_4)_2$



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21. A saturated solution, prepared by dissolving $CaF_2(s)$ in water, has $[Ca^{2+}] = 3.3 \times 10^{-4} M$. What is the K_{sp} of CaF_2 ?



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22. K_{sp} of AgCl is 1.8×10^{-10} . Calculate molar solubility in 1M $AgNO_3$

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23. A particular saturated solution of silver chromate Ag_2CrO_4 has

$$[Ag^+] = 5 \times 10^{-5} \text{ and } [CrO_4]^{2-} = 4.4 \times 10^{-4} M.$$

What is the value of K_{sp} for Ag_2CrO_4 ?

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24. Write the expression for the solubility product of Hg_2Cl_2 .

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25. K_{sp} of Ag_2CrO_4 is 1.1×10^{-12} . What is solubility of Ag_2CrO_4 in 0.1 M K_2CrO_4 .

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26. Will a precipitate be formed when 0.150 L of 0.1 M $Pb(NO_3)_2$ and 0.100 L of 0.2 M NaCl are mixed?

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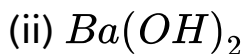
27. K_{sp} of $Al(OH)_3$ is 1×10^{-15} . At what pH does $1.0 \times 10^{-3} M Al^{3+}$ precipitate on the addition of buffer of NH_4Cl and NH_4OH solution?

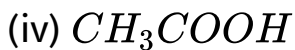
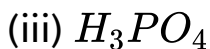


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Evaluate Yourself

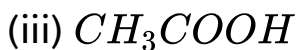
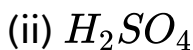
1. Classify the following as acid (or) base using Arrhenius concept





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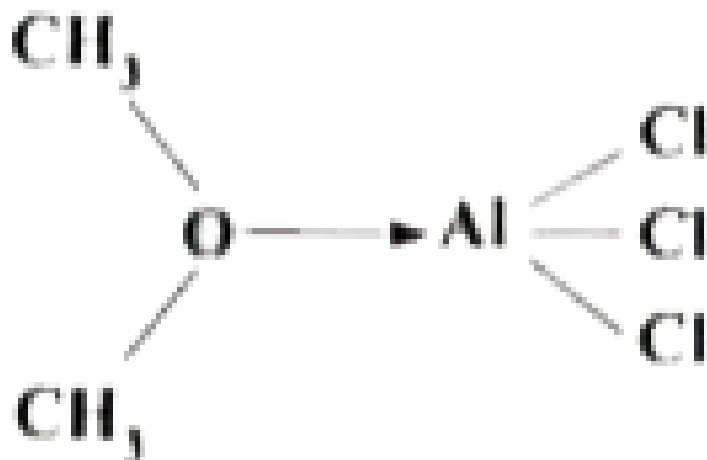
2. Write a balanced equation for the dissociation of the following in water and identify the conjugate acid-base pairs.



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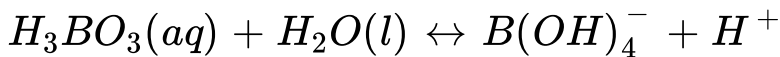
3. Identify the lewis acid and the lewis base in the following reactions. $CaO + CO_2 \rightarrow CaCO_3$

(ii) $CH_3 - O - CH_3 + AlCl_3 \rightarrow$



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4. H_3BO_3 accepts hydroxide ion from water as shown below



Predict the nature of H_3BO_3 using lewis concept.

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5. At a particular temperature, the K_w of a neutral solution was equal to 4×10^{-14} .

Calculate the concentration of $[H_3O^+]$ and $[OH^-]$.

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6. Calculate pH of $10^{-8}MH_2SO_4$

(ii) Calculate the concentration of hydrogen ion in moles per litre of a solution whose pH is 5.4.

(iii) Calculate the pH of an aqueous solution obtained by mixing 50 ml of 0.2 M HCl with 50 ml 0.1 M NaOH

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7. K_b for NH_4OH is 1.8×10^{-5} . Calculate the percentage of ionisation of 0.06 M ammonium hydroxide solution.

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8. Explain the buffer action of a basic buffer containing equimolar ammonium hydroxide and ammonium chloride.

(ii) Calculate the pH of a buffer solution consisting of 0.4 M CH_3COOH and 0.4 M CH_3COONa . What is the change in the pH after adding 0.01 mol of HCl to 500 ml of the above buffer solution. Assume that the addition of HCl causes negligible change in the volume.



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9. How can you prepare a buffer solution of pH 9. You are provided with 0.1 M NH_4OH solution and ammonium chloride crystals.

(ii) What volume of 0.6 M sodium formate solution is required to prepare a buffer solution of pH 4.0 by mixing it with 100 ml of 0.8 M formic acid .



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10. Calculate the

hydrolysis constant

(ii) degree of hydrolysis

(iii) pH of 0.05 M sodium carbonates solution pK_a for HCO_3^- is 10.26.



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Additional Questions Choose The Best Answer

1. The pH of 0.001 M HCL solution is

A. 3

B. 2

C. 1

D. 11

Answer:



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2. The pH of 0.001M HCl solution is

A. 3

B. 2

C. 1

D. 10

Answer:



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3. What is the pH of 0.1M HCL solution?

A. 1

B. 2

C. 13

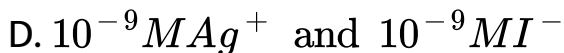
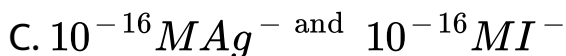
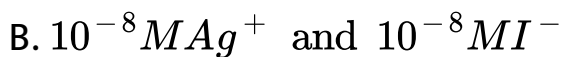
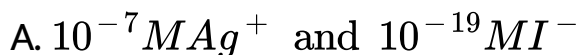
D. 3

Answer:



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4. The K_{sp} of AgI is 1.5×10^{-16} . ON mixing equal volume of the following solutions, precipitation will occur only with.....



Answer:



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5. The strongest Bronsted base in the following anion is.....



Answer:



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6. Calculate the hydrolysis constant of the salt containing NO_2 .

Given that K_a for $HNO_2 = 4.5 \times 10^{-10}$.

A. 2.22×10^{-5}

B. 2.02×10^{-5}

C. 4.33×10^4

D. 3.03×10^{-5}

Answer:



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7. Electrophiles are usually.....

A. Lewis acid

B. Lewis base

C. Bronsted acid

D. Bronsted base

Answer:



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8. Which one is a lewis acid

A. ClF_3

B. H_2O

C. NH_3

D. OH^-

Answer:

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9. An aqueous solution of ammonium acetate is.....

- A. faintly acidic
- B. faintly basic
- C. fairly acidic
- D. Almost neutral

Answer:

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10. The dissociation constant of weak acid is 1.0×10^{-5} .

The equilibrium constant for the reaction with strong base is.....

A. 1.0×10^{-5}

B. 1.0×10^{-9}

C. 1.0×10^9

D. 1.0×10^{14}

Answer:



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11. Arrange the acids (i) H_2SO_3 (ii) H_3PO_3 and (iii) $HClO_3$ in the decreasing order of acidity.

A. $(i) > (iii) > (ii)$

B. $(i) > (ii) > (iii)$

C. $(ii) > (iii) > (i)$

D. $(iii) > (i) > (ii)$

Answer:



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12. The pH of 0.1 M solution of a weak monoprotic acid 1% ionised is.....

A. 1

B. 2

C. 3

D. 4

Answer:



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13. K_{sp} for $Cr(OH)_3$ is 2.7×10^{-3} . What is the solubility in moles/litre?

A. 1×10^{-8}

B. 8×10^{-8}

C. 1.1×10^{-8}

D. 0.18×10^{-8}

Answer:



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14. pK_a for acetic acid is 4.74. The concentration of CH_3COONa is 0.01 M. The pH of CH_3COONa is.....

A. 3.37

B. 4.37

C. 4.74

D. 0.474

Answer:

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15. One litre of water contains 10^{-7} mol hydrogen ions.

The degree of ionisation in water will be

A. 1.8×10^{-7}

B. 0.8×10^{-9}

C. 3.6×10^{-7}

D. 3.6×10^{-9}

Answer:

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16. If the solubility product of lead iodide is (PbI_2) is 3.2×10^{-8} . Then its solubility in moles/litre will be.....

A. $2 \times 10^{-3} M$

B. $4 \times 10^{-4} M$

C. 1.6×10^{-5}

D. $1.8 \times 10^{-5} M$

Answer:



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17. The pH of a soft drink is 3.82. Its hydrogen ion concentration will be.....

A. $1.96 \times 10^{-2} \text{ mol / L}$

B. $1.96 \times 10^{-3} \text{ mol / L}$

C. $1.5 \times 10^{-4} \text{ mol / L}$

D. $1.96 \times 10^1 \text{ mol / L}$

Answer:



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18. The pH of a solution at 25°C containing 0.10 M solution acetate and 0.03 M acetic acid is.....

A. 4.09

B. 5.09

C. 6.10

D. 7.09

Answer:



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19. A weak acid is 0.1 % ionised in 0.1M solution. Its pH is.....

A. 2

B. 3

C. 4

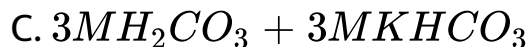
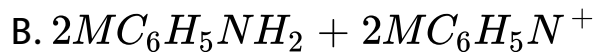
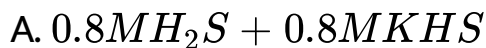
D. 1

Answer:



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20. Which one of the following is not a buffer solution?



Answer:



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21. The pH of pure water or neutral solution at $50^{\circ}C$ is.....

- A. 7.0
- B. 7.13
- C. 6.0
- D. 6.63

Answer:



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22. What is the pH of 1 M CH_3COOH solution?

K_a of acetic acid is 1.8×10^{-5} . $K = 10^{-14} \text{ mol}^2 \text{ litre}^2$.

A. 9.4

B. 4.8

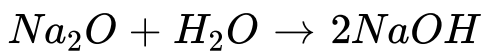
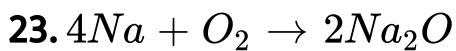
C. 3.6

D. 2.4

Answer:



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In the given reaction, the oxide of sodium is.....

- A. Acidic
- B. Basic
- C. Amphoteric
- D. Neutral

Answer:



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24. The pH of 0.001M NaOH will be.....

A. 3

B. 2

C. 11

D. 12

Answer:



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25. The addition of pure solid sodium carbonate to pure water causes.....

A. an increase in hydronium ion concentration

B. an increase in alkalinity

C. No change in acidity

D. A decrease in hydroxide ion

Answer:



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26. When solid potassium cyanide is added in water then.....

A. pH will increase

B. pH will decrease

C. pH will remains the same

D. electricity conductivity will not change

Answer:



[View Text Solution](#)

27. pH of a solution is 5. Its hydroxyl ion concentration is.....

A. 5

B. 10

C. 10^{-5}

D. 10^{-9}

Answer:



[View Text Solution](#)

28. Which will have maximum pH?

A. Distilled water

B. $1M NH_3$

C. 1 M NaOH

D. Water saturated by chlorine

Answer:



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29. pH of a solution is 9.5. The solution is

A. Neutral

B. Acidic

C. Basic

D. Amphoteric

Answer:



View Text Solution

30. A solution of $\text{pH}=5$. it is diluted 100 times, then it will become.....

A. Neutral

B. basic

C. unaffected

D. more acidic

Answer:



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31. pH of a human blood is 7.4. Then H^+ concentration will be.....

A. 4×10^{-8}

B. 2×10^{-8}

C. 4×10^{-4}

D. 2×10^{-4}

Answer:

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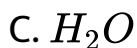
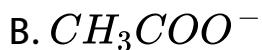
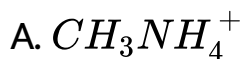
32. The highest pH 14 is given by.....



Answer:

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33. Which of the following is not a Bronsted acid?



Answer:



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34. Pure water is kept in a vessel and it remains exposed to atmospheric CO_2 which is absorbed, then its pH will be.....

A. greater than 7

B. less than 7

C. equal to 7

D. depends on ionic production of water

Answer:



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35. The pH of millimolar of HCl is.....

A. 1

B. 3

C. 2

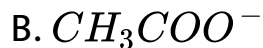
D. 4

Answer:



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36. Which of the following is the strongest conjugate base?

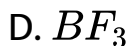
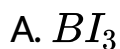


Answer:



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37. Which of the following is the strongest lewis acid?



Answer:



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38. Which of the following is the weakest acid?

A. HF

B. HCl

C. HBr

D. HI

Answer:



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39. Among the following the weakest lewis base is.....

A. H^{-}

B. OH^{-}

C. CL^{-}

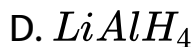
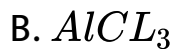
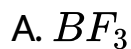


Answer:



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40. Which of the following is not a lewis acid?



Answer:



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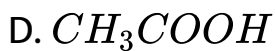
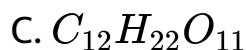
41. Which one of the following is called amphoteric solvent?

- A. Ammonium hydroxide
- B. Chloroform
- C. Benzene
- D. Water

Answer:

 [View Text Solution](#)

42. Which of the following is non-electrolyte.



Answer:



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43. At infinite dilution, the percentage ionisation for both strong and weak electrolyte is.....

A. 0.01

B. 0.2

C. 0.5

D. 1

Answer:



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44. Which of the following is not a lewis acid?

A. CO

B. $SiCl_4$

C. SO_3

D. Zn^{2+}

Answer:



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45. On addition of ammonium chloride to a solution of ammonium hydroxide

A. dissociation of NH_4OH increases

B. concentration of OH^- increases

C. concentration of OH^- decreases

D. concentration of NH_4^+ and OH^- increases

Answer:



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46. The solubility product of a salt having a general formula MX_2 in water is 4×10^{-2} . The concentration of M^{2+} ions in the aqueous solution of the salt is.....

A. $2.0 \times 10^{-6} M$

B. $1.0 \times 10^{-4} M$

C. $1.6 \times 10^{-4} M$

D. $4.0 \times 10^{-10} M$

Answer:



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47. The solubility of an aqueous solution of $Mg(OH)_2$ be x then its K_{sp} is.....

A. $4x^3$

B. $108x^5$

C. $27x^4$

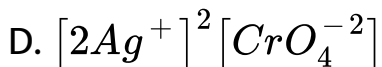
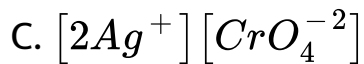
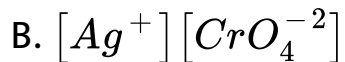
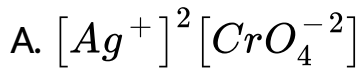
D. $9x$

Answer:



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48. What is the correct representation of the solubility product constant of Ag_2CrO_4 ?



Answer:



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49. What is the pH value of $\frac{N}{1000}$ KOH solution.

A. 10^{-11}

B. 3

C. 2

D. 11

Answer:



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50. The solubility of AgCl will be minimum in.....

A. 0.001M AgNO_3

B. pure water

C. 0.01M CaCl_2

D. 0.01M NaCl

Answer:



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51. Ionic product of water increases if....

- A. pressure is reduced
- B. H^+ is added
- C. OH^- is added
- D. temperature increases

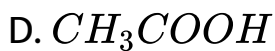
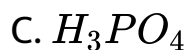
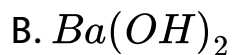
Answer:



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Additional Questions Find The Odd One Out And Give The Reasons

1. Find the odd one out and give and reasons.



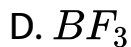
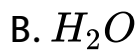
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2. Find the odd one out and give and reasons.



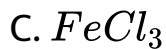
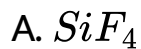


Answer:



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3. Find the odd one out and give and reasons.



Answer:

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4. Find the odd one out and give and reasons.

A. HCL

B. H_2SO_4

C. CH_3COOH

D. HNO_3

Answer:

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5. Find the odd one out and give and reasons.

A. HCOOH

B. CH_3COOH

C. Lactic acid

D. HCL

Answer:

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6. Find the odd one out and give and reasons.

A. HClO_4

B. HCl

C. HSO_4^-

D. H_2SO_4

Answer:



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7. Find the odd one out and give and reasons.

A. NH_2^-

B. O^{2-}

C. H^-

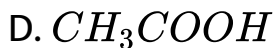
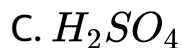
D. OH^-

Answer:



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8. Find the odd one out and give and reasons.

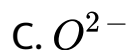
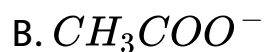
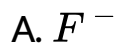


Answer:



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9. Find the odd one out and give and reasons.



Answer:

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10. Find the odd one out and give and reasons.

A. Vinegar

B. Black coffee

C. Sea water

D. Orange juice

Answer:



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11. Find the odd one out and give and reasons.

A. Baking soda

B. Tomato

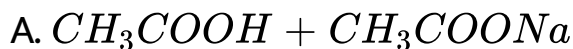
C. Soapy water

D. Drain cleaner

Answer:

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12. Find the odd one out and give and reasons.

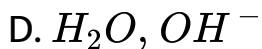
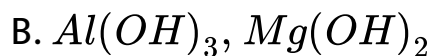
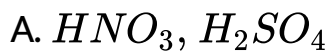


Answer:

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Additional Questions Find Out The Incorrect Pairs

1. Find the incorrect pair?



Answer: B



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Additional Questions 2 Mark Question

1. What are the general characteristics of acid and base?

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2. Explain the Arrhenius concept of acid and base with example.

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3. What are the limitation of Arrhenius concept?

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4. What is the meant by strong acid and weak acid?

Explain with example.

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5. Give two examples for Strong acid

(ii) Give two examples for Strong base

 [View Text Solution](#)

6. Give two examples Very weak acid

(ii) Give two examples Very weak base

 [View Text Solution](#)

7. Given two examples

Weak acid

(ii) Weak base



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8. What is meant by auto ionisation of water?



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9. Define -ionic product of water?



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10. $K_w = 1 \times 10^{-14}$ at $25^\circ C$ Justify that statement.

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11. With increase in temperature K_w also increases Why?

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12. Aqueous HCL is an acidic solution whereas aqueous NH_3 is a basic solution. Justify this statement.

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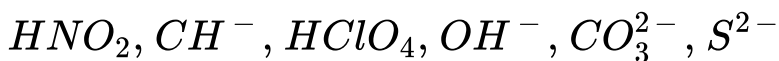
13. What is the statement of Ostwaid's dilution law.

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14. Define- Salt hydrolysis.

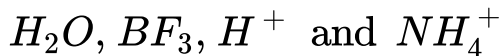
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15. What is meant by conjugate acid base pair? Find the conjugate acid I base for the following species:



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16. Which of the following are lewis acids?



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17. What will be the conjugate bases for the Bronsted acids? HF , H_2SO_4 and H_2CO_3 ?

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18. Write the conjugate acids for the following Bronsted bases: NH_2^- , NH_3 and $HCOO^-$

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19. The species H_2O , HCO_3^- , HSO_4^- and NH_3 can act both as Bronsted acid and base. For each case, given the corresponding conjugate acid and base.

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20. Classify the following species into Lewis acids and Lewis bases and show how these can act a Lewis acid/
Lewis base?

OH^- ions

(ii) F^-

(iii) H^+

(iv) BCl_3

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21. Predict the acidic, basic or neutral nature of the following salts:

NaCl, KBr, NaCN, NH₄NO₃, NaNO₂, KF.



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22. Ionic product of water at 310 K is 2.7×10^{-14} . What is the pH of neutral water at this temperature?



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23. The aqueous solution of sugar does not conduct electricity whereas when sodium chloride is added to water, it conducts electricity. Justify this statement.

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24. A reaction between ammonia and boron trifluoride is given below

$NH_3 + BF_3 \rightarrow H_3N, BF_3$ Identify the acid and base in the reactions. Which theory explain it?

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25. The salt of strong acid and strong base does not undergo hydrolysis. Explain

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Additional Questions 3 Mark Question

1. Explain Lowry- Bronsted theory of acid and base.

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2. Explain the reactions of water with ammonia by proton theory.

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3. Explain about the strength of acid on the basis of K_a value.

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4. Write 3 formulas of strong acids, strong bases and weak acids.

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5. pH of a neutral solution is equal to 7. Prove it.

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[View Text Solution](#)

6. Derive the relation between pH and pOH.

 [View Text Solution](#)

7. When the dilution increases by 100 times, the dissociation increases by 10 times. Justify that statement.

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8. What is buffer solution? Give an example for an acidic buffer and a basic buffer.

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9. Define buffer capacity and buffer index.

 [View Text Solution](#)

10. How is solubility product is used to decide the precipitation of ions?

 [View Text Solution](#)

11. Derive the value of solubility product from molar solubility?

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12. The concentration of hydrogen ions in a sample of soft drink is $3.8 \times 10^{-3} \text{ M}$. What is the pH value?

Whether the soft drink is acidic (or) basic?

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13. The pH of a sample of vinegar is 3.76. Calculate the concentration of hydrogen ion in it.

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14. The ionisation constant of HF, HCOOH, HCN at 298 K are 6.8×10^{-4} , 1.8×10^{-4} and 4.8×10^{-9} .

Respectively. Calculate the ionisation constant of the corresponding conjugate base.

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15. The pH of 0.1 M solution of cyanic acid (HCNO) is 2.34. Calculate the ionization constant of the acid and its degree of ionization in the solution.

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16. The ionization constant of nitrous acid is 4.5×10^{-4} . Calculate the pH of 0.04 M solution nitrite solution and also its degree of hydrolysis.





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17. What is the minimum volume of water required to dissolve 1g of calcium sulphate at 298 K, For calcium sulphate, $K_{sp} = 9.1 \times 10^{-6}$.



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18. Point out the difference between ionic product and solubility product.

(ii) The solubility of AgCl in water at 298 K is 1.06×10^{-5} mole per litre. Calculate its solubility product at this temperature.



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19. The value of K_{sp} of two sparingly soluble salts $Ni(OH)_2$ and $AgCN$ are 2.0×10^{-15} and 6×10^{-17} respectively. Which salt is more soluble? Explain.

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20. If 0.561 g KOH is dissolved in water to give 200mL of solution at 298 K, calculate the concentration of potassium, hydrogen and hydroxyl ions. What is the pH?

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1. Differentiate Lewis acids and Lewis bases.

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2. Explain about the ionisation of weak acid and how K_a is derived?

 [View Text Solution](#)

3. Explain buffer action with suitable example.

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4. Prove the buffer action of acetic acid and sodium acetate by the addition of 0.01 mol of solid sodium hydroxide.

 [View Text Solution](#)

5. Define Henderson- Hasselbalch equation

 [View Text Solution](#)

6. Explain about the hydrolysis of salt of strong acid and a strong base with a suitable example.

 [View Text Solution](#)

7. Explain about the hydrolysis of salt of strong base and weak acid. Derive the value of K_h for that reaction.

 [View Text Solution](#)

8. Derive the value of pH of salt solution in terms of K_a and concentration of electrolyte.

 [View Text Solution](#)

9. Explain about the hydrolysis of salt of strong acid and weak base. Derive K_b and pH for that solution.

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10. Discuss about the hydrolysis of salt of weak acid and weak base and derive pH value of the solution.



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11. It has been found that the pH of a 0.01 M solution of an organic acid is 4.15. Calculate the concentration of the anion, the ionization constant of the acid and its pK_a



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12. Assuming complete dissociation , calculate the pH of the following solution:

0.003 M HCl

(ii) 0.005 M NaOH

(iii) 0.002 M HBr

(iv) 0.002M KOH



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13. What is the pH of 0.001 M aniline solution? The ionisation constant of aniline is 4.27×10^{-10} .

(i) Calculate degree of ionization of aniline in the solution. Also calculate the ionisation constant of the conjugate acid of aniline.



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14. Calculate the degree of ionization of 0.05M acetic acid if its pK_a value is 4.74. (i) How is the degree of dissociation affected when its solution also contains 0.01M.

(ii) How is the degree of dissociation affected when its solution also contains 0.1M HCl.



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15. The ionization constant of acetic acid is 1.74×10^{-9} .

Calculate the degree of dissociation of acetic acid in its

0.05 M solution. Calculate the concentration of acetate ions in the solutions and its pH.



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