CHEMISTRY

RESONANCE ENGLISH

IONIC EQUILIBRIUM

Physical Chemitry Ionic Equilibrium

1. $100 mL$ of $0.1\,M\,NaOH$ solution is titrated with $100 mL$ of $0.5\,M$ H_2SO_4 solution. The pH of the resulting solution is : (For $H_2SO_4, K_{a1} = 10^{-2}$)

A. 7

B. 7.2

C. 7.4

D. 6.8

Answer: 2

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2. Find the pH of   0.1 M NaHCO_(3).

Use data $\left(K_1 = 4 \times 10^{-7}, K_2 = 4 \times 10^{-11} \text{ for } H_2CO_3, \log 4 = 0.6\right):$

A. 3.7

B. 8.4

C. 9.6

D. None of these

Answer: 2

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3. If a solution contains $10^{-6}M$ each of X^-, Y^{-2} and Z^{3-} ions, than upon addition of $AgNO_3(s)$ slowly to the above solution with striing : (

Given

$$: K_{sp}(AgX) = 9 \times 10^{-14}, K_{sp}(Ag_2Y) = 4.9 \times 10^{-21}, K_{sp}(Ag_3Z) = 5.12 \times$$

A. Ag_3Z will be the first one to precipitate out.

B. Ag_2Y will be the first one to precipitate out.

C. AgX will be the first one to precipitate out.

D. Nothing can be said with certainity.

Answer: 2

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4. The indicator constant for an acidic indicator, HIn is $5 \times 10^{-6}M$. This

indicator appears only in the colour of acidic form when $\dfrac{[In]}{[HIn]} \le \dfrac{1}{20}$

and it appears only in the colour of basic form when $\dfrac{[HIn]}{[In]} \le \dfrac{1}{40}$. The

pH range of indicator is $\left[\text{Given} : \log 5 = 0.7 \right]$

A. $4.3 - 6.3$

B. $4.0 - 6.6$

C. $4.0 - 6.9$

D. $3.7 - 6.6$

Answer: 3

5. Which solution is not a buffer solution ?

A. $NaCN$ (2 mole) $+ HCl$ (1 mole) in $5L$

B. $NaCN$ (1 mole) $+ HCl$ (1 molde) in $5L$

C. NH_3(2 mole) $+ HCl$ (1 mole) in $5L$

D. CH_3COOH (2 mole) $+ KOH$ (1 mole) in $5L$

Answer: 2

6. The pH of blood is 7.4 . What is the ratio of $\left[\dfrac{HPO_4^{2-}}{H_2PO_4^-}\right]$ in the blood.

$pK_a\left(H_2PO_4^-\right) = 7.1$

    A. 2:1

    B. 1:2

    C. 3:1

    D. 1:3

Answer: 1

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7. How much water must be added to $300mL$ of a $0.2M$ solution of CH_3COOH for the degree of dissociation of the acid to double ? (Assume K_a of acetic is of order of $10^{-5}M$)

    A. $900ml$

    B. $300ml$

C. $600ml$

D. $1200ml$

Answer: 1

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8. 10^{-2} mole of $NaOH$ was added to $10litres$ of water. The pH will change by

A. 4

B. 3

C. 11

D. 7
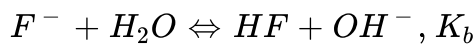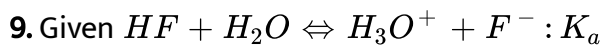
Answer: 1

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9. Given $HF + H_2O \Leftrightarrow H_3O^+ + F^- : K_a$

$F^- + H_2O \Leftrightarrow HF + OH^-, K_b$

Which of the following relations is correct ?

A. $K_b = K_w$

B. $K_b = \dfrac{1}{K_w}$

C. $K_a \times K_b = K_w$

D. $\dfrac{K_a}{K_b} = K_w$

Answer: 3

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10. When salt NH_4Cl is hydrolysed at $25°C$, the pH is

A. 7

B. < 7

C. > 7

D. 0

Answer: 2

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11. A weak acid HA and a weak base BOH are having same value of dissociation constants . If pH of $0.01MHA$ is 4, then pH of $0.01MBOH$ will be

A. 3

B. 4

C. 10

D. 11

Answer: 2

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12. At $900°C$, pK_w is 13. At this temperature an aqueous solution with $pH = 7$ will be

A. Acid

B. Basic

C. Neutral

D. None of these

Answer: 2

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13. Which relation is wrong

A. $10^{-pH} + 10^{-pOH} = 10^{-14}$

B. $pH \alpha \dfrac{1}{[H^+]}$

C. $K_w \propto T$

D. dissociation constant of water $K = 1.8 \times 10^{-16}$

Answer: 1

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14. Ph of an aqueous solution of HCl is 5. If $1c.c.$ of this solution is dilution to 1000 times. The pH will become

A. 8

B. 5

C. 6.9

D. None

Answer: 3

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15. Dissociation constant of a weak acid is 10^{-6} . What is the value of equilibrium constant for its reaction with strong base
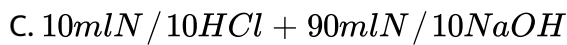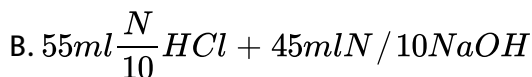
A. 10^{-5}

B. 6.9

C. None

D. 10^9

Answer: 4

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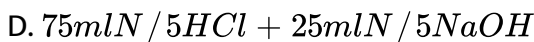
16. Which of the following solutions will have pH close to 1.0?

A. $100 \text{ ml} N/10 HCl + 100 \text{ ml} N/10 NaOH$

B. $55ml\dfrac{N}{10}HCl + 45mlN/10NaOH$

C. $10mlN/10HCl + 90mlN/10NaOH$

D. $75mlN/5HCl + 25mlN/5NaOH$

Answer: 4

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17. What is ΔpH (final $-$ initial) for $1/3 \& 2/3$ stages of neutralization of $0.1M CH_3COOH$ with $0.1M NaOH$

A. $+2\log 2$

B. $-2\log 3$

C. $2\log 1/4$

D. $2\log 2/3$

Answer: A

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18. A weak acid (HA) is titrated with $N/100 NaOH$. What will be the pH when 50% of titration is completed. Given $K_a = 1^{-4}$ & concentration of $HA = 0.1M$

A. 4

B. 8

C. 6.9

D. 10

Answer: 1

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19. An acid indicator is represented by Hl_n. $(K_a = 10^{-5})$. The range of change of colour for the indicator is

A. $3 - 5$

B. $4 - 6$

C. $5 - 7$

D. $6 - 8$

Answer: 2

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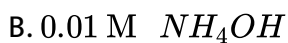
20. Which will act as a buffer solution

A. $200 mol N/10 NaOH + 100 ml N/20 HCl$

B. $100 ml 0.1 N NaOH + 100 ml 0.1 N HCl$

C. $100 mol 0.1 N NaOH + 50 ml 0.2 N CH_3COOH$

D. $100 ml 0.1 N NaOH + 150 ml 0.1 N HCN$
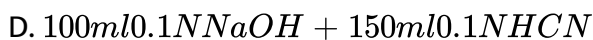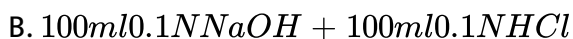
Answer: 4

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21. 0.1 MNH_4OH & 0.01M NH_4OH are taken. Which is a stronger base

A. $0.1 M NH_4OH$

B. 0.01 M NH_4OH

C. Both equal

D. None

Answer: B

22. How many moles of $NaOH$ must be removed from 1 litre of aqueous solution to change its pH from 12 to 11

A. 0.009

B. 0.01

C. 0.02

D. 0.1

Answer: 1

23. Let the solubilities of $AgBr$ in water and in $0.01MCaBr_2$, $0.01MKBr$, and $0.05MAgNO_3$be S_1, S_2, S_3 and S_4,

respectively. Give the decreasing order of the solubilities.

A. $S_1 > S_2 > S_3 > S_4$

B. $S_1 > S_2 = S_3 > S_4$

C. $S_4 > S_3 > S_2 > S_1$

D. $S_1 > S_3 > S_2 > S_4$

Answer: 4

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24. $0.1 M H_2 S$ has $K_1 = 10^{-5} \& K_2 = 1.5 \times 10^{-12}$. What will be the concentration of S^{-2} in the solution.

A. $\approx 10^{-8}$

B. $\approx 10^{-9}$

C. $\approx 1.5 \times 10^{-12}$

D. 1.2×10^{-13}

Answer: 3

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25. Which has maximum solubility AB, AB_2, AB_3 and AB_4 if K_{SP} for all the salts are 10^{-10} :

    A. AB

    B. AB_2

    C. AB_3

    D. AB_4

Answer: 4

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26. Four acids HA, HB, HC and HD form salts with $NaOH$ of Ph 7,8,9 and 10 respectively when each solution was $0.1M$, the strongest acid is :

A. HA

B. HB

C. HC

D. HD

Answer: 1

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27. Three bases $XOH, YOH \& ZOH$ has pK_b values $2, 3, \& 4$ reespectively the strongest conjugate acid is :

A. XOH_2^+

B. YOH_2^+

C. ZOH_2^+

D. All same

Answer: 3

28. Four solution of NH_4Cl are taken with concentration $1M, 0.1M, 0.01M \& 0.001M$. Their degree of hydrolysis are $h_1, h_2 \& h_3, h_4$. What is the gradation of degree of hydrolysis

A. $h_1 > h_2 > h_3 > h_4$

B. $h_1 = h_2 = h_3 = h_4$

C. $h_4 > h_3 > h_2 > h_1$

D. None of these

Answer: 3

29. Ph of $3 \times 10^{-3}M$ solution of H_3X will be Assuming $\alpha_1 = 1, \alpha_2 = 1/3, \alpha_3 = $ negligible

A. 2.40

B. 3.0

C. 3.4771

D. 4.0

Answer: 1

30. Degree of hydrolysis of $0.25M CH_3COOHNa$ is 10% what will be the degree of hydrolysis if concentration of CH_3COONa is made $0.01M$

A. 10%

B. 1%

C. 50%

D. 75%

Answer: 3

31. The strengths of acids and bases are directly related to their strengths as electrolytes. The electrical conductivity of $0.1MHCl$:

    A. is higher than $0.1MCH_3COOH$

    B. is lower than $0.1MCH_3COOH$

    C. equal to $0.1MCH_3COOH$

    D. None

Answer: 1

32. Calculate the pH of resulting solution obtained by mixing $50mL$ of $0.6NHCl$ and $50ml$ of $0.3NNaOH$

    A. 0.1

B. 0.8

C. 2.1

D. 4

Answer: 2

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33. $50mlN/10NaOH$ solution is mixed with $50mlN/20HCl$ solution.

The resulting solution will

(a) Turns phenolphthalein solution pink (b) Turns blue litmus red

(c) Turns methyl orange red $(d) [H^+] \& [OH^-]$

A. only (a) is correct

B. $(a)\&(b)$ are correct

C. $(a)\&(d)$ are correct

D. all are correct

Answer: C

34. To prepare a buffer of pH 8.26, amount of $(NH_4)_2SO_4$ to be added into 500mL of $0.01M NH_4OH$ solution $\left[pK_a\left(NH_4^+\right) = 9.26\right]$ is:

A. 0.05 mole

B. 0.025 mole

C. 0.10 mole

D. 0.0005 mole

Answer: 2

35. A solution containing 0.2 mole of dicholoracetice acid $\left(K_a = 5 \times 10^{-2}\right)$ and 0.1 mole sodium dicholoroacetate in one litre

solution has $[H^+]$:

A. $0.05M$

B. $0.025M$

C. $0.10M$

D. $0.005M$

Answer: 1

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36. The volume of $0.2MNaOH$ needed to prepare a buffer of $pH4.74$ with $50mL$ fo $0.2M$ sodium dicholoroacetate acid $(pK_b$ of $CH_3COO^- = 9.26)$ is :

A. $50mL$

B. $25mL$

C. $20mL$

D. $10 mL$

Answer: 2

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37. The ratio of pH of solution (1) containing 1 mole of CH_3COONa and 1 mole of HCl and solution (II) containing 1 mole of CH_3COONa and 1 mole of acetic acid in one litre is :

A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer: A

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38. Equal volumes of two HCl solutions of $pH = 3$ and $pH = 5$ were mixed. What is the Ph of the resulting solution ?

A. 3.5

B. 4.0

C. 4.5

D. 3.3

Answer: 4

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39. pOH of 0.002 M HNO_3 is:

A. $11 + \log 2$

B. $11 - \log 2$

C. $-3 + \log 2$

D. none of these

Answer: 1

40. To a 10 mL of $10^{-3}NH_2SO_4$ solution water has been added to make the total volume of one litre.Its pOH would be :

A. 3

B. 12

C. 9

D. 5

Answer: 3

41. A weak base MOH of 0.1 N concentration shows a pH value of 9. What is the precentage degree of dissociation of the base?

A. 0.01 %

B. 0.001 %

C. 0.1 %

D. 0.02 %

Answer: 3

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42. Calculate the $\left[OH^-\right]$ in $0.01M$ aqueous solution of $NaOCN(K_b$ for

$OCN^- = 10^{-10})$:

(a)10^{-6} M

(b)10^{-7} M

(c)10^{-8} M

(d)None of these

A. $10^{-6}M$

B. $10^{-7}M$

C. $10^{-8}M$

D. none of these

Answer: 1

43. What will be the pH and $\% \, \alpha$ (degree of hydrolysis) respectively for the salt BA of $0.1M$ concentration ? Given : K_a for $HA = 10^{-6}$ and K_b for $BOH = 10^{-6}$

(a)5, 1 %

(b)7, 10 %

(c)9, 0.01 %

(d)7, 0.01 %

A. 5, 1 %

B. 7, 10 %

C. 9, 0.01 %

D. 7, 0.01 %

Answer: 2

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44. 50 mL of a solution containing 10^{-3} mole of Ag^+ is mixed with 50 mL of a 0.1 M HCl solution. How much Ag^+ remains in solution? $(K_{sp} of AgCl = 1.0 \times 10^{-10})$

A. 2.5×10^{-9}

B. 2.5×10^{-7}

C. 2.5×10^{-8}

D. 2.5×10^{-8}

Answer: 1

45. The solubility product of AgCl is 10^{-10} M^2. The minimum volume $(\in m^3)$ of water required to dissolve 14.35mg of AgCl is approximately :

A. 0.01

B. 0.1

C. 100

D. 10

Answer: A

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46. What is the molar solubility of Ag_2CO_3 $(K_{sp} = 4 \times 10^{-13})$ in 0.1 M $NaCO_3$ solution?

A. 10^{-6}

B. 10^{-7}

C. 2×10^{-6}

D. 2×10^{-7}

47. A solution saturated in lime water has a pH fo 12.4. Then the Ksp for $Ca(OH)_2$ is $-$

A. 3.2×10^{-3}

B. 7.8×10^{-6}

C. 7.8×10^{-28}

D. 3.2×10^{-4}

48. Find ΔpH when 100 ml of 0.01 M HCl is added in a solution containing 0.1 m moles of $NaHCO_3$ solution of negligible volume. $\left(Ka_1 = 10^{-7}, Ka_2 = 10^{-11} \text{ for } H_2CO_3\right)$

A. $6 + 2\log 3$

B. $3 - 2\log 3$

C. $3 + 2\log 2$

D. $6 - 2\log 3$

Answer: 1

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49. If the solubility of Ag_2SO_4 in $10^{-2} M Na_2SO_4$ solution be $2 \times 10^{-8} M$ then K_{sp} of Ag_2SO_4 will be

A. 32×10^{-24}

B. 16×10^{-18}

C. 32×10^{-18}

D. 16×10^{-24}

Answer: 2

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50. $10mL$ of a strong acid solution of $pH = 2.000$ are mixed with $990mL$ of another strong acid solution of $pH = 4.000$. The pH of the resulting solution will be :

A. 4.002

B. 4.000

C. 4.200

D. 3.7

Answer: 4

51. At infinite dilution, the percentage dissociation of both weak acid and weak base is:

A. 1 %

B. 20 %

C. 50 %

D. 100 %

Answer: 4

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Inorganic Chemistry D F Block Elments

1. If a solution contains $10^{-6} M$ each of X^-, Y^{-2} and Z^{3-} ions, than upon addition of $AgNO_3(s)$ slowly to the above solution with striing : (

Given

$$: K_{sp}(AgX) = 9 \times 10^{-14}, K_{sp}(Ag_2Y) = 4.9 \times 10^{-21}, K_{sp}(Ag_3Z) = 5.12 \times$$

A. Mischmetal

B. Brass

C. Bronze

D. Ziggler-Natta

Answer: 1

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2. The indicator constant for an acidic indicator, HIn is $5 \times 10^{-6} M$. This indicator appears only in the colour of acidic form when $\dfrac{[In]}{[HIn]} \leq \dfrac{1}{20}$ and it appears only in the colour of basic form when $\dfrac{[HIn]}{[In]} \leq \dfrac{1}{40}$. The pH range of indicator is [Given $: \log 5 = 0.7$]

A. Among V, Cr, Mn and Fe, Mn is expected to have the highest third ionization enthalpy.

B. $Eu(II)$ acts as a strong reducing agent.

C. The ionic sizes of lanthanoids decrease in general with increasing atomic number.

D. $VOCl_2$ and $FeCl_2$ are expected to have the same magnetic moment ('spin only')

Answer: 4

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3. Which solution is not a buffer solution ?

A. Curium

B. Califormium

C. Uranium

D. Europium

Answer: 4

4. The pH of blood is 7.4 . What is the ratio of $\left[\dfrac{HPO_4^{2-}}{H_2PO_4^-}\right]$ in the blood.

$pK_a\left(H_2PO_4^-\right) = 7.1$

    A. They are diamagnetic

    B. They shows variable oxidation states

    C. They do not form alloy

    D. They shows inert pair effect

Answer: 2

5. How much water must be added to $300mL$ of a $0.2M$ solution of CH_3COOH for the degree of dissociation of the acid to double ? (Assume K_a of acetic is of order of $10^{-5}M$)

A. $Ti^{+3}, V^{+2}, Cr^{+3}, Mn^{+4}$

B. $Ti^{+2}, V^{+3}, Cr^{+4}, Mn^{+5}$

C. $Ti^{+}, V^{+4}, Cr^{+6}, Mn^{+7}$

D. $Ti^{+2}, V^{+3}, Cr^{+2}, Mn^{+3}$
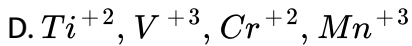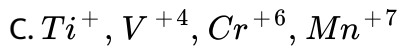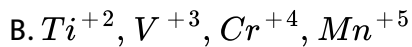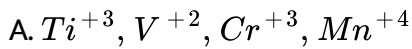
Answer: 2

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6. 10^{-2} mole of $NaOH$ was added to $10 litres$ of water. The pH will change by

A. (i) and (ii) only

B. $(i), (ii)$ and (iii)

C. (iii) and (iv) only

D. (ii) and (iii) only

Answer: 1
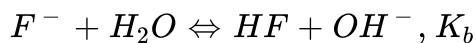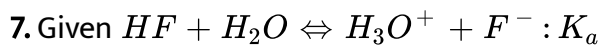
7. Given $HF + H_2O \Leftrightarrow H_3O^+ + F^- : K_a$

$$F^- + H_2O \Leftrightarrow HF + OH^-, K_b$$

Which of the following relations is correct ?

A. Mn^{2+}

B. Fe^{2+}

C. Co^{2+}

D. Cr^{2+}

Answer: 1

8. When salt NH_4Cl is hydrolysed at $25°C$, the pH is

A. $3d^3 4s^2$
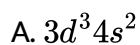
B. $3d^5 4s^1$

C. $3d^5 4s^2$

D. $3d^6 4s^2$

Answer: 3

9. A weak acid HA and a weak base BOH are having same value of dissociation constants . If pH of $0.01MHA$ is 4, then pH of $0.01MBOH$ will be

A. $+5, +5, +3, +2$

B. $+5, +6, +3, +3$

C. $+5, +4, +5, +2$

D. $+5, +3, +2, +1$

Answer: 2

10. At $900° C$, pK_w is 13. At this temperature an aqueous solution with $pH = 7$ will be

    A. of high ionic charge

    B. of variable oxidation state

    C. large surface area of reactants

    D. of their specific nature

Answer: 2

11. Which relation is wrong

    A. Cr^{3+}

    B. Cr_2O_3

C. $Cr_2O_7^{2-}$

D. CrO_4^{-}
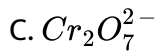
Answer: 3

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12. Ph of an aqueous solution of HCl is 5. If $1c.\,c.$ of this solution is dilution to 1000 times. The pH will become

A. $3/5$

B. $2/5$

C. $4/5$

D. 1

Answer: 1

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13. Dissociation constant of a weak acid is 10^{-6}. What is the value of equilibrium constant for its reaction with strong base

A. Suluphur dioxide

B. Ferric chloride

C. H_2O_2

D. $FeSO_4$

Answer: 2

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14. Which of the following solutions will have pH close to 1.0?

A. k_2MnO_4, green

B. Mn_2O_3brown

C. Mn_2O_4,black

D. $KMnO_4$,purple

Answer: 1

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15. What is ΔpH (final $-$ initial) for $1/3 \& 2/3$ stages of neutralization of $0.1MCH_3COOH$ with $0.1MNaOH$

    A. $VO > CrO > TiO > FeO$

    B. $CrO > VO > FeO > TiO$

    C. $TiO > FeO > VO > CrO$

    D. $TiO > VO > CrO > FeO$

Answer: 4

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16. A weak acid (HA) is titrated with $N/100NaOH$. What will be the pH when 50% of titration is completed. Given $K_a = 1^{-4}$ & concentration of

$HA = 0.1M$

A. $AgNO_3 + NaBr \rightarrow AgBr + NaNO_3$

B. $AgNO_3 + 2Na_2S_2O +_3 \rightarrow Na_3[Ag(S_2O_3)_2 + NaBr$

C. $C_6H_4(OH)_2 + 2AgBr^* \rightarrow C_6H_4O_2 + 2HBr + 2Ag$

D. $AgBr + 2NH_3 \rightarrow [Ag(NH_3)_2]Br$
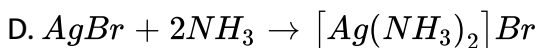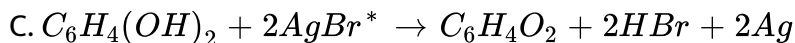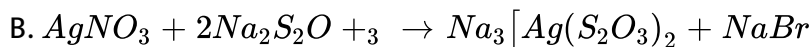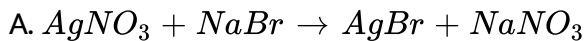
Answer: 3

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17. An acid indicator is represented by Hl_n. $(K_a = 10^{-5})$. The range of change of colour for the indicator is

A. La^{3+} and Lu^{3+}

B. Nd^{3+} and Pm^{3+}

C. Ce^{3+} and Pt^{3+}

D. Sm^{3+} and Eu^{3+}

Answer: 1

---
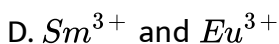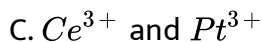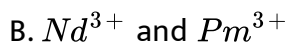
18. Which will act as a buffer solution

    A. Poor shielding of one of the $4f-$ electrons by anoher in the sub-

       shell.

    B. Effective shielding of one of the $4f-$ electrons by another in the

       sub-shell

    C. Poorer shielding of 5d electron by 4f electrons.

    D. Greater shielding of 5d electron by 4f electron.

Answer: 1

---

19. $0.1 \, \mathrm{M} NH_4 \mathrm{OH}$ & $0.01 \mathrm{M} \quad NH_4OH$ are taken. Which is a stronger base

A. $d - d$ transition

B. $C - T$ spectra

C. Higher polarisation caused by Zn^{2+} ion

D. $F - $ centres

Answer: 4

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20. How many moles of $NaOH$ must be removed from 1 litre of aqueous solution to change its pH from 12 to 11

A. $Zn < Cu < Ni < Fe$

B. $Fe < Ni < Cu < Zn$

C. $Ni < Fe < Zn < Cu$

D. $Cu < Zn < Fe < Ni$

Answer: 1

21. Let the solubilities of $AgBr$ in water and in $0.01MCaBr_2$, $0.01MKBr$, and $0.05MAgNO_3$ be S_1, S_2, S_3 and S_4, respectively. Give the decreasing order of the solubilities.

A. ZnO

B. BaO

C. $HgCl$

D. Hg_2Cl_2

Answer: 1

22. $0.1MH_2S$ has $K_1 = 10^{-5} \& K_2 = 1.5 \times 10^{-12}$. What will be the concentration of S^{-2} in the solution.

A. $Cr_2O_7^{2-}$

B. CrO_4^{2-}

C. $Cr(OH)_3^{2-}$

D. $Cr(OH)_2$
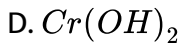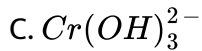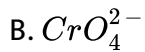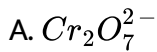
Answer: 2

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23. Which has maximum solubility AB, AB_2, AB_3 and AB_4 if K_{SP} for all
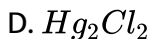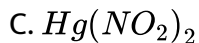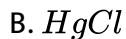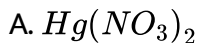
the salts are 10^{-10}:

A. $Hg(NO_3)_2$

B. $HgCl$

C. $Hg(NO_2)_2$

D. Hg_2Cl_2

Answer: 2

24. Four acids HA, HB, HC and HD form salts with $NaOH$ of Ph 7,8,9 and 10 respectively when each solution was $0.1M$, the strongest acid is :

A. $CuCO_3.\ Cu(OH)_2$

B. $2CuCO_3.\ Cu(OH)_2$

C. $CuCO_3.2Cu(OH)_2$

D. $CuSO_4.\ Cu(OH)_2$
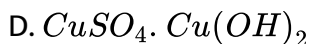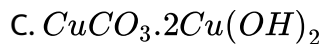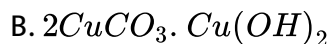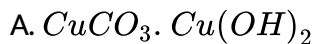
Answer: 2

25. Three bases $XOH, YOH \& ZOH$ has pK_b values 2, 3, &4 reespectively the strongest conjugate acid is :

A. Al^{3+}

B. Cr^{3+}

C. Fe^{3+}

D. Zn^{2+}
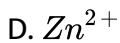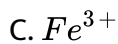
Answer: 3

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26. Four solution of NH_4Cl are taken with concentration $1M, 0.1M, 0.01M \& 0.001M$. Their degree of hydrolysis are $h_1, h_2 \& h_3, h_4$. What is the gradation of degree of hydrolysis

A. is greater than one

B. is less than one

C. is equal to one

D. cannot be predicted

Answer: 2

27. Ph of $3 \times 10^{-3} M$ solution of H_3X will be Assuming

$\alpha_1 = 1, \alpha_2 = 1/3, \alpha_3 = $ negligible

A. 6, 8

B. 6, 5

C. 8, 6

D. 7, 7

Answer: 1

28. Degree of hydrolysis of $0.25M CH_3COOH Na$ is 10% what will be the degree of hydrolysis if concentration of CH_3COONa is made $0.01M$
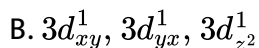
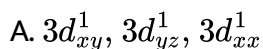A. CuS_2O_3

B. $Cu_2S_2O_3$

C. $Na_2[Cu(S_2O_3)_2]$

D. $Na_4[Cu_6(S_2O_3)_5]$
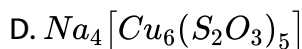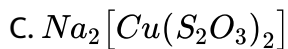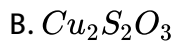
Answer: 4

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29. The strengths of acids and bases are directly related to their strengths as electrolytes. The electrical conductivity of $0.1MHCl$:

A. $3d_{xy}^1, 3d_{yz}^1, 3d_{xx}^1$

B. $3d_{xy}^1, 3d_{yx}^1, 3d_{z^2}^1$

C. $3d_{(x^2-y^2)}^1, 3d_{z^2}^1, 3d_{zx}^1$

D. $3d_{xy}^1, 3d_{(x^2-y^2)}^1, 3d_{yz}^1$
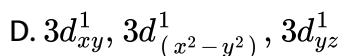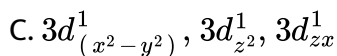
Answer: 1

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30. Calculate the pH of resulting solution obtained by mixing $50mL$ of $0.6NHCl$ and $50ml$ of $0.3NNaOH$

A. Cl_2 is passed into an aqueous solution of $KMnO_4$

B. MnO_2 is fuesed with KOH

C. Formaldehyde reacts with $KMnO_4$ in the presence of strong alkali

D. $KMnO_4$ reacts with conc. H_2SO_4

Answer: 3

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31. $50mlN/10NaOH$ solution is mixed with $50mlN/20HCl$ solution. The resulting solution will

(a) Turns phenolphthalein solution pink (b) Turns blue litmus red

(c) Turns methyl orange red (d) $[H^+]\&[OH^-]$

A. 102

B. 108

C. 110

D. 112

Answer: D

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32. To prepare a buffer of pH 8.26, amount of $(NH_4)_2SO_4$ to be added into 500mL of $0.01MNH_4OH$ solution $\left[pK_a\left(NH_4^+\right) = 9.26\right]$ is:

A. $Cr_2O_7^{-2}$

B. MnO_4^-

C. CrO_5

D. CrO_4^{-2}
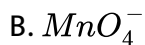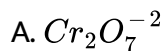
Answer: 3

33. A solution containing 0.2 mole of dicholoracetice acid $\left(K_a = 5 \times 10^{-2}\right)$ and 0.1 mole sodium dicholoroacetate in one litre solution has $\left[H^+\right]$:

A.
| $I - \text{step}$ | $II - \text{step}$ | $III - \text{step}$ |
| $Na_2CO_3 / \text{air}, \Delta$ | C | C |

B.
| $I - \text{step}$ | $II - \text{step}$ | $III - \text{step}$ |
| $NaOH / \text{air}, \Delta$ | C, Δ | At, Δ |

C.
| $I - \text{step}$ | $II - \text{step}$ | $III - \text{step}$ |
| $NaOH / \text{air}, \Delta$ | C, Δ | C, Δ |

D.
| $I - \text{step}$ | $II - \text{step}$ | $III - \text{step}$ |
| $\text{conc.} H_2SO_4, \Delta$ | NH_4Cl, Δ | C, Δ |

Answer: 2

34. The volume of $0.2 MNaOH$ needed to prepare a buffer of $pH 4.74$ with $50 mL$ fo $0.2M$ sodium dicholoroacetate acid $(pK_b$ of $CH_3COO^- = 9.26)$ is :
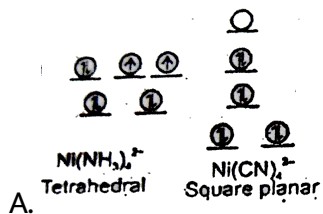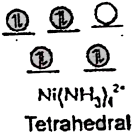
A. $1:1$

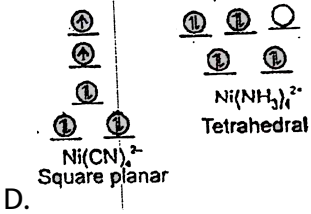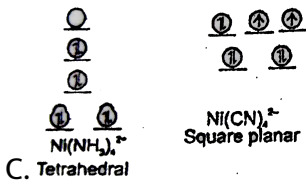B. $1:2$

C. $2:1$

D. $9:4$

Answer: 1

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35. The ratio of pH of solution (1) containing 1 mole of CH_3COONa and 1 mole of HCl and solution (II) containing 1 mole of CH_3COONa and 1 mole of acetic acid in one litre is :

A.

$Ni(NH_3)_4^{2+}$
Tetrahedral

$Ni(CN)_4^{2-}$
Square planar

B.

$Ni(CN)_4^{-}$
Square planar

$Ni(NH_3)_4^{2+}$
Tetrahedral

C. Tetrahedral Ni(NH₃)₄²⁺ ... Ni(CN)₄²⁻ Square planar

D. Ni(CN)₄²⁻ Square planar ... Ni(NH₃)₄²⁺ Tetrahedral
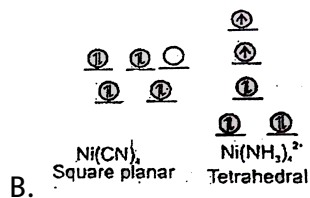
Answer: 1

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36. Equal volumes of two HCl solutions of $pH = 3$ and $pH = 5$ were mixed. What is the Ph of the resulting solution ?

A. Zero

B. $\sqrt{3}$

C. $\sqrt{24}$

D. $\sqrt{35}$

Answer: 1

---

37. pOH of 0.002 M HNO_3 is:

   A. Na

   B. Sn

   C. Ni

   D. Hg

Answer: 3

---

38. To a 10 mL of $10^{-3}NH_2SO_4$ solution water has been added to make the total volume of one litre.Its pOH would be :

	a	b	c	d
A.	II	I	IV	III
B.	III	I	II	IV
C.	IV	II	III	I
D.	I	II	III	IV

Answer: 1

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39. A weak base MOH of 0.1 N concentration shows a pH value of 9. What is the precentage degree of dissociation of the base?

	a	b	c	d
A.	p	q	r	s
B.	p	r	q	s
C.	p	s	q	r
D.	q	s	p	r

Answer: A

40. Calculate the $\left[OH^-\right]$ in $0.01M$ aqueous solution of $NaOCN(K_b$ for

$OCN^- = 10^{-10})$:

(a)10^{-6} M

(b)10^{-7} M

(c)10^{-8} M

(d)None of these

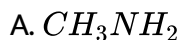A. $Cr^{+2}(aq)$ is more stable than $Cr^{+3}(aq)$

B. $Mn^{+3}(aq)$ is more stalbe than $Mn^{+2}(aq)$

C. Cr^{+2} acts as a reducing agent and Mn^{+2} acts as an oxidising

agent in their aqueous solutions

D. None of these

Answer: 3

1. $100mL$ of 0.1 M NaOH solution is titrated with $100mL$ of 0.5 M H_2SO_4 solution. The pH of the resulting solution is : (For H_2SO_4, $K_{a1} = 10^{-2}$)

A. CH_3NH_2

B. CH_3CN

C. CH_3CH_2OH

D. CH_3CHO
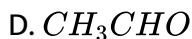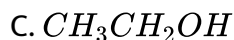
Answer: 1

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2. Find the pH of 0.1 M NaHCO_(3).

Use data $(K_1 = 4 \times 10^{-7}, K_2 = 4 \times 10^{-11}$ for H_2CO_3, $\log 4 = 0.6)$:

A. Mendius reaction

B. Oxo process

C. Sandmeyer reaction

D. Stephen's reaction

Answer: B

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3. If a solution contains $10^{-6}M$ each of X^-, Y^{-2} and Z^{3-} ions, than upon addition of $AgNO_3(s)$ slowly to the above solution with striing : (

Given

: $K_{sp}(AgX) = 9 \times 10^{-14}$, $K_{sp}(Ag_2Y) = 4.9 \times 10^{-21}$, $K_{sp}(Ag_3Z) = 5.12$ ⟩
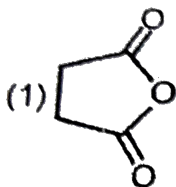
A. H_2/Ni

B. $NaBH_4$

C. $K_2Cr_2O_7/H^+$

D. Both (1) and (2)

Answer: 2

4. The indicator constant for an acidic indicator, HIn is $5 \times 10^{-6} M$. This indicator appears only in the colour of acidic form when $\dfrac{[In]}{[HIn]} \le \dfrac{1}{20}$ and it appears only in the colour of basic form when $\dfrac{[HIn]}{[In]} \le \dfrac{1}{40}$. The pH range of indicator is [Given : $\log 5 = 0.7$]
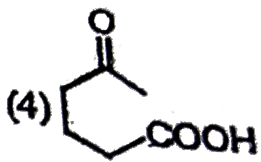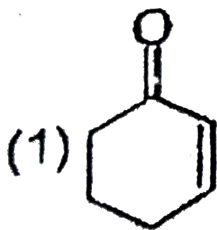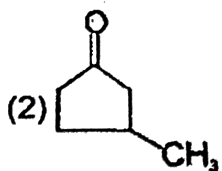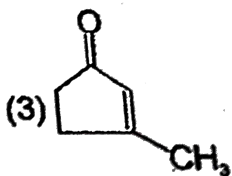
(1)

A.

(2)

B.

(3)

C.

(4)

D.

Answer: 2

5. Which solution is not a buffer solution ?
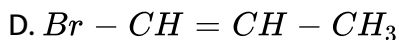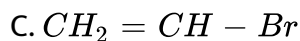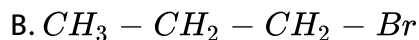

(1)

A.

(2)

B.

(3)
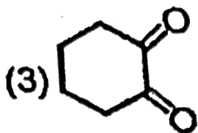
C.
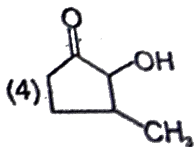
D.

Answer: 3

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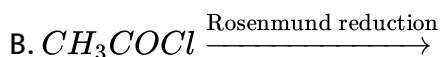**6.** The pH of blood is 7.4 . What is the ratio of $\left[\dfrac{HPO_4^{2-}}{H_2PO_4^-}\right]$ in the blood.

$pK_a(H_2PO_4^-) = 7.1$

A. $CH_3CH(Br)CH_3$

B. $CH_3 - CH_2 - CH_2 - Br$

C. $CH_2 = CH - Br$

D. $Br - CH = CH - CH_3$

Answer: 1

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7. How much water must be added to $300mL$ of a $0.2M$ solution of CH_3COOH for the degree of dissociation of the acid to double ? (Assume K_a of acetic is of order of $10^{-5}M$)

A. $CH_3COCH_3 \xrightarrow{NaBH_4}$

B. $CH_3COCl \xrightarrow{\text{Rosenmund reduction}}$

C. $CH_3CH_2COCH_2CH_3 \xrightarrow{Sn.HCl}$

D. $CH_3CH_2COCH_3 \xrightarrow{LiAlH_4}$

Answer: D

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8. 10^{-2} mole of $NaOH$ was added to $10litres$ of water. The pH will change by

A. Reaction $I:P$ and Reaction $II:P$
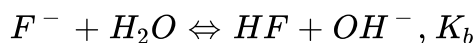
B. Reaction I : U, acetone and Reaction II : Q, acetone

C. Reaction I : T, U, acetone and Reaction II : P

D. Reaction I : R, acetone and Reaction II : S , acetone

Answer: 3

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9. Given $HF + H_2O \Leftrightarrow H_3O^+ + F^- : K_a$
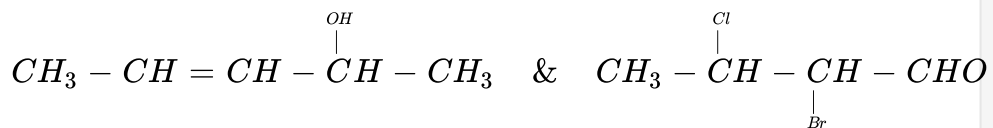
$\qquad F^- + H_2O \Leftrightarrow HF + OH^-, K_b$

Which of the following relations is correct ?

A. $CH_3 - \underset{\underset{CH_2}{|}}{CH} - CH_2CHO$ & $CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{Cl}{|}}{CH}} - CH - CHO$

B.

$\qquad CH_3 - CH = CH - \underset{\overset{|}{OH}}{CH} - CH_3$ & $CH_3 - \underset{\underset{Cl}{|}}{\overset{\overset{Br}{|}}{CH}} - CH - CHO$

C. $CH_3 - \underset{\underset{CH_3}{|}}{CH_2} - CHO$ & $CH_3 - \underset{\underset{Cl}{|}}{\overset{\overset{Br}{|}}{CH}} - CH - CHO$

D.

$$CH_3 - CH = CH - \overset{\overset{\displaystyle OH}{|}}{CH} - CH_3 \quad \& \quad CH_3 - \overset{\overset{\displaystyle Cl}{|}}{CH} - \overset{\underset{\displaystyle Br}{|}}{CH} - CHO$$

Answer: 4

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10. When salt NH_4Cl is hydrolysed at $25°C$, the pH is

A. (1) Z is ⟨O⟩—CH₂—COOH

B. (2) X is ⟨O⟩—CBr₃

C. (3) Y is ⟨O⟩—CH₂—CN

D. (4) X is ⟨O⟩—CH,—Br
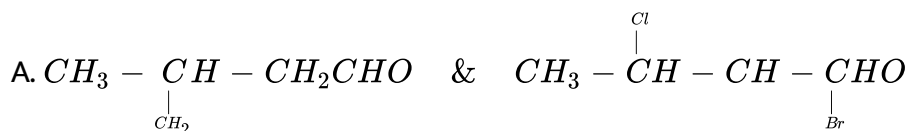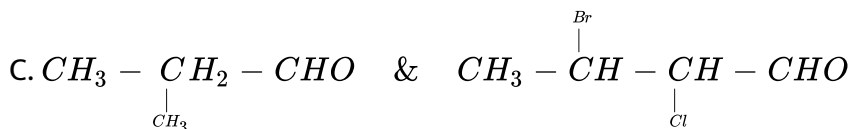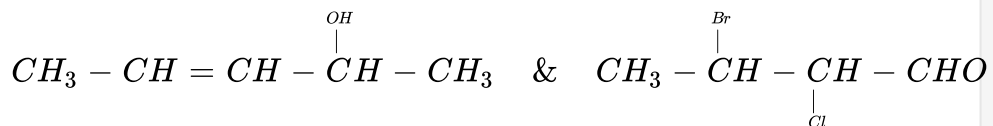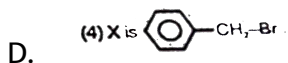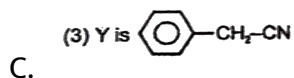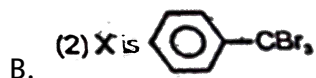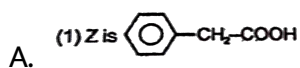
Answer: 2

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11. A weak acid HA and a weak base BOH are having same value of dissociation constants . If pH of $0.01MHA$ is 4, then pH of $0.01MBOH$ will be

   A. P is $2-$ phenylethanamin

   B. Q is anilin, process is Hofmann's bromamide

   C. R is benzene carbonitrile, process is dehydration

   D. formation of P, involves reduction

Answer: 1

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12. At $900°C$, pK_w is 13. At this temperature an aqueous solution with $pH = 7$ will be

   A. The product is a mixture of two compounds
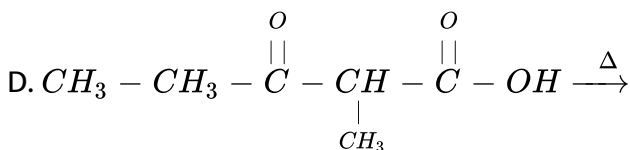
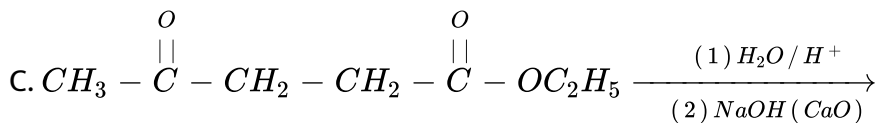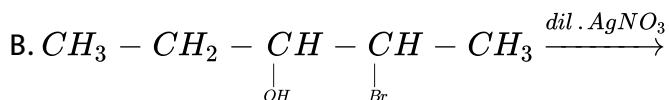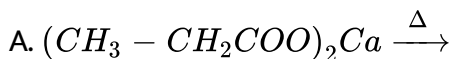   B. The product is optically active

C. The product is a mixture of two chiral and one achiral stereoisomers

D. The product is a mixture of four stereoisomers.

Answer: 3

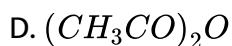▶ Watch Video Solution

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13. Which relation is wrong

A. $(CH_3 - CH_2COO)_2 Ca \xrightarrow{\Delta}$

B. $CH_3 - CH_2 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_3 \xrightarrow{dil.\,AgNO_3}$

C. $CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - CH_2 - \overset{O}{\overset{||}{C}} - OC_2H_5 \xrightarrow[(2)\,NaOH\,(CaO)]{(1)\,H_2O\,/\,H^+}$

D. $CH_3 - CH_3 - \overset{O}{\overset{||}{C}} - \underset{\underset{CH_3}{|}}{CH} - \overset{O}{\overset{||}{C}} - OH \xrightarrow{\Delta}$
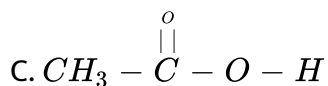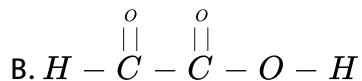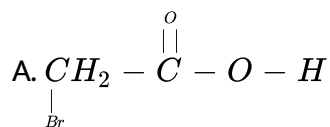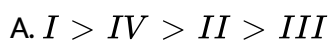
Answer: 3

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14. Ph of an aqueous solution of HCl is 5. If $1c.\,c.$ of this solution is dilution to 1000 times. The pH will become

A. $CH_2 \overset{\overset{\displaystyle O}{\|}}{-} C - O - H$
   $\,|$
   Br

B. $H - \overset{\overset{\displaystyle O}{\|}}{C} - \overset{\overset{\displaystyle O}{\|}}{C} - O - H$

C. $CH_3 - \overset{\overset{\displaystyle O}{\|}}{C} - O - H$

D. $(CH_3CO)_2O$

Answer: 4

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15. Dissociation constant of a weak acid is 10^{-6} . What is the value of equilibrium constant for its reaction with strong base

A. $I > IV > II > III$

B. $I > II > III > IV$

C. $I > III > II > IV$

D. $IV > III > II > I$

Answer: A

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16. Which of the following solutions will have pH close to 1.0?

A. $(i)PBr_3(ii)NH_3$

B. $(i)\text{red}P/Br_2(ii)NH_3(\text{excess})$

C. $(i)PBr_3, NaCN(ii)LiAlH_4$

D. None of the above

Answer: B

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17. What is ΔpH (final $-$ initial) for $1/3 \& 2/3$ stages of neutralization of $0.1MCH_3COOH$ with $0.1MNaOH$

A. Aldol condensation

B. Tischenko reaction

C. Cannizaro reaction

D. Reimer Tiemann reaction

Answer: 3

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