Part IV - Ch.14MCQ

Daily Life & Chemistry Question

- Q1: Which of the following aci is commonly found in the lemon?
  - ▼ Ans:
    1. Ethanoic Acid ⇒ Vinegar
    2. Ascorbic Acid ⇒ Vitamin C ⇒ Lemon
    3. Hydrochloric Acid ⇒ Gastric Juice
    4. Lactic Acid ⇒ Yoghurt

- Q2: Which of the following acid is/are the organic acid?
  - Analyze the Question: What is orgainic substance?
    - Basic Definition: The substance in human body is consdered as organic substances
      - Mainly cotain carbon atom & hydrogen atom ⇒ organic sub.
      - Organic Acid ⇒ Organic Subs.
      - Inorganic Acid ⇒ Mineral Acid ⇒ Inorganic Acid

> 💡 However, some of the basic carbon molecule [e.g: Carbonate, Carbon dioxide] isn't considered as organic subs.

▼ Ans:

1. Carbonic Acid

$$H_2CO_{3(aq)} \rightleftharpoons H^+ + HCO^-_{3(aq)} \rightleftharpoons 2H^+ + CO^{2-}_{3(aq)}$$

> Carbonate ion is an inorganic subs ⇒ Mineral Acid ⇒ (1) is incorrect

2. Citric Acid

$$C_6H_8O_{7(aq)} \rightleftharpoons 3H^+ + C_6H_5O^{3-}_{7(aq)}$$

> Citrate ion is a kind of organic subs. ⇒ Organic Acid ⇒ (2) is correct

3. Ethanoic Acid

$$CH_3COOH_{(aq)} \rightleftharpoons H^+ + CH_3COO^-_{(aq)}$$

> Acetate is a kind of organic subs. ⇒ Organic Acid ⇒ (3) is correct

4. Sulphuric Acid

$$H_2SO_{4(aq)} \longrightarrow 2H^+ + SO^-_{4(aq)}$$

> Sulphate is an inorganic subs ⇒ Mineral Acid ⇒ (1) is incorrect

5. Oxalic Acid

$$C_2H_2O_4 \rightleftharpoons 2H^+ + C_2O_{4(aq)}^{2-}$$

> Oxalates is a kind of organic subs. ⇒ Organic Acid ⇒ (3) is correct

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- Q3: Which of the following subs is/are usually present in "fizzy drink" tablets [即溶片]?

  Choice: (1) Citric Acid (2) Ethanoic Acid (3)Sodium Hydroxide

  - Ans: (1) and (3) | [X: (1)] [X: (3)]

  ▼ Analyze:

  - Fizzy Drink Tablet is in solid state:

  > However, Ethanoic Acid is in liquid state in the room temperature ⇒ (2) is incorrect

  - Fizzy Drink can produce gas:

  > Citric Acid & Sodium hydroxide won't react with water to produce gas

  - Only Citric Acid (+) Sodium hydroxide (+) Water ⇒ Hydrogen Gas ⇒ Correct

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Misconceptions

- Q1:Under stable condition, which aqueous solution can react with HCl to form colorless solution?
  - Analyze the Question: Colourless solution ⇒ No color & No percipitate

  > 💡 睇完 ion color，种要記得睇 solubility

  ▼ Ans:

  1. Copper (II) Sulphate
     - Salt ⇒ Copper (II) Chloride ⇒ Copper (II) ion have color
  2. Iron (III) hydroxide
     - Salt ⇒ Iron (III) Chloride ⇒ Iron (III) ion have color
  3. Magnesium Carbonate
     - Salt ⇒ Magnesium Chloride ⇒ Magnesium ion is colorless
  4. Silver Nitrate
     - Salt ⇒ Silver Chloride ⇒ Silver ion is colorless

     > However, Silver salt is always insoluble [Except:Silver Nitrate] ⇒ White percipitate formed ⇒ "X : Colorless Solution"

- Q2:A simple of air is added to alkaline solution and shaked. The Remaining gas is be collected and it can put off a burning splint. What composition of the air is be removed?

  Choice: (1) Carbon Dioxide (2) Oxygen (3) Nitrogen

- Ans: (1) AND (2)

▼ Analyze:

$$\because \ Alkali + CO_2 \longrightarrow Carbonate\ Salt + H_2O$$

- The Carbon dioxide is removed

$$\because \ Burning\ Splint + Product_{(g)} \longrightarrow Glowing\ Splint$$

- No Oxygen is founded ⇒ Oxygen is removed

- Q3: Which experiment between Gas G & Solution S would have reaction?

  Choice: (1) [G: Hydrogen Gas & S: Sodium Iodide] (2) [G: Sulphur Dioxide & S: Sodium hydroxide] (3) [G: Chlorine Gas & S: Potassium Sulphate]

  - Ans: (2)

  ▼ Analyze:

  - Hydrogen Gas + Salt ⇒ No reaction
  - Sulphur Dioxide + Alkali ⇒ Sulphite Salt + Water

  > ∵Sulphur Compound + Alkali → Sulphite Salt [X: Sulphate Salt] + Water

  - Chlorine Gas + Salt ⇒ No reaction

- Q4: Which is the property of ammonia?

  Choice: (1)Very Soluble in Water (2)Lighter than Air (3)Irrating Smell

  - Ans: (1) AND (2) AND (3)

  ▼ Analyze:

  - (1) : Ammonia is a alkali ⇒ Can dissolve in water

  💡 Although Ammonia is a weak alkai ⇒ small amount of ammonia is ionized, All ammonia molecule can be dissolved in water.

  💡 Ammonia is a covalent bond ⇒ dissolve in non-aqueous solvent ⇒ no hydroxide ion give out !

  > 記住Dissolve 同 Release ion 係完全唔同嘅野 ⇒ [Dissolve=broken down the van der waal's force=Soluble] | [Release ion=pH value of solution]

  - (2) : Air [Water vapour + Nitrogen + Carbon dioxide + Oxygen + Noble Gas +.....] | Ammonia Gas [Ammonia]
  - (3) : 明顯

- Q5: Which of the following about concentrated acid is/are usually stored in brown bottle?

  Choice: (1)Nitric Acid (2)Hydrochloric Acid (3)Sulphuric Acid

  - Ans: (1)

  ▼ Analyze:

∵ **[Nitric Acid ⇒ Nitrate ion + Hydrogen ion] AND [Nitrate is a strong oxidizing agent]**

∴**Strong Sunlight ⇒ Heat ⇒ Decomposed Nitric Acid**

Hard Question:

- Q6: Which of the following Salts would form an acidic solution when dissolved in water?

  Choice: (1)Ammonium Nitrate (2)Iron(III) Chloride (3)Potassium Iodide

> 主要思路1：'Acidic Solution = No. of Hydrogen ion > No. of Hydroxide ion'

> 主要思路2：'Water ⇌ Hydroxide ion + Hydrogen ion'

▼ Analyze Option1:

$$\because [H_2O \rightleftharpoons H^+ + OH^-]\ AND\ [NH_{4(aq)}^+ + H_2O \rightleftharpoons NH_{3(g)} + H_3O^+] \therefore OH^-\ is\ decreased$$

∵ **Hydroxide ion decreased ⇒ No. of Hydrogen ion is relatively higher than No. of Hydroxide ion ⇒ Acidic**

▼ Analyze Option2:

∵**Iron(III) Chloride is soluble in water ⇒ Iron (III) ion + Chloride ion**

$$\because [H_2O \rightleftharpoons H^+ + OH^-]\ AND\ [Fe_{(aq)}^{3+} + 3OH^- \rightarrow Fe(OH)_{3(s)}] \therefore OH^-\ is\ decreased$$

∵**Iron(III) hydroxide is a insoluble salt ⇒ Mobile hydroxide ion decreased**

∵ **Hydroxide ion decreased ⇒ No. of Hydrogen ion is relatively higher than No. of Hydroxide ion ⇒ Acidic**

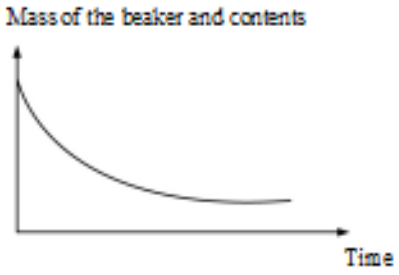
▼ Analyze Option3:

∵**Potassium Iodide is soluble in water ⇒ Potassium ion + Iodide ion ⇒ Potassium Hydroxide is formed**

∵**Potassium hydroxide is a soluble salt ⇒ Mobile hydroxide ion no change ⇒ No change in acidity**

Special Question

▼ Two solutions were mixed in a beaker. The mass of the beaker and contents was then noted at various times. The mass of the beaker and contents is plotted against time as below.



▼ What could the two solutions be?

A. Sodium chloride solution and iron(II) sulphate solution

B. Potassium hydroxide solution and aluminium nitrate solution

C. Potassium carbonate solution and dilute hydrochloric acid

D. Dilute nitric acid and magnesium sulphate solution

▼ Ans & Analyze:

(C) The graph shows a loss in mass. Most likely, a gas was formed and escaped from the beaker. $K_2CO_3(aq) + 2HCl(aq) \rightarrow 2KCl(aq) + H_2O(l) + CO_2(g)$

(A) Salt + Salt ⇒ No Gas

(B) Alkali + Salt/Metal ion ⇒ No Gas

(D) Acid + Salt/Metal ion ⇒ No Gas

▼ Which of the following statements about a 2 M sodium hydroxide solution is/ are correct?

▼ Choice:

(1) It is alkaline.

(2) It conducts electricity.

(3) It contains 2 M hydroxide ions.

▼ Option:

A. (1)

B. (2)

C. (1) & (3)

D. (2) & (3)

▼ Ans & Analyze:

(D):Hydroixe solution have mobile ion ⇒ conduct electricity | Mole ratio of Sodium Hydroxide to Hydroxide ion = 1 : 1 = 2M : 2M

(1) is in correct. What if the solution have 100M of Hydrochloric Acid & 2M of Soudium Hydroxide solution? Obviously, No edvidence to prove 2M of NaOH of solution is alkaine.
