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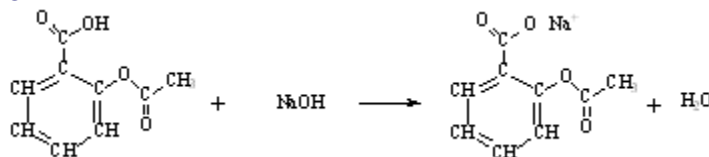
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1.

A 25.00 mL sample of 0.0500 M NaOH neutralized a 1.000 g sample of an aspirin tablet (as shown in the reaction below). What mass percent of aspirin was present in the sample?



Student Response

1. 90.1%
2. 180%
3. 22.5%
4. 4.44%
5. 0.00125%

2.

Identify the spectator ions in this reaction:



Student Response

1. Cu^{2+} and NO_3^-
2. Cu^{2+}
3. Ag^+ and NO_3^-
4. NO_3^-
5. Ag^+

3.

All of the following are strong electrolytes in aqueous solution *except*

Student Response

1. Na_3PO_4 .
2. Na_2HPO_4 .
3. NH_3 .
4. $\text{NH}_4\text{H}_2\text{PO}_4$.
5. NaH_2PO_4 .

4.

When solutions of barium chloride and sodium sulfate are mixed, the spectator ions in the resulting reaction are

Student Response

1. both Na^+ and Cl^- .
2. only Ba^{2+} .
3. only Cl^- .
4. only Na^+ .
5. only SO_4^{2-} .

5.

How many moles of sodium phosphite are required to prepare 12.3 mL of 0.0445 M Na_3PO_3 ?

Student Response

1. 5.47×10^{-4} moles Na_3PO_3
2. 8.10×10^{-2} moles Na_3PO_3
3. 3.70×10^{-3} moles Na_3PO_3
4. 4.45×10^{-2} moles Na_3PO_3
5. 6.58×10^0 moles Na_3PO_3

6.

What volume of a 0.649 M LiCl solution contains 0.0787 moles of lithium chloride?

Student Response

1. 8.25×10^0 mL
2. 1.00×10^3 mL
3. 1.27×10^1 mL
4. 1.21×10^2 mL
5. 5.11×10^1 mL

7.

Which of the following is a weak electrolyte in aqueous solution?

Student Response

1. NH_4Cl
2. $\text{HC}_2\text{H}_3\text{O}_2$
3. NaCl
4. HCl
5. $\text{Al}(\text{NO}_3)_3$

8.

The volume of 0.150-molar NaHCO_3 (FW = 84.0) solution that contains 6.30 g of Na_2CO_3 is

Student Response

1. 0.200 L.
2. 2.50 L.
3. 1.60 L.
4. 0.400 L.
5. 0.500 L.

9.

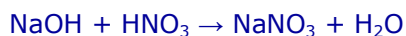
Which net ionic equation best represents the reaction that occurs when an aqueous solution of barium chloride is mixed with an aqueous solution of sulfuric acid?

Student Response

1. $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{HCl}$
2. $\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{BaSO}_4(\text{s})$
3. $2\text{H}^+(\text{aq}) + 2\text{Cl}^-(\text{aq}) \longrightarrow \text{HCl}(\text{g})$
4. $\text{Ba}^{2+}(\text{aq}) + 2\text{Cl}^-(\text{aq}) + 2\text{H}^+(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{BaSO}_4(\text{s}) + 2\text{HCl}(\text{g})$
5. No net reaction occurs.

10.

A 15.00 mL sample of HNO_3 (nitric acid) is titrated with a NaOH (sodium hydroxide) solution. The sodium hydroxide solution was prepared by dissolving 10.00 g of solid NaOH in sufficient water to form 200.00 mL of solution. If the equivalence point was reached after the addition of 23.50 mL of the NaOH solution, what is the molarity of HNO_3 ?



Student Response

1. 15.67 M
2. 7.833 M
3. 0.3917 M
4. 1.250 M
5. 1.948 M

11.

What is the average oxidation number of C in $\text{C}_6\text{H}_{12}\text{O}_6$?

Student Response

1. +1
2. +2
3. 0
4. -1
5. -2

12.

Based on the information below, if 10.00 mL of 0.0500 NaOH neutralizes 10.00 mL of H_xY , which of the following statements is always correct?



Student Response

1. The coefficients for NaOH and H_xY are equal in the balanced equation.
2. The molarity of H_xY equals 0.0500.
3. H_2O and NaY are formed.
4. If x equals 2, then the molarity of H_xY equals 0.100.
5. Moles NaOH and moles H^+ are equal.

13.

For the reaction $C_6H_5CH_3(l) + 3HNO_3(aq) \rightarrow C_6H_2(NO_2)_3CH_3(s) + 3H_2O(l)$, what mass of TNT ($C_6H_2(NO_2)_3CH_3$) may be produced by the complete reaction of 85.2 L of liquid toluene ($C_6H_5CH_3$, $d = 0.867$ g/mL) with 476 L of 10.2 M HNO_3 ?

Student Response

1. 182 kg TNT
2. 0.772 kg TNT
3. 0.227 kg TNT
4. 19.4 kg TNT
5. 368 kg TNT

14.

If a 10.00 mL sample of 0.250 M H_2SO_4 (sulfuric acid) is titrated with 0.250 M KOH (potassium hydroxide), what volume of KOH would have been used at the equivalence point?

Student Response

1. Approximately 5.00 mL
2. Approximately 20.00 mL
3. Less than 10.00 mL
4. Equal to 10.00 mL
5. Greater than 10.00 mL

15.

In which of the following compounds does the underlined element have an oxidation number of -3?

Student Response

1. Cr O_2Cl_2
2. H NO_2
3. N O_2
4. P H_4^+
5. Zn $(OH)_4^{2-}$

16.

Which of the following salts is (are) soluble in aqueous solution?

1. lead(II) nitrate
2. lead(II) sulfide
3. lead(II) carbonate

Student Response

- A. 3 only
- B. 2 only
- C. 1 and 2 only
- D. 1, 2, and 3
- E. 1 only

17.

What is the concentration of potassium nitrate in a solution prepared by dissolving 4.31×10^{-3} moles of KNO_3 in 89.3 mL of water?

Student Response

1. $4.83 \times 10^{-5} \text{ M KNO}_3$
2. 4.88 M KNO_3
3. $4.88 \times 10^{-3} \text{ M KNO}_3$
4. $3.85 \times 10^{-1} \text{ M KNO}_3$
5. $4.83 \times 10^{-2} \text{ M KNO}_3$

18.

For the reaction $3\text{Ba}(\text{OH})_2(\text{aq}) + 2\text{H}_3\text{PO}_4(\text{aq}) \rightarrow \text{Ba}_3(\text{PO}_4)_2(\text{s}) + 6\text{H}_2\text{O}(\text{l})$, if 14.0 mL of a 0.742 M solution of barium hydroxide is mixed with 25.9 mL of a 0.724 M solution of phosphoric acid, and 1.98 g of solid barium phosphate is collected once the reaction is complete, what is the percent yield of the reaction?

Student Response

1. 17.5%
2. 100%
3. 31.7%
4. 95.2%
5. 35.1%

19.

How many molecules of ethanol ($\text{C}_2\text{H}_5\text{OH}$) are required to prepare 70.7 mL of 0.609 M ethanol?

Student Response

1. $6.99 \times 10^{22} \text{ C}_2\text{H}_5\text{OH molecules}$
2. $4.26 \times 10^{22} \text{ C}_2\text{H}_5\text{OH molecules}$
3. $3.67 \times 10^{23} \text{ C}_2\text{H}_5\text{OH molecules}$
4. $1.19 \times 10^{24} \text{ C}_2\text{H}_5\text{OH molecules}$
5. $2.59 \times 10^{22} \text{ C}_2\text{H}_5\text{OH molecules}$

20.

The net ionic equation for the reaction of $\text{Ba}(\text{OH})_2$ with H_3PO_4 is

Student Response

1. $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \longrightarrow \text{H}_2\text{O}(\text{l})$.
2. $6\text{H}^+(\text{aq}) + 2\text{PO}_4^{3-}(\text{aq}) + 3\text{Ba}^{2+}(\text{aq}) + 6\text{OH}^-(\text{aq}) \longrightarrow \text{Ba}_3(\text{PO}_4)_2(\text{s}) + 6\text{H}_2\text{O}(\text{l})$.
3. $2\text{PO}_4^{3-}(\text{aq}) + 3\text{Ba}^{2+}(\text{aq}) \longrightarrow \text{Ba}_3(\text{PO}_4)_2(\text{s})$.
4. $2\text{H}_3\text{PO}_4(\text{aq}) + 3\text{Ba}(\text{OH})_2(\text{aq}) \longrightarrow \text{Ba}_3(\text{PO}_4)_2(\text{s}) + 6\text{H}_2\text{O}(\text{l})$.
5. $2\text{H}_3\text{PO}_4(\text{aq}) + 3\text{Ba}^{2+}(\text{aq}) + 6\text{OH}^-(\text{aq}) \longrightarrow \text{Ba}_3(\text{PO}_4)_2(\text{s}) + 6\text{H}_2\text{O}(\text{l})$.