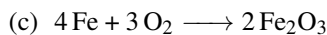
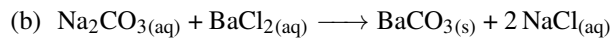
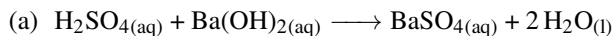


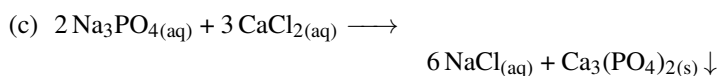
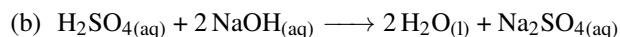
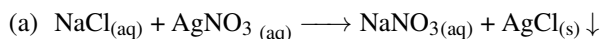
Full Name:

February 22,
2023

0.1 Classify the following reaction as acid-base or precipitation:



0.2 Classify the following reaction as acid-base or precipitation:



0.3 Break down the following compounds into ions: (a) H_2SO_4

(b) HNO_3 (c) KMnO_4

0.4 Break down the following compounds into ions: (a) $\text{Ca}(\text{OH})_2$

(b) K_2CrO_4 (c) $\text{Ca}(\text{NO}_3)_2$

0.5 Indicate whether solutions of the following chemicals will have ions (I), ions and molecules (I+M), or just molecules (M):

Chemical	I	I+M	M
H_2O			
NO_2			
CO_2			

0.6 Indicate whether solutions of the following chemicals will have ions (I), ions and molecules (I+M), or just molecules (M):

Chemical	I	I+M	M
NaCl			
HCl			
CaCl_2			

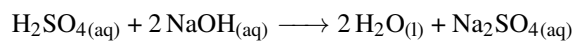
0.7 Indicate the soluble/insoluble character of the following compounds:

Chemical	Soluble	Insoluble
NaCH_3COO		
NaHCO_3		
Ag_2SO_4		
NaCrO_4		
CaS		

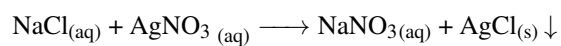
0.8 Indicate the soluble/insoluble character of the following compounds:

Chemical	Soluble	Insoluble
AgNO ₃		
AgBr		
CaCO ₃		
Na ₂ CO ₃		

0.9 Obtain the net ionic equation for the following reaction:



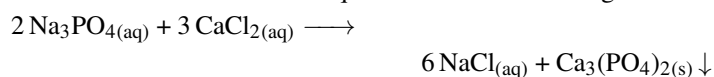
0.10 Obtain the net ionic equation for the following reaction:



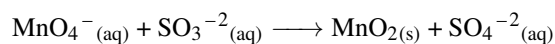
0.11 Obtain the net ionic equation for the following reaction:



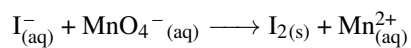
0.12 Obtain the net ionic equation for the following reaction:



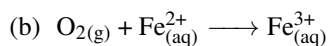
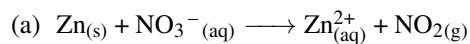
0.13 Balance the following redox reactions in acidic medium:



0.14 Balance the following redox reactions in acidic medium:

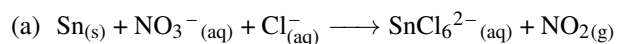


0.15 Balance the following redox reactions in acidic medium:

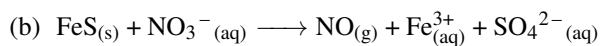
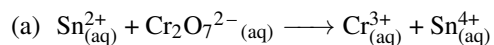


0.16

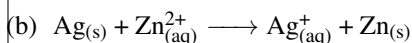
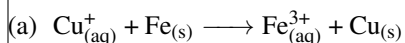
0.17 Balance the following redox reaction in basic medium:



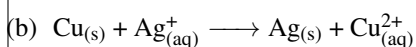
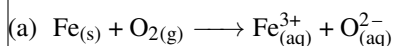
0.18 Balance the following redox reactions in basic medium:



0.19 Balance the following redox reactions:



0.20 Balance the following redox reactions:



0.21 What is the concentration of a solution prepared when 100mL a 4% HCl solution is diluted to a final volume of 500mL.

0.22 What is the final volume when 50mL of a 2M NaCl solution is diluted to a 1M.

0.23 Describe how to prepare 100mL of a 0.1M H_2SO_4 solution, starting with a 2M stock H_2SO_4 solution.

0.24 Describe how to prepare 50mL of a 0.5M H_2SO_4 solution, starting with a 1M stock H_2SO_4 solution.

0.25 Classify the following molecules as polar or nonpolar: (a) $\text{H}_2\text{O}_{(l)}$
(b) $\text{C}_5\text{H}_{12(l)}$ (c) $\text{CH}_3\text{COOH}_{(l)}$ (d) $\text{CH}_3\text{OH}_{(l)}$

0.26 Classify the following molecules as polar or nonpolar: (a) $\text{C}_6\text{H}_{14(l)}$
(b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}_{(l)}$ (c) $\text{C}_5\text{H}_{10(l)}$ (d) $\text{C}_6\text{H}_5\text{CH}_3(l)$ (e) $\text{CH}_3\text{CH}_2\text{OH}_{(l)}$
(f) $\text{C}_6\text{H}_5\text{NH}_2(l)$

0.27 A solution is prepared by mixing 15g of KCl in 50g of water. Calculate the mass percent of solute.

0.28 Sodium hydroxide NaOH, a very strong base, is a chemical used in drain cleaners. A drain cleaning solution is prepared by mixing 25g of NaOH in 250g of water. Calculate the mass percent of solute.

0.29 Vinegar is not a pure chemical, it is indeed a (m/m) 5% acetic acid solution. How many grams of acetic acid are there in 2g of vinegar.

0.30 Alcohol-hydroxide is a mixture of a base with an organic alcohol, employed to clean glass. An alcohol-hydroxide mixture is prepared by mixing 60g of NaOH with 500g of ethanol. Calculate: (a) the mass percent of solvent. (b) the mass percent of solute.

0.31 Order the following solution from more to less concentrated: (a) Solution A ($4.3 \times 10^{-5}\text{M}$) (b) Solution B ($6.1 \times 10^{-3}\text{M}$) (c) Solution C ($6.4 \times 10^{-4}\text{M}$)

0.32 Order the following solution from more to less concentrated:
(a) A vanillin solution ($1.3 \times 10^{-1}\text{M}$) (b) An adrenaline solution ($1.1 \times 10^3\text{M}$) (c) Vinegar, an acetic acid solution ($1.2 \times 10^0\text{M}$)

0.33 Which chemicals from the following list will mix with $\text{C}_5\text{H}_{12}(\text{l})$: (a) $\text{H}_2\text{O}(\text{l})$ (b) $\text{C}_6\text{H}_{14}(\text{l})$ (c) $\text{CH}_3\text{COOH}(\text{l})$

0.34 Which chemicals from the following list will mix with $\text{H}_2\text{O}(\text{l})$: (a) $\text{NH}_3(\text{l})$ (b) $\text{C}_5\text{H}_{12}(\text{l})$ (c) $\text{C}_6\text{H}_{14}(\text{l})$

0.35 How many mL of a 0.001M $\text{Ca}(\text{OH})_2$ (MW=74g/mol) solution can be prepared from 5 mg of $\text{Ca}(\text{OH})_2$.

0.36 How many grams of solute are there in 100mL of a 0.01M HNO_3 (MW=63g/mol) solution.

0.37 How many mL of a 3M KCl solution contains 0.06 moles of KCl.

0.38 An HCl solution is prepared by mixing 4 moles of HCl with water until reaching a volume of 250mL. Calculate the molarity of the solution.

0.39 How many mL of a 1M NaCl (MW=58g/mol) solution contains 4 grams of NaCl.

0.40 How many mL of a 4M NaCl (MW=58g/mol) solution contains 5 grams of NaCl.

0.41 A solution is made by mixing 2 mL of a solute and 100mL of solvent. Calculate the Percent Volume/Volume.

0.42 Vanilla extract is a solution vanillin in ethanol. A vanilla solution is made by mixing 15 mL of pure vanillin and 50mL of ethanol. Calculate the Percent Volume/Volume.

0.43 A solution is prepared by mixing 5 g of Au_(s) and 2 g of Cu_(s). Indicate the true statement: (a) Au is the solute (b) Cu is the solute (c) Both elements do not mix (d) The mixture is not a solution

0.44 A solution is prepared by mixing 4 g of C₆H_{6(l)} and 10 g of CCl_{4(l)}. Indicate the true statement: (a) C₆H₆ is the solute (b) CCl₄ is the solute (c) Both chemicals do not mix (d) The mixture is not a solution

Answers v. 60 **0.1** (a) Acid-base (b) Precipitation (c) redox **0.2** (a) Precipitation (b) Acid-base (c) Precipitation **0.3** (a) $2\text{H}^+ + \text{SO}_4^{2-}$ (b) $\text{H}^+ + \text{NO}_3^-$ (c) $\text{K}^+ + \text{MNO}_4^-$ **0.4** (a) $(\text{Ca}^{2+} + 2\text{OH}^-)$ (b) $2\text{K}^+ + \text{CrO}_4^{2-}$ (c) $\text{Ca}^{2+} + 2\text{NO}_3^-$ **0.5** H_2O (M+I); NO_2 (M); CO_2 (M) **0.6** NaCl (I); HCl (I); CaCl_2 (I) **0.7** NaCH_3COO (Soluble); NaHCO_3 (Soluble); Ag_2SO_4 (Insoluble); NaCrO_4 (Soluble); CaS (Insoluble); **0.8** AgNO_3 (Soluble); AgBr (Insoluble); CaCO_3 (Soluble); Na_2CO_3 (Soluble) **0.9**

0.10 $\text{Ag}^+_{(\text{aq})} + \text{Cl}^-_{(\text{aq})} \longrightarrow \text{AgCl}_{(\text{s})} \downarrow$ **0.11** $\text{HSO}_4^-_{(\text{aq})} + \text{NH}_3_{(\text{aq})} \longrightarrow \text{NH}_4^+_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})}$ **0.12** $3\text{Ca}^{2+}_{(\text{aq})} + 2\text{PO}_4^{3-}_{(\text{aq})} \longrightarrow \text{Ca}_3(\text{PO}_4)_2_{(\text{s})} \downarrow$ **0.13** $2\text{MnO}_4^-_{(\text{aq})} + 2\text{H}^+ + 3\text{SO}_3^{2-}_{(\text{aq})} \longrightarrow \text{H}_2\text{O}_{(\text{l})} + 2\text{MnO}_{2(\text{s})} + 3\text{SO}_4^{2-}_{(\text{aq})}$ **0.14** $10\text{I}^-_{(\text{aq})} + 2\text{MnO}_4^-_{(\text{aq})} + 16\text{H}^+_{(\text{aq})} \longrightarrow 5\text{I}_{2(\text{s})} + 2\text{Mn}^{2+}_{(\text{aq})} + 8\text{H}_2\text{O}_{(\text{l})}$ **0.15** No solution listed **0.16** **0.17** No solution listed **0.18** No solution listed **0.19** (a) $3\text{Cu}^+_{(\text{aq})} + \text{Fe}_{(\text{s})} \longrightarrow \text{Fe}^{3+}_{(\text{aq})} + 3\text{Cu}_{(\text{s})}$ (b) $2\text{Ag}_{(\text{s})} + \text{Zn}^{2+}_{(\text{aq})} \longrightarrow 2\text{Ag}^+_{(\text{aq})} + \text{Zn}_{(\text{s})}$ **0.20** (a) $4\text{Fe}_{(\text{s})} + 3\text{O}_{2(\text{g})} \longrightarrow 4\text{Fe}^{3+}_{(\text{aq})} + 6\text{O}^{2-}_{(\text{aq})}$ (b) $\text{Cu}_{(\text{s})} + 2\text{Ag}^+_{(\text{aq})} \longrightarrow 2\text{Ag}_{(\text{s})} + \text{Cu}^{2+}_{(\text{aq})}$ **0.21** 0.8 % **0.22** 100 mL **0.23** 5mL **0.24** 25mL **0.25** (a) $\text{H}_2\text{O}_{(\text{l})}$ (polar) (b) $\text{C}_5\text{H}_{12(\text{l})}$ (nonpolar) (c) $\text{CH}_3\text{COOH}_{(\text{l})}$ (polar) (d) $\text{CH}_3\text{OH}_{(\text{l})}$ (polar) **0.26** (a) $\text{C}_6\text{H}_{14(\text{l})}$ (nonpolar) (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}_{(\text{l})}$ (polar) (c) $\text{C}_5\text{H}_{10(\text{l})}$ (nonpolar) (d) $\text{C}_6\text{H}_5\text{CH}_3_{(\text{l})}$ (nonpolar) (e) $\text{CH}_3\text{CH}_2\text{OH}_{(\text{l})}$ (polar) (f) $\text{C}_6\text{H}_5\text{NH}_2_{(\text{l})}$ (polar) **0.27** 23% **0.28** 9% **0.29** 0.1 g **0.30** (a) 89% (b) 11% **0.31** $\text{A} \geq \text{C} \geq \text{B}$ **0.32** $\text{adrenaline} \geq \text{vinegar} \geq \text{vanillin}$ **0.33** $\text{C}_6\text{H}_{14(\text{l})}$ (nonpolar) **0.34** $\text{NH}_3_{(\text{l})}$ (polar) **0.35** 67.56mL **0.36** 0.062g **0.37** 20mL **0.38** 16M **0.39** 69mL **0.40** 21mL **0.41** 1.9% **0.42** 23% **0.43** Cu is the solute **0.44** C_6H_6 is the solute

