

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) What volume (mL) of 0.135 M NaOH is required to neutralize 13.7 mL of 0.129 M HCl?
 - A) 6.55
 - B) 14.3
 - C) 0.076
 - D) 0.24
 - E) 13.1
- 2) What are the respective concentrations (M) of Cu^{+2} and Cl^{-} afforded by dissolving 0.200 mol CuCl_2 in water and diluting to 345 mL?
 - A) 0.200 and 0.400
 - B) 0.580 and 0.290
 - C) 0.580 and 1.16
 - D) 0.200 and 0.200
 - E) 1.16 and 2.32
- 3) Oxidation cannot occur without _____.
 - A) acid
 - B) air
 - C) water
 - D) reduction
 - E) oxygen
- 4) Zinc is more active than cobalt and iron but less active than aluminum. Cobalt is more active than nickel but less active than iron. Which of the following correctly lists the elements in order of increasing activity?
 - A) $\text{Ni} < \text{Co} < \text{Fe} < \text{Zn} < \text{Al}$
 - B) $\text{Fe} < \text{Ni} < \text{Co} < \text{Al} < \text{Zn}$
 - C) $\text{Ni} < \text{Fe} < \text{Co} < \text{Zn} < \text{Al}$
 - D) $\text{Co} < \text{Ni} < \text{Fe} < \text{Zn} < \text{Al}$
 - E) $\text{Zn} < \text{Al} < \text{Co} < \text{Ni} < \text{Fe}$
- 5) Oxidation is the _____ and reduction is the _____.
 - A) loss of oxygen, gain of electrons
 - B) loss of electrons, gain of electrons
 - C) gain of electrons, loss of electrons
 - D) gain of oxygen, loss of mass
 - E) gain of oxygen, loss of electrons
- 6) In which species does sulfur have the highest oxidation number?
 - A) S_8 (elemental form of sulfur)
 - B) H_2SO_3
 - C) K_2SO_4
 - D) H_2S
 - E) SO_2
- 7) In which reaction does the oxidation number of hydrogen change?
 - A) $\text{HCl}(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
 - B) $\text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{SO}_3(\text{aq})$
 - C) $2\text{HClO}_4(\text{aq}) + \text{CaCO}_3(\text{s}) \rightarrow \text{Ca}(\text{ClO}_4)_2(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$
 - D) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
 - E) $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{s})$
- 8) Which compound has the atom with the highest oxidation number?
 - A) NH_4Cl
 - B) Na_3N
 - C) $\text{Al}(\text{NO}_2)_3$
 - D) CaS
 - E) MgSO_3
- 9) Based on the activity series, which one of the reactions below will occur?
 - A) $\text{Fe}(\text{s}) + \text{ZnCl}_2(\text{aq}) \rightarrow \text{FeCl}_2(\text{aq}) + \text{Zn}(\text{s})$
 - B) $\text{SnBr}_2(\text{aq}) + \text{Cu}(\text{s}) \rightarrow \text{CuBr}_2(\text{aq}) + \text{Sn}(\text{s})$
 - C) $\text{Pb}(\text{s}) + \text{NiI}_2(\text{aq}) \rightarrow \text{PbI}_2(\text{aq}) + \text{Ni}(\text{s})$
 - D) $\text{Mn}(\text{s}) + \text{NiCl}_2(\text{aq}) \rightarrow \text{MnCl}_2(\text{aq}) + \text{Ni}(\text{s})$
 - E) None of the reactions will occur.
- 10) Of the choices below, which would be the best for the lining of a tank intended for use in storage of hydrochloric acid?
 - A) nickel
 - B) copper
 - C) iron
 - D) tin
 - E) zinc

- 11) Which of these metals will be oxidized by the ions of aluminum?
 A) iron
 B) magnesium
 C) chromium
 D) nickel
 E) zinc
- 12) Sodium does not occur in nature as Na (s) because _____.
 A) it is easily oxidized to Na⁺
 B) it is easily reduced to Na⁻
 C) it reacts with water with great difficulty
 D) it is easily replaced by silver in its ores
 E) it undergoes a disproportionation reaction to Na⁻ and Na⁺
- 13) Which of the following is an oxidation-reduction reaction?
 A) $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2 (\text{aq}) + \text{Na}_2\text{SO}_4 (\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2\text{NaC}_2\text{H}_3\text{O}_2 (\text{aq})$
 B) $\text{H}_2\text{CO}_3 (\text{aq}) + \text{Ca}(\text{NO}_3)_2 (\text{aq}) \rightarrow 2\text{HNO}_3 (\text{aq}) + \text{CaCO}_3 (\text{s})$
 C) $\text{Cu} (\text{s}) + 2\text{AgNO}_3 (\text{aq}) \rightarrow 2\text{Ag} (\text{s}) + \text{Cu}(\text{NO}_3)_2 (\text{aq})$
 D) $\text{HCl} (\text{aq}) + \text{NaOH} (\text{aq}) \rightarrow \text{H}_2\text{O} (\text{l}) + \text{NaCl} (\text{aq})$
 E) $\text{AgNO}_3 (\text{aq}) + \text{HCl} (\text{aq}) \rightarrow \text{AgCl} (\text{s}) + \text{HNO}_3 (\text{aq})$
- 14) The net ionic equation for formation of an aqueous solution of $\text{Al}(\text{NO}_3)_3$ via mixing solid $\text{Al}(\text{OH})_3$ and aqueous nitric acid is _____.
 A) $\text{Al}(\text{OH})_3 (\text{s}) + 3\text{HNO}_3 (\text{aq}) \rightarrow 3\text{H}_2\text{O} (\text{l}) + \text{Al}(\text{NO}_3)_3 (\text{aq})$
 B) $\text{Al}(\text{OH})_3 (\text{s}) + 3\text{HNO}_3 (\text{aq}) \rightarrow 3\text{H}_2\text{O} (\text{l}) + \text{Al}^{3+} (\text{aq}) + \text{NO}_3^- (\text{aq})$
 C) $\text{Al}(\text{OH})_3 (\text{s}) + 3\text{NO}_3^- (\text{aq}) \rightarrow 3\text{OH}^- (\text{aq}) + \text{Al}(\text{NO}_3)_3 (\text{s})$
 D) $\text{Al}(\text{OH})_3 (\text{s}) + 3\text{H}^+ (\text{aq}) \rightarrow 3\text{H}_2\text{O} (\text{l}) + \text{Al}^{3+} (\text{aq})$
 E) $\text{Al}(\text{OH})_3 (\text{s}) + 3\text{NO}_3^- (\text{aq}) \rightarrow 3\text{OH}^- (\text{aq}) + \text{Al}(\text{NO}_3)_3 (\text{aq})$
- 15) Which of the following is soluble in water at 25 °C?
 A) $\text{Fe}(\text{OH})_2$
 B) $\text{Fe}(\text{NO}_3)_2$
 C) FeCO_3
 D) $\text{Fe}_3(\text{PO}_4)_2$
 E) FeS
- 16) Which of the following is insoluble in water at 25 °C?
 A) $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$
 B) $(\text{NH}_4)_2\text{CO}_3$
 C) Na_2S
 D) $\text{Ca}(\text{OH})_2$
 E) $\text{Mg}_3(\text{PO}_4)_2$
- 17) When aqueous solutions of _____ are mixed, a precipitate forms.
 A) NaI and KBr
 B) NiBr_2 and AgNO_3
 C) K_2SO_4 and CrCl_3
 D) Li_2CO_3 and CsI
 E) KOH and $\text{Ba}(\text{NO}_3)_2$
- 18) Which one of the following compounds is insoluble in water?
 A) $\text{Fe}(\text{NO}_3)_3$
 B) AgNO_3
 C) K_2SO_4
 D) Na_2CO_3
 E) ZnS
- 19) Which one of the following compounds is insoluble in water?
 A) ZnCl_2
 B) $\text{Mn}(\text{NO}_3)_2$
 C) K_2SO_4
 D) MgC_2O_4
 E) $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$
- 20) With which of the following will the potassium ion form an insoluble salt?
 A) sulfate and carbonate
 B) chloride
 C) sulfate
 D) carbonate
 E) none of the above

Answer Key

Testname: UNTITLED1

- 1) E
- 2) C
- 3) D
- 4) A
- 5) B
- 6) C
- 7) D
- 8) E
- 9) D
- 10) B
- 11) B
- 12) A
- 13) C
- 14) D
- 15) B
- 16) E
- 17) B
- 18) E
- 19) D
- 20) E