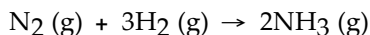


Name _____

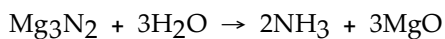
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Under appropriate conditions, nitrogen and hydrogen undergo a combination reaction to yield ammonia: 1) _____



A 7.1-g sample of N_2 requires _____ g of H_2 for complete reaction.

- A) 0.51 B) 1.5 C) 0.76 D) 17.2 E) 1.2
- 2) How many moles of magnesium oxide are produced by the reaction of 3.82 g of magnesium nitride with 7.73 g of water? 2) _____



- A) 0.0756 B) 0.113 C) 4.57 D) 0.0378 E) 0.429
- 3) Of the species below, only _____ is NOT an electrolyte. 3) _____
- A) HCl B) Ar C) Rb_2SO_4 D) NaCl E) KOH

- 4) With which of the following will ammonium ion form an insoluble salt? 4) _____
- A) chloride
B) carbonate
C) sulfate and carbonate
D) sulfate
E) none of the above

- 5) A weak electrolyte exists predominantly as _____ in solution. 5) _____
- A) electrons B) ions C) an isotope D) atoms E) molecules

- 6) Which of the following are weak electrolytes? 6) _____
- 1) HCl
2) $\text{HC}_2\text{H}_3\text{O}_2$
3) NH_3
4) KCl
A) $\text{HC}_2\text{H}_3\text{O}_2$, KCl
B) HCl, $\text{HC}_2\text{H}_3\text{O}_2$, KCl
C) HCl, $\text{HC}_2\text{H}_3\text{O}_2$, NH_3 , KCl
D) HCl, KCl
E) $\text{HC}_2\text{H}_3\text{O}_2$, NH_3

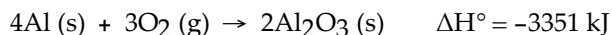
- 7) Which ion(s) is/are spectator ions in the formation of a precipitate of AgCl via combining aqueous solutions of CoCl₂ and AgNO₃? 7) _____
- A) Co²⁺ and NO₃⁻
 B) NO₃⁻ and Cl⁻
 C) Cl⁻
 D) NO₃⁻
 E) Co²⁺ and Ag⁺
- 8) When H₂SO₄ is neutralized by NaOH in aqueous solution, the net ionic equation is _____. 8) _____
- A) SO₄²⁻ (aq) + 2Na⁺ (aq) → Na₂SO₄ (s)
 B) H₂SO₄ (aq) + 2OH⁻ (aq) → 2H₂O (l) + SO₄²⁻ (aq)
 C) 2H⁺ (aq) + 2NaOH (aq) → 2H₂O (l) + 2Na⁺ (aq)
 D) SO₄²⁻ (aq) + 2Na⁺ (aq) → Na₂SO₄ (aq)
 E) H⁺ (aq) + OH⁻ (aq) → H₂O (l)
- 9) The molarity of a solution prepared by diluting 43.72 mL of 5.005 M aqueous K₂Cr₂O₇ to 500 mL is _____. 9) _____
- A) 0.0044 B) 57.2 C) 0.870 D) 0.0879 E) 0.438
- 10) The balanced reaction between aqueous nitric acid and aqueous strontium hydroxide is _____. 10) _____
- A) HNO₃ (aq) + Sr(OH)₂ (aq) → H₂O (l) + Sr(NO₃)₂ (aq)
 B) HNO₃ (aq) + Sr(OH)₂ (aq) → Sr(NO₃)₂ (aq) + H₂ (g)
 C) HNO₃ (aq) + SrOH (aq) → H₂O (l) + SrNO₃ (aq)
 D) 2HNO₃ (aq) + Sr(OH)₂ (aq) → 2H₂O (l) + Sr(NO₃)₂ (aq)
 E) 2HNO₃ (aq) + Sr(OH)₂ (aq) → Sr(NO₃)₂ (aq) + 2H₂ (g)
- 11) The net ionic equation for the dissolution of zinc metal in aqueous hydrobromic acid is _____. 11) _____
- A) 2Zn (s) + H⁺ (aq) → 2Zn²⁺ (aq) + H₂ (g)
 B) Zn (s) + 2Br⁻ (aq) → ZnBr₂ (aq)
 C) Zn (s) + 2H⁺ (aq) → Zn²⁺ (aq) + H₂ (g)
 D) Zn (s) + 2HBr (aq) → ZnBr₂ (s) + 2H⁺ (aq)
 E) Zn (s) + 2HBr (aq) → ZnBr₂ (aq) + 2H⁺ (aq)
- 12) Which of the following is an oxidation-reduction reaction? 12) _____
- A) AgNO₃ (aq) + HCl (aq) → AgCl (s) + HNO₃ (aq)
 B) HCl (aq) + NaOH (aq) → H₂O (l) + NaCl (aq)
 C) Cu (s) + 2AgNO₃ (aq) → 2Ag (s) + Cu(NO₃)₂ (aq)
 D) H₂CO₃ (aq) + Ca(NO₃)₂ (aq) → 2HNO₃ (aq) + CaCO₃ (s)
 E) Ba(C₂H₃O₂)₂ (aq) + Na₂SO₄ (aq) → BaSO₄ (s) + 2NaC₂H₃O₂ (aq)

- 13) _____ is an oxidation reaction. 13) _____
- A) The reaction of sodium chloride with lead nitrate to form lead chloride and sodium nitrate
 - B) Ice melting in a soft drink
 - C) Table salt dissolving in water for cooking vegetables
 - D) Rusting of iron
 - E) Neutralization of HCl by NaOH

- 14) Which combination will produce a precipitate? 14) _____
- A) AgNO_3 (aq) and $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$ (aq)
 - B) KOH (aq) and $\text{Mg}(\text{NO}_3)_2$ (aq)
 - C) NaOH (aq) and HCl (aq)
 - D) $\text{NaC}_2\text{H}_3\text{O}_2$ (aq) and HCl (aq)
 - E) NaOH (aq) and HCl (aq)

- 15) Which compound has the atom with the highest oxidation number? 15) _____
- A) NH_4Cl B) Na_3N C) MgSO_3 D) $\text{Al}(\text{NO}_2)_3$ E) CaS

- 16) The reaction 16) _____



is _____, and therefore heat is _____ by the reaction.

- A) exothermic, released
 - B) exothermic, absorbed
 - C) endothermic, absorbed
 - D) endothermic, released
 - E) thermoneutral, neither released nor absorbed
- 17) The value of ΔE for a system that performs 213 kJ of work on its surroundings and loses 79 kJ of heat is _____ kJ. 17) _____
- A) -213 B) -292 C) -134 D) +292 E) +134

- 18) The value of ΔH° for the reaction below is +128.1 kJ: 18) _____



How many kJ of heat are consumed when 15.5 g of $\text{CH}_3\text{OH}(\text{l})$ decomposes as shown in the equation?

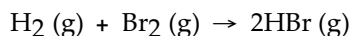
- A) 62.0 B) 8.3 C) 1.3×10^2 D) 32 E) 0.48
- 19) Which one of the following conditions would always result in an increase in the internal energy of a system? 19) _____
- A) The system loses heat and has work done on it by the surroundings.
 - B) The system loses heat and does work on the surroundings.
 - C) The system gains heat and does work on the surroundings.
 - D) The system gains heat and has work done on it by the surroundings.
 - E) None of the above is correct.

20) Of the following, which one is a state function? 20) _____
A) q
B) w
C) heat
D) H
E) none of the above

21) The units of of specific heat are _____. 21) _____
A) g-K/J or g-°C/J
B) K/J or °C/J
C) J/g-K or J/g-°C
D) J/mol
E) J/K or J/°C

22) For which one of the following reactions is the value of $\Delta H^\circ_{\text{rxn}}$ equal to ΔH°_f for the product? 22) _____
A) $2 \text{C (s, graphite)} + 2 \text{H}_2 \text{(g)} \rightarrow \text{C}_2\text{H}_4 \text{(g)}$
B) $2 \text{H}_2 \text{(g)} + \text{O}_2 \text{(g)} \rightarrow 2 \text{H}_2\text{O (g)}$
C) $\text{N}_2 \text{(g)} + \text{O}_2 \text{(g)} \rightarrow 2 \text{NO (g)}$
D) $\text{H}_2\text{O (l)} + 1/2 \text{O}_2 \text{(g)} \rightarrow \text{H}_2\text{O}_2 \text{(l)}$
E) $2 \text{H}_2 \text{(g)} + \text{O}_2 \text{(g)} \rightarrow 2 \text{H}_2\text{O (l)}$

23) The value of ΔH° for the reaction below is -72 kJ. _____ kJ of heat are released when 1.0 mol of HBr is formed in this reaction. 23) _____



A) 36 B) 0.44 C) 72 D) 144 E) -72

24) For which one of the following reactions is the value of $\Delta H^\circ_{\text{rxn}}$ equal to ΔH°_f for the product? 24) _____
A) $\text{C (diamond)} + \text{O}_2 \text{(g)} \rightarrow \text{CO}_2 \text{(g)}$
B) $2\text{Ca (s)} + \text{O}_2 \text{(g)} \rightarrow 2\text{CaO (s)}$
C) $\text{C}_2\text{H}_2 \text{(g)} + \text{H}_2 \text{(g)} \rightarrow \text{C}_2\text{H}_4 \text{(g)}$
D) $2\text{C (graphite)} + \text{O}_2 \text{(g)} \rightarrow 2\text{CO (g)}$
E) $3\text{Mg (s)} + \text{N}_2 \text{(g)} \rightarrow \text{Mg}_3\text{N}_2 \text{(s)}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

25) Calculate the oxidation number of Cl in each of the following and indicate which species has the highest oxidation number of Cl. 25) _____

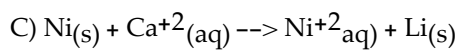
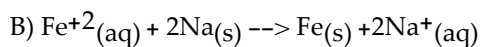
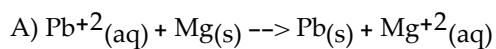
HClO₄ NaClO₃ KClO₂ KClO

26) If an equal number of moles of each of the following species were placed in water which would have the highest conductivity? 26) _____
MgCl₂, NaCl, K₂SO₄, Li₃PO₄

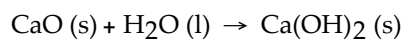
27) The in class demonstration of ionic conductivity in water used a clear, colorless sugar solution and a white cloudy solution of salt (NaCl) water. Why was the salt water cloudy? 27) _____

28) An acid is defined as something which: 28) _____

29) Using the activity series, which lists which metals get oxidized the easiest, determine if the following reactions will occur or not: 29) _____



30) Calcium oxide reacts with water in a combination reaction to produce calcium hydroxide: 30) _____

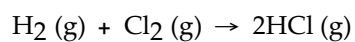


A 1.50-g sample of CaO is reacted with 1.45 g of H₂O. How many grams of water remains after completion of reaction?

31) A stock solution of HNO_3 is prepared and found to contain 13.5 M of HNO_3 . If 25.0 mL of the stock solution is diluted to a final volume of 0.500 L, the concentration of the diluted solution is _____ M. 31) _____

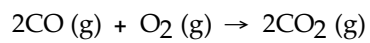
32) The molarity (M) of an aqueous solution containing 22.5 g of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) in 35.5 mL of solution is _____. 32) _____

33) The value of ΔH° for the reaction below is -186 kJ. 33) _____



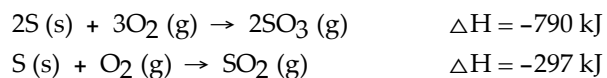
The value of ΔH_f° for $\text{HCl} (\text{g})$ is _____ kJ/mol.

34) The value of ΔH° for the reaction below is -482 kJ . Calculate the heat (kJ) released to the surroundings when 12.0 g of $\text{CO} (\text{g})$ reacts completely. 34) _____

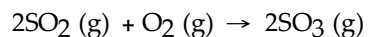


35) A sample of aluminum metal absorbs 9.86 J of heat, upon which the temperature of the sample increases from 23.2°C to 30.5°C . Since the specific heat capacity of aluminum is $0.90 \text{ J/g}\cdot\text{K}$, the mass of the sample is _____ g. 35) _____

36) Calculate ΔH° (in kJ) for reaction 3. 36) _____



the enthalpy of the reaction in which sulfur dioxide is oxidized to sulfur trioxide



is _____ kJ.

Answer Key

Testname: PRACTICE TEST 2A

- 1) B
- 2) B
- 3) B
- 4) E
- 5) E
- 6) E
- 7) A
- 8) E
- 9) E
- 10) D
- 11) C
- 12) C
- 13) D
- 14) B
- 15) C
- 16) A
- 17) B
- 18) A
- 19) D
- 20) D
- 21) C
- 22) A
- 23) A
- 24) E
- 25) 7, 5, 3, 1. HClO₄ has the highest.
- 26) Li₃PO₄
- 27) The salt contains insoluble compounds to prevent the grains of salt from sticking together in humid weather.
- 28) increases the concentration of H⁺ ions in aqueous solutions
- 29) a) Yes, b) Yes, c) No
- 30) .970 g
- 31) 0.675
- 32) 3.52
- 33) -93.0
- 34) 103
- 35) 1.5
- 36) -196