

1. The chemical formula for cocaine is $C_{17}H_{21}NO_4$. What is the percent carbon in cocaine?
 - A) 32.2
 - B) 67.3
 - C) 8.43
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2. Analysis of calcium carbide showed its mass composition is 62.5% calcium and 37.5% carbon. What is its empirical formula?
 - A) CaC_2
 - B) Ca_2C
 - C) CaC
 - D) Ca_3C_2

3. Consider the balanced equation:
$$3NaHCO_3 + C_6H_8O_7 \rightarrow 3CO_2 + 3H_2O + Na_3C_6H_5O_7$$
What mass of CO_2 is produced when 200 g of $NaHCO_3$ undergoes reaction?
 - A) 105 g
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4. Which of these compounds is not a strong acid?
 - A) HCl
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5. A gas occupies a volume of 525 mL at a pressure of 1.00 atm. What is the new volume of the gas when the pressure is doubled?
 - A) 104 mL
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6. In a solution with $\text{pH} = 7.0$:
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 - B) $[\text{H}_3\text{O}^+] > [\text{OH}^-]$
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 - D) $[\text{H}_3\text{O}^+] + [\text{OH}^-] = K_w$
7. A gas under 33.30 atm pressure occupies 30.00 L at 273°C . What is the volume of the gas at STP (1 atm & 0°C)?
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8. What is a sphygmomanometer used for?
- A) measuring blood pressure
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9. In which state of matter are molecules extremely far apart and disordered?
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 - D) II and III only
10. Which solution is the most acidic?
- A) blood
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II Liquid
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A) I only
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13. What is the equilibrium constant expression for this reaction?
$$aA(aq) + bB(aq) + cC(aq) \rightleftharpoons dD(l) + eE(s)$$

A) $[A]^a[B]^b[C]^c[D]^d[E]^e$
B) $[A]^a[B]^b[C]^c$
C) $1 / [A]^a[B]^b[C]^c$
D) $[D]^d[E]^e / [A]^a[B]^b[C]^c$
14. Which solution is the most basic?
A) blood
B) vinegar
C) milk
D) household ammonia
15. Which secondary force would be expected to hold together the particles of a liquid with a very low boiling point?
A) Ionic bonds
B) Hydrogen bonds
C) London forces
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16. Which statement is true about the reaction $A + B \rightleftharpoons C + D + \text{heat}$?
- A) The forward and reverse reactions are exothermic.
 - B) The forward reaction is exothermic, and the reverse reaction is endothermic.
 - C) The forward reaction is exothermic, and the reverse reaction can be either endothermic or exothermic.
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17. Which is the symbol for the heat of reaction?
- A) E_a
 - B) ΔH
 - C) K
 - D) M
18. Which action will shift the equilibrium of this reaction to the right?
 $AB(g) + C(g) \rightleftharpoons A(s) + BC(g)$
- A) adding A
 - B) removing C
 - C) increasing the pressure
 - D) increasing the volume of the reaction vessel
19. Which transition can occur when the temperature of a substance is increased at constant pressure?
- I Sublimation
 - II Melting
 - III Boiling
- A) I and II only
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 - D) I, II, and III
20. Which statement describes the characteristics of an endothermic reaction?
- A) ΔH_{rxn} is positive, and the reaction products have less energy than the reactants.
 - B) ΔH_{rxn} is positive, and the reaction products have more energy than the reactants.
 - C) ΔH_{rxn} is negative, and the reaction products have less energy than the reactants.
 - D) ΔH_{rxn} is negative, and the reaction products have more energy than the reactants.

21. Which statement is true about reaction rate for the reaction: $A + B \rightarrow C + D$?
- A) If the reaction begins with only A and B, the reaction rate will be positive, because C and D are forming.
 - B) If the reaction begins with only C and D, the rate will be negative because the concentrations of C and D decrease as A and B form.
 - C) The reaction rate will be positive because rate is defined as the change in the number of moles of a reactant or a product per unit time.
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22. The kinetic energy of molecules decreases when:
- A) the sample volume is decreased
 - B) the substance condenses
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23. The addition of a catalyst to a chemical reaction brings about a change in:
- A) the activation energy of the reaction
 - B) the heat of reaction (ΔH_{rxn}) of the reaction
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24. In an aqueous solution of sodium chloride, _____ is the solute and _____ is the solvent.
- A) Cl; Na
 - B) Na; Cl
 - C) NaCl; H₂O
 - D) H₂O; NaCl
25. One liter of 2 M NaOH can be prepared with water and how many g of NaOH?
- A) 20 g of NaOH
 - B) 40 g of NaOH
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Answer Key EXAM A

1. B
2. A
3. A
4. D
5. B
6. A
7. B
8. A
9. C
10. B
11. A
12. C
13. C
14. D
15. C
16. B
17. B
18. C
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- In a solution with pH = 7.0:
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4. C
5. C
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7. D
8. C
9. B
10. A
11. B
12. B
13. C
14. B
15. B
16. D
17. B
18. D
19. C
20. B
21. A
22. D
23. C
24. C
25. A