

CH 121

General Chemistry Examination 4 April 19, 2002

Name: _____
(please print)

SSN: *** - ** -
(last 4 digits)

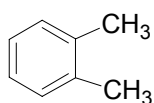
There are 20 Questions. Each question is worth 1 point.
Circle your answer **clearly**; otherwise no credit will be given.
Circle only **one** answer. If you circle two or more, you will receive no credit.

$R = 0.082057 \text{ L}\cdot\text{atm}/\text{K}\cdot\text{mol}$

1. Which of the following formulas could represent an alkyne?

- a. C_2H_4
- b. C_3H_7
- c. C_3H_6
- d. C_5H_8
- e. C_6H_{14}

2. The formula for the following compound is



- a. C_8H_6
- b. C_6H_6
- c. C_6H_{10}
- d. C_8H_{10}
- e. C_8H_{12}

3. A straight-chain alkene has six carbon atoms. Its molecular formula is

- a. C_6H_6
- b. C_6H_8
- c. C_6H_{10}
- d. C_6H_{12}
- e. C_6H_{14}

4. Which functional group does **not** contain an oxygen atom?

- a. ester
- b. amide
- c. alkene
- d. aldehyde
- e. alcohol

5. Which of the following functional groups contains a C = O linkage?
- alcohols
 - ethers
 - amines
 - amides
 - alkynes
6. When a primary alcohol is oxidized, the initial product is an
- alkane.
 - alkene.
 - aldehyde.
 - alkyne.
 - isomer.
7. Nylon-6,6 can be produced from the condensation polymerization of a diacid with six carbon atoms and a diamine with six carbon atoms. Nylon is classified as a
- polyamine.
 - polyurethane.
 - polyalcohol.
 - polyamide.
 - polyester.
8. Rank 355 torr, 0.524 atm, and 0.513 bar in increasing order of pressure.
- $355 \text{ torr} < 0.524 \text{ atm} < 0.513 \text{ bar}$
 - $0.524 \text{ atm} < 355 \text{ torr} < 0.513 \text{ bar}$
 - $0.513 \text{ bar} < 355 \text{ torr} < 0.524 \text{ atm}$
 - $355 \text{ torr} < 0.513 \text{ bar} < 0.524 \text{ atm}$
 - $0.513 \text{ bar} < 0.524 \text{ atm} < 355 \text{ torr}$

9. Avogadro stated that equal volumes of gases under the same conditions of temperature and pressure have equal
- numbers of molecules.
 - numbers of grams.
 - molar masses.
 - atoms.
 - speeds.
10. What volume of CH_4 at $0\text{ }^\circ\text{C}$ and 1.00 atm contains the same number of molecules as 0.50 L of N_2 measured at $27\text{ }^\circ\text{C}$ and 1.50 atm ?
- 0.37 L
 - 0.46 L
 - 0.68 L
 - 0.50 L
 - 0.82 L
11. What is the chemical formula of a gas if it has a pressure of 1.40 atm and a density of 1.82 g/L at $27\text{ }^\circ\text{C}$?
- CO_2
 - CO
 - CH_4
 - O_2
 - N_2
12. The volume of a certain gas sample is 235 mL when collected over water at a temperature of $25\text{ }^\circ\text{C}$ and a pressure of 698 mmHg . What will be the volume of this gas sample when measured dry at standard pressure? The vapor pressure of water at this temperature is 23.8 mmHg .
- 197 mL
 - 208 mL
 - 223 mL
 - 265 mL
 - 275 mL

13. At a particular temperature, which of the following molecules has an average velocity closest to that of ethylene, C_2H_4 , at the same temperature?
- N_2
 - CO_2
 - NO_2
 - O_2
 - CH_4
14. For a given sample of gas molecules, the average kinetic energy depends only on the value of the
- pressure.
 - temperature.
 - volume.
 - moles.
 - molar mass.
15. At room temperature, which of the following compounds has the strongest interparticle forces?
- CO_2
 - H_2O
 - $NaCl$
 - CH_3CH_3
 - CH_3Cl
16. Which of the following would be expected to have the highest melting point?
- Cl_2
 - $NaCl$
 - $MgCl_2$
 - CCl_4
 - CH_4

The following questions pertain to lead (atomic mass of 207.2 g/mol) which crystallizes in a face-centered cubic arrangement. Lead has an atomic radius of 1.75×10^{-8} cm.

17. What is the density of lead in g/cm^3 ?

- a. 9.85 g/cm^3
- b. 11.4 g/cm^3
- c. 13.2 g/cm^3
- d. 14.7 g/cm^3
- e. 19.7 g/cm^3

The following questions pertain to gold (atomic mass 197.0 g/mol) which crystallizes in a face-centered cubic arrangement with the atoms touching along the face diagonal. A gold atom has a radius of 1.44×10^{-8} cm.

18. How many gold atoms are there per unit cell?

- a. 1
- b. 2
- c. 4
- d. 8
- e. 12

19. The sublimation of solid carbon dioxide, dry ice, is an example of

- a. evaporation.
- b. a physical property.
- c. a chemical property.
- d. a chemical change.
- e. a physical change.

20. An atom that is shared equally between eight cubic unit cells is called

- a. an edge atom.
- b. a face atom.
- c. a corner atom.
- d. a diagonal atom.
- e. a central atom.