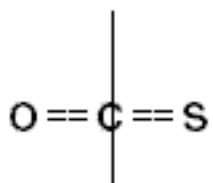
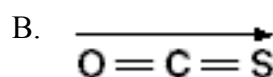
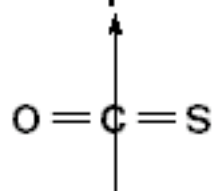
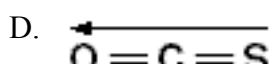


- Which of the following gases can be a greenhouse gas?
A. O₂ B. N₂ C. H₂ D. Ar E. CH₄
- Which of the C-O bonds in the following molecules do you expect to absorb the longest wavelength infrared radiation?
A. The C = O bond in CO₂
B. C ≡ O
C. The C = O bond in H₂CO (formaldehyde)
D. The C-O bond in CH₃OH (methanol)
E. They all absorb at the same wavelength
- Objects warmed by absorbing visible radiation from the Sun emit radiation in the _____ region of the spectrum.
A. X-ray
B. radio frequency
C. infrared
D. visible
E. ultraviolet
- Molecular geometry is determined by
A. nuclear repulsive forces.
B. neutron-neutron repulsive forces.
C. electron-electron repulsive forces.
D. electron-proton attractive forces.
E. electron-electron attractive forces.
- What is the partial charge in fractions of an electron on the Br atom in HBr if the dipole moment is 0.78 D and the bond length is 267. pm? Useful constants: 1 D = 3.336 x 10⁻³⁰ C•m, charge on electron (e) = 1.60 x 10⁻¹⁹ C.
A. 9.7 x 10⁻²¹ C B. 1.6 x 10¹ e
C. 0.245 e D. 1.8 x 10²⁸ e
E. 0.061 e

6. Which of the following shows the orientation of the net dipole for OCS?

- A. 
- B. 
- C. 
- D. 
- E. None of these pictures is correct.

7. Which of the following molecules has a trigonal pyramid shape? Central atom is underlined.

- A. COCl₂ B. NH₄⁺ C. CO₃²⁻ D. KrF₄ E. SeO₃²⁻

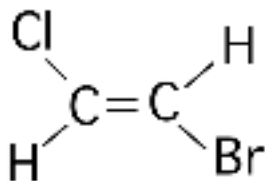
8. Predict the molecular geometry and polarity of the SO₂ molecule.

- A. linear, polar
 B. linear, nonpolar
 C. bent, polar
 D. bent, nonpolar
 E. none of the above

9. According to the VSEPR theory, the *actual* F-As-F bond angles in AsF₄⁻ ion are predicted to be

- A. <109.5°
 B. 180°
 C. 90° and 120°
 D. <90° and <120°
 E. 109.5°

10. This molecule is



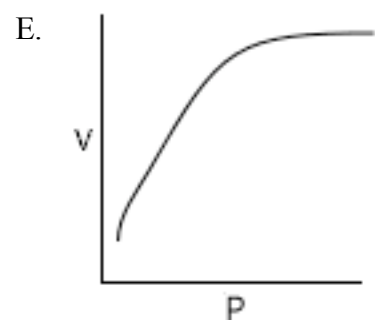
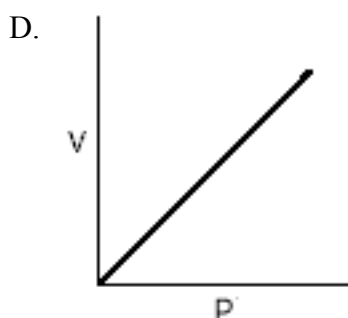
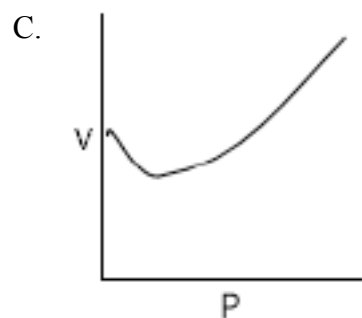
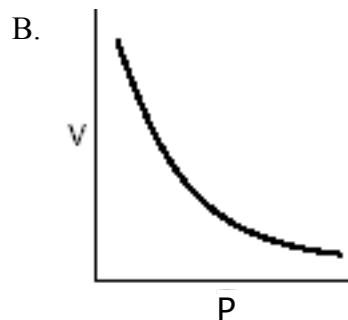
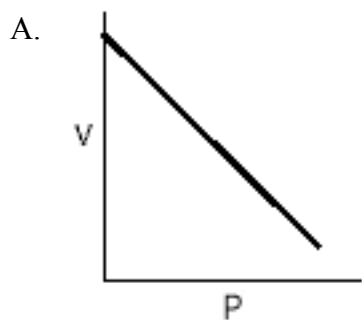
- A. trigonal pyramidal shaped
 B. octahedral shaped
 C. tetrahedral shaped
 D. a cis isomer
 E. a trans isomer

11. What type of hybridization will lead to a "T-shaped" molecule?
A. sp^3d^2 B. sp C. sp^3 D. sp^2 E. sp^3d
12. How many electrons occupy each overlapping set of orbitals that are used to make a bond in the valence bond model?
A. 4 B. 3 C. 1 D. 2 E. 6
13. The number of π -bonds in the molecule below is
- $$\begin{array}{cccc} \text{H}-\text{C}=\text{C}-\text{C}=\text{C}-\text{H} \\ | \quad | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$$
- A. 1 B. 5 C. 7 D. 3 E. 2
14. A barometer measures a pressure of 745 mm Hg. What is this pressure in atm?
A. 1.03×10^5 atm B. 0.745 atm
C. 0.980 atm D. 1.00×10^4 atm
E. 1.02 atm
15. 1.018 g of Freon-113 gas is trapped in a 145 mL container at 760. mmHg and 50.0°C. What is the molar mass of Freon-113?
A. 21.7 g/mol B. 186. g/mol C. 245. g/mol
D. 28.8 g/mol E. 46.1 g/mol
16. Nitrous monoxide (N_2O , also known as laughing gas) has been used as an anesthetic. What is the density of nitrous monoxide at 750 torr and 30°C?
A. 1.8 g/L B. 1.1 g/L C. 1.2 g/L
D. 1.7 g/L E. 0.83 g/L
17. A gas, initially at 1.00 atm and 5.00 L, is compressed while maintaining the temperature to a pressure of 15.00 atm. What is the volume of the gas at this pressure?
A. .333 mL B. 3.00 L
C. 333. mL D. 75.0 L
E. 3.00 mL
18. How many liters of chlorine gas at 200°C and 0.500 atm can be produced by the reaction of 12.0 g of MnO_2 with HCl as follows?
 $\text{MnO}_2(\text{s}) + 4\text{HCl}(\text{aq}) \rightarrow \text{MnCl}_2(\text{aq}) + 2\text{H}_2\text{O}(\text{l}) + \text{Cl}_2(\text{g})$
A. 3.09 L B. 10.7 L C. 1.38 L
D. 4.53 L E. 0.093 L

19. The gas pressure in an aerosol can is 1.8 atm at 25°C. If the gas is an ideal gas, what pressure would develop in the can if it were heated to 475°C?

- A. 0.717 atm B. 34.2 atm C. 4.52 atm
D. 0.095 atm E. 3.26 atm

20. Which of the graphs below shows the correct relationship between the volume and pressure of a gas confined to a container that can change size?



21. Which of the following gases will effuse through a hole in a balloon fastest?

- A. NO B. N₂O C. NO₂ D. SO₂ E. Kr

22. A gas mixture with a total pressure of 950 torr has partial pressures of 120 torr N₂, 350 torr Ar, and 480 torr SF₆. What is the mole fraction of sulfur hexafluoride in the mixture?

- A. 0.13 B. 0.37 C. 0.51 D. 0.73 E. 0.34

23. The atmospheric pressure at the summit of Mt. Humphrey (roughly 12,600 ft) in northern Arizona is approximately 500 Torr. The mole fraction of O_2 in the air is roughly 0.20. So the partial pressure of O_2 is 0.100 Torr. What is the solubility of oxygen in blood at this elevation and atmospheric pressure? ($k_H(O_2) = 7.8 \times 10^{-3} \text{ mol/L atm}$)
- A. $1.0 \times 10^{-3} \text{ mol } O_2 / \text{L blood}$ B. $0.78 \text{ mol } O_2 / \text{L blood}$
C. $2.5 \times 10^{-1} \text{ mol } O_2 / \text{L blood}$ D. $5.1 \times 10^{-3} \text{ mol } O_2 / \text{L blood}$
E. $2.4 \times 10^{-3} \text{ mol } O_2 / \text{L blood}$
24. Water is a very non-ideal gas. The ideal gas law suggests that 1.00 mol of water vapor confined to 3.00 L at 25°C will exert a pressure of 8.15 atm. Using the van der Waals equation and the following van der Waals coefficients calculate the actual pressure exerted by 1.00 mol of water vapor confined to 3.00 L at 25°C . $a(\text{H}_2\text{O}) = 5.46 \text{ atm}\cdot\text{L}^2\cdot\text{mol}^{-2}$, $b(\text{H}_2\text{O}) = 0.0305 \text{ L}\cdot\text{mol}^{-1}$.
- A. 7.54 atm B. 0.131 atm C. 7.63 atm D. 8.24 atm E. 0.133 atm
25. Which of the following statements is true?
- A. All gas molecules have the same kinetic energy at a given temperature.
B. All gases have the same root-mean-square speeds at a given temperature.
C. All gases have different average kinetic energies at a given temperature.
D. All gases have the same average kinetic energy at a given temperature.
E. All gases have the same average kinetic energy.

Answer Key for Test "Chem_105_Exam_4_S07_A.mtp", 4/18/07

No. in Q-Bank	No. on Test	Correct Answer
7 106	1	E
7 12	2	D
7 1	3	C
7 55	4	C
7 113	5	E
7 90	6	D
7 61	7	E
7 116	8	C
7 115	9	D
7 118	10	E
7 79	11	E
7 119	12	D
7 117	13	E
8 8	14	C
8 115	15	B
8 54	16	D
8 21	17	C
8 116	18	B
8 114	19	C
8 113	20	B
8 82	21	A
8 66	22	C
8 74	23	A
8 117	24	C
8 80	25	D