

Name KEY

- Deviations from the ideal gas law are greater at
 - low temperatures and low pressures.
 - low temperatures and high pressures.**
 - high temperatures and high pressures.
 - high temperatures and low pressures.
- Which gas has molecules with the greatest average molecular speed at 25°C?
 - CH₄**
 - Kr
 - N₂
 - CO₂
 - Ar
- A mixture of KCl and KClO₃ weighing 1.80 g was heated. The dry O₂ generated occupied a volume of 1.40×10^2 mL at STP. What percent of the original mixture was KClO₃?
$$2 \text{ KClO}_3 (s) \rightarrow 2 \text{ KCl} (s) + 3 \text{ O}_2 (g)$$
 - 28.6%**
 - 37.2%
 - 42.6%
 - 63.8%
 - 72.6%
- Reading from left to right across a phase diagram, what is the order in which you would find the three states of matter?
 - gas, liquid, solid
 - gas, solid, liquid
 - liquid, gas, solid
 - liquid, solid, gas
 - solid, liquid, gas**
- A compound that is a poor conductor of electricity when solid, but a very good conductor when molten is most likely to fit into which category?
 - molecular solid
 - covalent solid
 - ionic solid**
 - metallic solid
 - any of the above
- What solid is held together by an extended network of covalent bonds?
 - sodium chloride
 - gold
 - calcium carbonate
 - diamond**
 - dry ice (solid CO₂)
- Dispersion force is the attractive force between
 - an ion and a permanent dipole
 - an instantaneous dipole and an induced dipole**
 - two permanent dipoles
 - two molecules with hydrogen bonds to an oxygen atom
- Which noble gas has the highest boiling point?
 - Ne
 - He
 - Xe**
 - Ar
 - Kr

Consider the four molecules below when answering the next *two* questions.

I. HF II. PCl₃ III. CuCl₂ IV. CO₂

9. Which of these molecules is most likely to exist as a crystalline solid at room temperature?
- a) I b) II c) **III** d) II, III e) all of them
10. The major attractive intermolecular forces present in these compounds are (in order from I-IV):
- a) dipole, dipole, ionic, ionic
b) ionic, London dispersion, metallic, dispersion
c) hydrogen bonding, ionic, dipole, dipole
d) dipole, ionic, metallic, dipole
e) **hydrogen bonding, dipole, ionic, dispersion**
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11. Which of the following liquids would make a good solvent for iodine, I₂?
- a) HCl b) H₂O c) CH₃OH d) NH₃ e) **CS₂**
12. How many grams of water are needed to dissolve 27.8 g of ammonium nitrate, NH₄NO₃, in order to prepare a 0.452 *m* solution?
- a) 0.157 g b) 36.2 g c) 100 g d) **768 g** e) 157 g
13. The density of a 20.3 *M* CH₃OH (methanol) solution is 0.858 g/mL. What is the molality of this solution? H₂O is the solvent.
- a) 17.4 *m* b) 20.8 *m* c) 23.7 *m* d) 70.0 *m* e) **97.5 *m***
14. The solubility of gases in water usually decreases with
- a) increasing pressure b) **increasing temperature** c) decreasing temp.
15. The vapor pressure of water at 20°C is 17.5 mmHg. What is the vapor pressure of water over a solution prepared from 2.00 × 10² g of sucrose (C₁₂H₂₂O₁₁) and 3.50 × 10² g water?
- a) 0.51 mmHg b) 16.0 mmHg c) **17.0 mmHg** d) 18.0 mmHg e) 19.4 mmHg
16. Dissolving a solute such as KOH in a solvent such as water results in
- a) an increase in the melting point of the solid.
b) a decrease in the boiling point of the liquid.
c) **a decrease in the vapor pressure of the liquid.**
d) no change in the boiling point of the liquid.
17. What is the freezing point of a solution that contains 10.0 g of glucose (C₆H₁₂O₆) in 100 g of H₂O? *K_f* = 1.86°C/*m*.
- a) -0.186°C b) +0.186°C c) -0.10°C d) +0.10°C e) **-1.03°C**
18. A solution that contains 55.0 g of ascorbic acid (Vitamin C) in 250 g of water freezes at -2.34°C. Calculate the molar mass (g/mol) of the solute. *K_f* = 1.86°C/*m*.
- a) 1.26 g/mol b) 10.9 g/mol c) 43.6 g/mol d) **175 g/mol** e) 277 g/mol