## Final Exam Sample. These random questions may, or may not be on the final exam. Please consider the essential truths in each one.

## Multiple Choice

Identify the choice that best completes the statement or answers the question.

1) In general, for a gas at a constant volume,
(A) the pressure of the gas is inversely proportional to its temperature in kelvins
(B) the volume of the gas is inversely proportional to its temperature in kelvins
(C) the volume of the gas is directly proportional to its temperature in kelvins
(D) the pressure of the gas is directly proportional to its temperature in kelvins
$\qquad$ 2) How does the surface tension of water compare with the surface tensions of most other liquids?
(A) It is lower.
(B) It is about the same.
(C) It is higher.
(D) It is higher when a surfactant is added.
$\qquad$ 3) What is the maximum amount of KCl that can dissolve in 200 g of water?
(The solubility of KCl is $34 \mathrm{~g} / 100 \mathrm{~g} \mathrm{H}_{2} \mathrm{O}$ at $20^{\circ} \mathrm{C}$.)
(A) 17 g
(C) 68 g
(B) 34 g
(D) 6800 g
$\qquad$ 4) What is the molality of a solution of water and KCl if the freezing point of the solution is $-3^{\circ} \mathrm{C}$ ? $\left(K_{\mathrm{f}}=\right.$
$1.86^{\circ} \mathrm{C} / \mathrm{m}$; molar mass of water $=18 \mathrm{~g}$ )
(A) 0.6 m
(C) $0.8 m$
(B) $1.2 m$
(D) $6 m$
$\qquad$ 5) What is the specific heat of a substance if 1560 cal are required to raise the temperature of a $312-\mathrm{g}$ sample by $15^{\circ} \mathrm{C}$ ?
(A) $0.033 \frac{\mathrm{cal}}{\mathrm{g}^{\circ} \mathrm{C}}$
(C) $0.99 \frac{\mathrm{cal}}{\mathrm{g}^{\circ} \mathrm{C}}$
(B) $0.33 \frac{\mathrm{cal}}{\mathrm{g}^{\circ} \mathrm{C}}$
(D) $1.33 \frac{\mathrm{cal}}{\mathrm{g}^{\circ} \mathrm{C}}$
2) Which of the following is a valid unit for specific heat?
(A) $\frac{\mathrm{cal}}{\mathrm{g}^{\circ} \mathrm{C}}$
(C) $\frac{\mathrm{cal}}{\mathrm{g}}$
(B) cal
(D) ${ }^{\circ} \mathrm{C}$
$\qquad$ 7) Which of the following has the greatest heat capacity?
(A) 1000 g of water
(C) 1 g of water
(B) 1000 g of steel
(D) 1 g of steel
$\qquad$ 8) What happens to a reaction at equilibrium when more reactant is added to the system?
(A) The reaction makes more products.
(C) The reaction is unchanged.
(B) The reaction makes more reactants.
(D) The answer cannot be determined.
$\qquad$ 9) Which of the following is true about the combustion of carbon?
(A) The reaction is spontaneous.
(B) Carbon is produced from oxygen and carbon dioxide.
(C) Enthalpy remains constant.
(D) Entropy decreases.
$\qquad$ 10) What determines whether or not a reaction is spontaneous?
(A) change in molar volume and heat change
(B) change in enthalpy only
(C) enthalpy change and entropy change
(D) change in entropy only
$\qquad$ 11) Which type of solution is one with a pH of 8 ?
(A) acidic
(B) basic
(C) neutral
(D) The type varies, depending on the solution.
$\qquad$ 12) Which of these compounds is an alkene?
(A) methane
(C) butyne
(B) nonene
(D) propanone
3) Which of the following is true about structural isomers?
(A) Structural isomers have the same molecular formula.
(B) Structural isomers have different physical and chemical properties.
(C) Structural isomers have the same elemental composition.
(D) all of the above
4) Which of the following is NOT a product obtained from the distillation of coal tar?
(A) benzene
(C) coke
(B) phenol
(D) toluene
