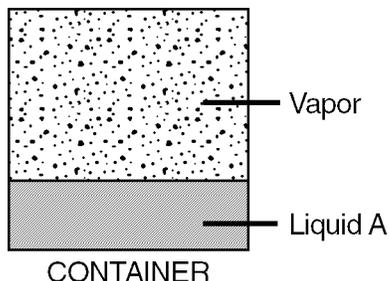


Chemistry Sample Questions

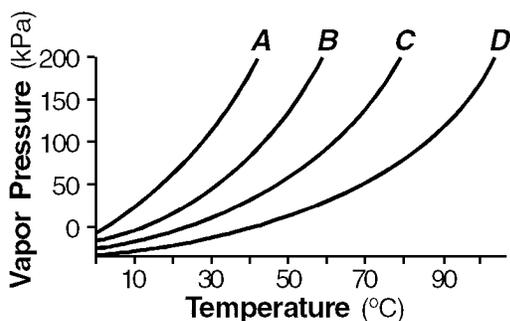
Name: _____

- 1) Which phase change represents deposition?
 - A) liquid \rightarrow gas
 - B) gas \rightarrow solid
 - C) gas \rightarrow liquid
 - D) solid \rightarrow liquid
- 2) Which pair has identical electron configurations?
 - A) S^{2-} and Cl^-
 - B) K^0 and Na^+
 - C) Cl^- and K^0
 - D) S^0 and Ar^0
- 3) Liquid *A* is confined in a container as shown in the diagram below.



The equilibrium vapor pressure of liquid *A* depends on the

- A) amount of liquid in the container
 - B) amount of vapor in the container
 - C) temperature of liquid *A*
 - D) size of the confining container
- 4) As an Na atom forms an Na^+ ion, the number of protons in its nucleus
 - A) remains the same
 - B) decreases
 - C) increases
 - 5) The chart below shows the change in vapor pressure of four liquids with increasing temperature.

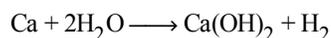


What liquid has the *lowest* normal boiling point?

- A) *A*
- B) *B*
- C) *C*
- D) *D*

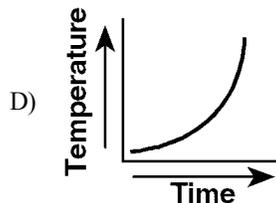
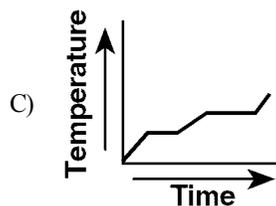
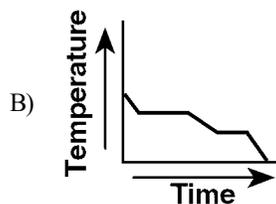
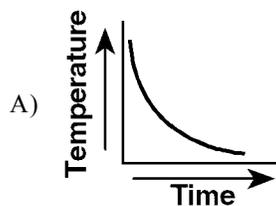
- 6) In 1909, a team of British scientists led by Ernest Rutherford, carried out the Gold Foil experiments to determine the arrangement of particles in the atom. In these experiments, alpha particles were used to bombard gold foil.
 - (a) Most of the alpha particles passed through the gold foil undeflected. What conclusion was made about the structure of the atom based on this observation?
 - (b) A few of the alpha particles were deflected back at the source. What did this observation reveal about the structure of the atom?

- 7) Given the reaction:

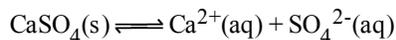


How many moles of H_2O are needed to react completely with 2.0 moles of Ca?

- A) 1.0 moles
 - B) 2.0 mole
 - C) 0.50 mole
 - D) 4.0 moles
- 8) Which graph *best* represents a change of phase from a gas to a solid?



9) Given the system at equilibrium:



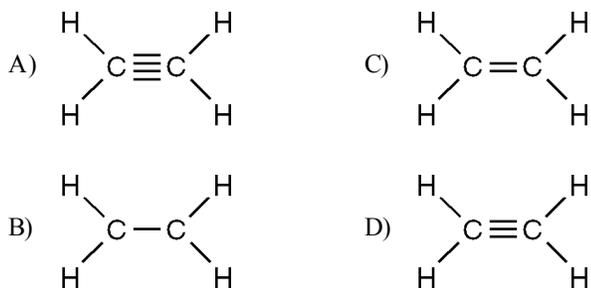
If $\text{K}_2\text{SO}_4(\text{s})$ is added and the temperature remains constant, the $\text{Ca}^{2+}(\text{aq})$ concentration will

- A) decrease, and the amount of $\text{CaSO}_4(\text{s})$ will decrease
- B) increase, and the amount of $\text{CaSO}_4(\text{s})$ will increase
- C) increase, and the amount of $\text{CaSO}_4(\text{s})$ will decrease
- D) decrease, and the amount of $\text{CaSO}_4(\text{s})$ will increase

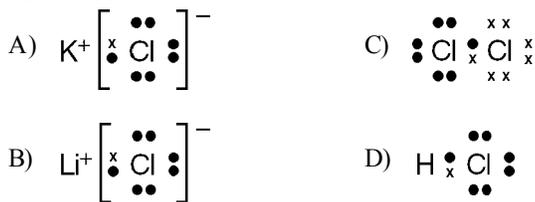
10) An atomic mass unit is defined as exactly

- A) $\frac{1}{16}$ the mass of a ^{12}C atom
- B) $\frac{1}{12}$ the mass of a ^{16}O atom
- C) $\frac{1}{12}$ the mass of a ^{12}C atom
- D) $\frac{1}{16}$ the mass of a ^{16}O atom

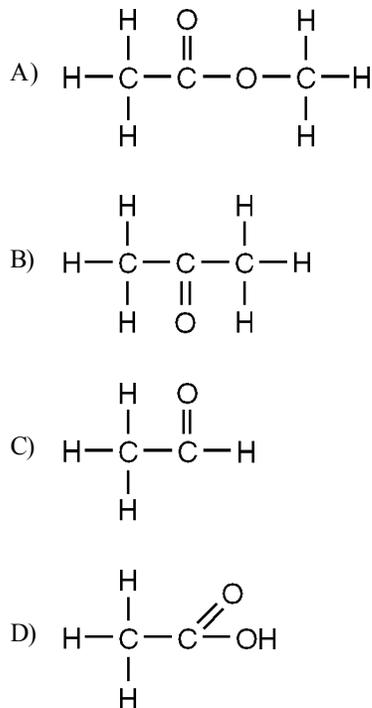
11) What is the structural formula for ethene?



12) Which electron-dot diagram represents a molecule that has a polar covalent bond?



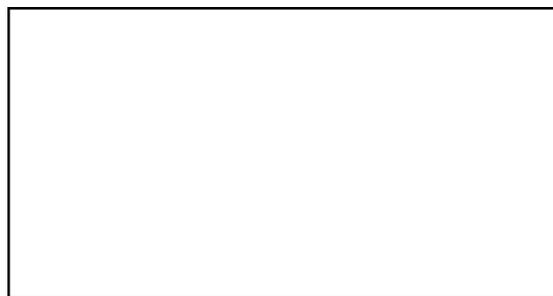
13) Which structural formula represents a ketone?



14) Which process usually produces water as one of the products?

- A) cracking
- B) condensation polymerization
- C) addition polymerization
- D) hydrolysis

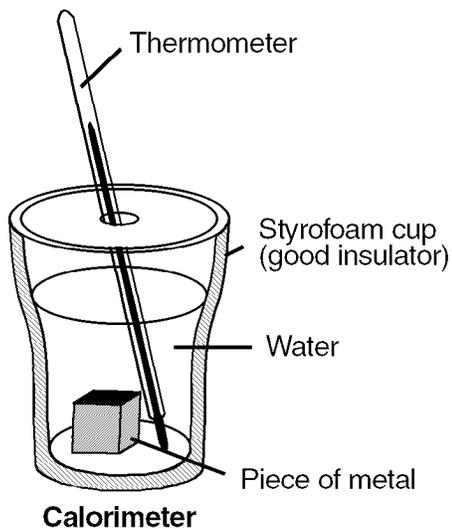
15) In the box below, draw the structural formula for ethanamine.



- 16) Beaker *A* contains a 1-gram piece of zinc and beaker *B* contains 1 gram of powdered zinc. If 100 milliliters of 0.1 M HCl is added to each of the beakers, how does the rate of reaction in beaker *A* compare to the rate of reaction in beaker *B*?
- A) The rate in *A* is greater due to the smaller surface area of the zinc.
 B) The rate in *B* is greater due to the smaller surface area of the zinc.
 C) The rate in *A* is greater due to the larger surface area of the zinc.
 D) The rate in *B* is greater due to the larger surface area of the zinc.

- 17) In the reaction $2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{Na}^+ + 2\text{OH}^- + \text{H}_2$, the substance oxidized is
- A) Na
 B) H_2
 C) Na^+
 D) H^+

- 21) A student using a Styrofoam cup as a calorimeter added a piece of metal to distilled water and stirred the mixture as shown in the diagram below. The student's data is shown in the table below.



DATA TABLE

Mass of H_2O	50.0 g
Initial temperature of H_2O	25.0°C
Mass of metal	20.0 g
Initial temperature of metal	$100.^\circ\text{C}$
Final temperature of $\text{H}_2\text{O} + \text{metal}$	32.0°C
Specific Heat Capacity of H_2O	$4.18 \text{ J/g}\cdot\text{K}$

Which of the following statements correctly describes the heat flow in joules? [Ignore heat gained or lost by the calorimeter.]

- A) The water lost 1,463 joules of heat and the metal gained 1,463 joules of heat.
 B) The water gained 5,685 joules of heat and the metal lost 5,685 joules of heat.
 C) The water lost 5,685 joules of heat and the metal gained 5,685 joules of heat.
 D) The water gained 1,463. joules of heat and the metal lost 1,463. joules of heat.

- 18) Which species acts as the anode when the reaction $\text{Zn(s)} + \text{Pb}^{2+}(\text{aq}) \longrightarrow \text{Zn}^{2+}(\text{aq}) + \text{Pb(s)}$ occurs in a voltaic cell?

- A) $\text{Pb}^{2+}(\text{aq})$
 B) Pb(s)
 C) Zn(s)
 D) $\text{Zn}^{2+}(\text{aq})$

- 19) Which metal is obtained from its fused salt by electrolysis?

- A) Pb
 B) Pt
 C) Cr
 D) Ca

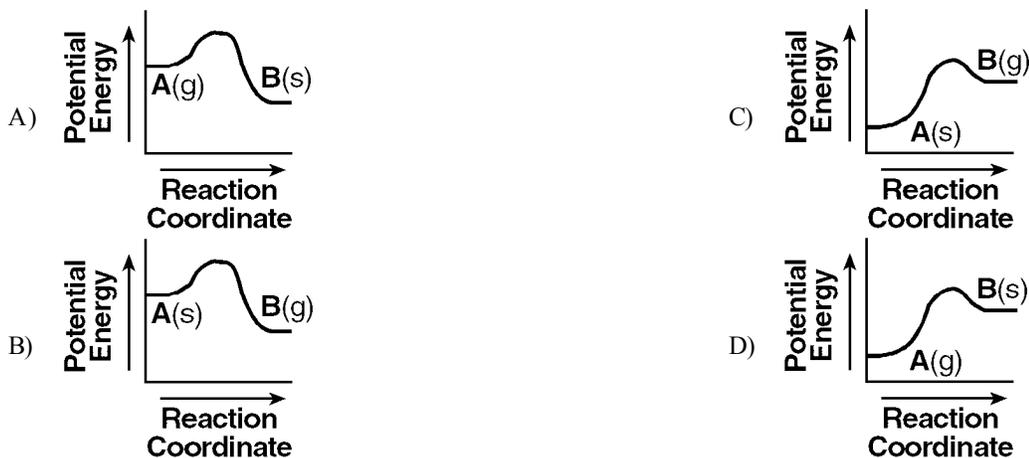
- 20) Given a reaction that occurs in the contact process:



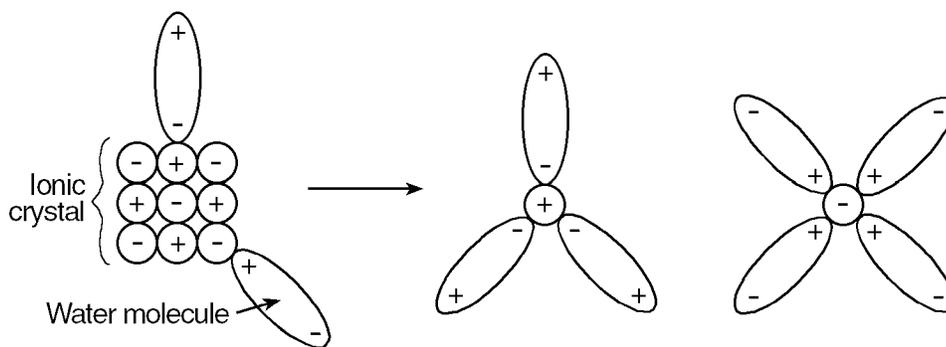
Adding a catalyst to this system causes the

- A) activation energy to decrease
 B) heat of reaction to increase
 C) heat of reaction to decrease
 D) activation energy to increase

22) Which potential energy diagram indicates a reaction that must occur spontaneously?



23) The diagram below represents an ionic crystal being dissolved in water.



According to the diagram, the dissolving process takes place by

- A) molecule-ion attractions
- B) network bond formation
- C) hydrogen bond formation
- D) dispersion forces of attraction

24) Which sample represents a homogeneous mixture?

- A) $C_2H_5OH(s)$
- B) $C_2H_5OH(g)$
- C) $C_2H_5OH(l)$
- D) $C_2H_5OH(aq)$

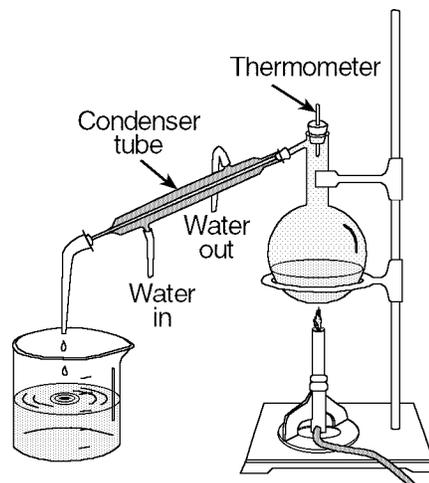
25) Human body temperature is 37° Celsius. What temperature does this correspond to on the Kelvin scale?

- A) 236 K
- B) 98.6 K
- C) 310 K
- D) -236 K

26) The heat of fusion of water is 80 calories per gram. How many calories of heat would be required to completely melt 5 grams of $H_2O(s)$ at $0^\circ C$ to $H_2O(l)$ at $0^\circ C$?

- A) 5
- B) 40
- C) 400
- D) 80

27)



The laboratory apparatus above is used to separate components of a mixture based on differences in

- A) boiling point
- B) particle size
- C) density
- D) solubility