Unit 3 MCQ set 2

1. A gaseous solution contains 0.40 mol Ar, 1.20 mol He, and 0.40 mol Ne. What is the mole fraction of Ne in the solution?
   (A) 0.120
   (B) 0.20
   (C) 0.333
   (D) 0.60

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2. A sample of H_2 gas is collected over water. The pressure in the gas collection tube is 1.03 atm. The vapor pressure of the water is 0.06 atm. What pressure does the hydrogen gas exert?
   (A) 1.09 atm
   (B) 1.03 atm
   (C) 1.00 atm
   (D) 0.97 atm

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3. An ideal gas is cooled from 100°C to -43°C in a sealed container while maintaining a constant pressure. Which of the following statements are true?
   I. The volume of the gas decreases.
   II. The average distance between the gas particles decreases.
   III. The average kinetic energy of the gas particles increases.
   (A) I only
   (B) I and II only
   (C) I, II, and III
   (D) I and III only

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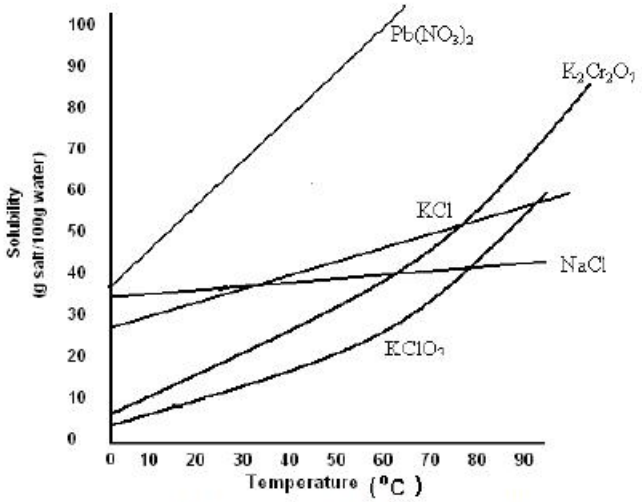
4. Water boils at 87°C on top of a certain mountain and boils at 100°C at sea level. Which of the following statements provides the best possible explanation for this observation?
   (A) Water boils when its vapor pressure equals the atmospheric pressure, and atmospheric pressure decreases as elevation increases.
   (B) The evaporation process is accelerated due to the reduction of gaseous molecules in the air.
   (C) The increased atmospheric pressure pushing down on the surface of the water causes it to boil at a lower internal energy.
   (D) The average kinetic energy of molecules increases as atmospheric pressure decreases.

5. Substances can sometimes be separated from one another using fractional distillation. This technique can be used when the substances have different:
   (A) Surface areas
   (B) Solubilities
   (C) Boiling temperatures
   (D) Melting temperatures

6. When the temperature of an unsaturated solution of potassium nitrate, KNO_3, increases from 12°C to 85°C, which of the following statements hold true.
   (A) The molarity remains the same.
   (B) The mole fraction of KNO_3 remains the same.
   (C) The vapor pressure of the solution remains the same.
   (D) The average kinetic energy of the particles remains the same.



7. Suppose you have saturated solutions at 50°C for each of the compounds in the above graph. Which solution will precipitate the smallest mass of solute when the solutions are cooled to 20°C?
   (A) $K_2Cr_2O_7$
   (B) $KClO_3$
   (C) KCl
   (D) NaCl