

# Self Assessment B

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## Question 1

The most significant force between solute particles in an aqueous  $\text{MgCl}_2$  solution is

- ☐ A) charge-charge interaction
- ☐ B) charge-dipole interaction
- ☐ C) van der Waals interaction
- ☐ D) hydrogen bonding

## Question 2

Which of the following liquids would make a good solvent for bromine,  $\text{Br}_2$ ?

- ☐ A)  $\text{HCl(g)}$
- ☐ B)  $\text{H}_2\text{O(l)}$
- ☐ C)  $\text{CS}_2\text{(l)}$
- ☐ D)  $\text{NH}_3\text{(g)}$
- ☐ E)  $\text{CH}_3\text{OH(l)}$

## Question 3

What is the sulfate ion concentration in a 12 M aqueous solution of  $\text{Mn}(\text{SO}_4)_2$ ?

- ☐ A) 12 M
- ☐ B) 24 M
- ☐ C) 36 M
- ☐ D) 48 M
- ☐ E) None of the above.

## Question 4

Calculate the molar concentration of a sulfuric acid solution containing 23.0% by mass of  $\text{H}_2\text{SO}_4$ . The solution density is  $1.398 \text{ g/cm}^3$ .

- ☐ A) 5.96 M
- ☐ B) 0.328 M
- ☐ C) 0.596 M
- ☐ D) 3.28 M
- ☐ E) None of the above.

## Question 5

The molality of a solution of ethyl alcohol,  $(\text{C}_2\text{H}_5\text{OH})$  in water is  $0.960 \text{ mol/kg}$ . How many grams of alcohol are

dissolved in 5.98 kg of water?

- ☐ A) 5.74 g
- ☐ B) 287 g
- ☐ C) 74.1 g
- ☐ D) 265 g
- ☐ E) 740 g

### Question 6

What change would you predict in the solubility of  $\text{N}_2(\text{g})$  in water if the temperature changes from  $20^\circ\text{C}$  to  $80^\circ\text{C}$ ?

- ☐ A) Less  $\text{N}_2$  would dissolve.
- ☐ B) More  $\text{N}_2$  would dissolve.
- ☐ C) The solubility of  $\text{N}_2$  would not change
- ☐ D) Some specific information about  $\text{N}_2$  would have to be given before its solubility characteristics can be determined.

### Question 7

The freezing point of pure camphor is  $178.4^\circ\text{C}$ , and its molal freezing-point constant,  $K_f$ , is  $40.0^\circ\text{C}/\text{m}$ . Find the freezing point of a solution containing 3.00 g of a compound (molar mass = 125 g/mol) dissolved in 45.0 g of camphor.

- ☐ A)  $174.1^\circ\text{C}$
- ☐ B)  $157^\circ\text{C}$
- ☐ C)  $135.2^\circ\text{C}$
- ☐ D)  $140^\circ\text{C}$
- ☐ E)  $21.3^\circ\text{C}$

### Question 8

The osmotic pressure of a 0.82 M HCl solution is 35.9 atm at  $18^\circ\text{C}$ . Calculate the van't Hoff factor for HCl at this concentration.

- ☐ A) 1.8
- ☐ B) 17.2
- ☐ C) 1.5
- ☐ D) 2.00

### Question 9

Colloidal particles are \_\_\_\_\_ solute molecules.

- ☐ A) larger than
- ☐ B) smaller than
- ☐ C) the same size as
- ☐ D) either smaller than or larger than

### Question 10

Which of the following is not an example of a hydrophilic group that can be attached to the surface of a large molecule?

- ☐ A)  $\text{-COO}^-$
  - ☐ B)  $\text{-OH}$
  - ☐ C)  $\text{-NH}_3^+$
  - ☐ D)  $\text{-CH}_3$
  - ☐ E)  $\text{-NH}_2$
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