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Self Assessment B

Question 1

Which of the following substances can form hydrogen bonds?

Substances: (1) CH_3COCH_3; (2) CH_3OH; (3) C_2H_6; (4) HCOOH

- **A)** compounds 1 and 2
- **B)** compounds 1 and 3
- **C)** compounds 1, 2, and 3
- **D)** compounds 2 and 4
- **E)** compounds 1, 2, and 4

Question 2

Samples of which one of the following substances exhibits both dipole-dipole forces and hydrogen bonding?

- **A)** HCl
- **B)** PH_3
- **C)** Br_2
- **D)** H_2
- **E)** CH_3NH_2

Question 3

In which of the following substances are dispersion forces likely to be the most important intermolecular interaction in determining the melting and boiling points?

- **A)** Br_2
- **B)** H_2S
- **C)** CO
- **D)** HCl
- **E)** ICl

Question 4

At a given temperature, which of the following liquids should have the highest viscosity?

- **A)** CH_2Br_2
- **B)** $HOCH_2CH_2OH$
- **C)** CH_2CH_2OH
- **D)** CH_3Cl
- **E)** CH_3OCH_3

Question 5

Krypton crystallizes in a structure that has four Kr atoms in each unit cell, and the unit cell is a cube. The edge length of the unit cell is 0.559 nm. Calculate the density of crystalline Kr, in kg/m^3.

- **A)** 9.97×10^{-13} kg/m^3
- **B)** 3.14×10^{3} kg/m^3
- **C)** 3.14 kg/m^3
- **D)** 3.19×10^{3} kg/m^3

Question 6

At room temperature, SiO_2 is a solid, whereas CO_2 is a gas. This is because

- **A)** both are molecular, but the dispersion forces between SiO_2 molecules are stronger because SiO_2 is the larger of the two compounds.
- **B)** both are molecular, but CO_2 is linear whereas SiO_2 is bent, and therefore has dipole-dipole attractions.
- **C)** CO_2 is molecular, whereas SiO_2 is a covalent network solid.
- **D)** CO_2 is molecular whereas SiO_2 is ionic.

Question 7

Which of the following compounds should have the highest melting point?

- **A)** $MgCl_2$

- **B)** BCl_3
- **C)** NCl_3
- **D)** CCl_4

Question 8

Which of the following substances would have the greatest electrical conductivity in the solid state?

- **A)** K
- **B)** KI
- **C)** I
- **D)** IF

Question 9

Use the Clausius-Clapeyron equation to estimate the boiling point of water at 24.0 torr pressure. The average (H_{vap} for water over the relevant temperature range is 42.34 kJ/mol).

- **A)** 33.2 ^oC
- **B)** 25 ^oC
- **C)** 298 ^oC
- **D)** 80 ^oC

Question 10

Acetic acid has a heat of fusion of 10.8 kJ/mol and a heat of vaporization of 24.3 kJ/mol. The estimated value for the heat of sublimation of acetic acid is

- **A)** -13.5 kJ/mol.
- **B)** -35.1 kJ/mol.
- **C)** 13.5 kJ/mol.
- **D)** 17.6 kJ/mol.
- **E)** 35.1 kJ/mol.