Chapter Summary Worksheet

Chapter 8
Shapes of molecules and ions, polarity and intermolecular forces

Print out and complete this worksheet to generate a summary for Chapter 8.

1 The shape of the hydrogen sulfide molecule, H_2S, is

- ☐ **A** tetrahedral
- ☐ **B** linear
- ☐ **C** V-shaped
- ☐ **D** non-planar

2 The shape of the sulfur trioxide molecule, SO_3, is

- ☐ **A** tetrahedral
- ☐ **B** pyramidal
- ☐ **C** planar
- ☐ **D** V-shaped

3 The number of lone pairs around the xenon atom in XeF_4 is

- ☐ **A** 4
- ☐ **B** 2
- ☐ **C** 1
- ☐ **D** 0

4 Which is polar?

- ☐ **A** *cis*-1,2-difluoroethene
- ☐ **B** *trans*-1,2-difluoroethene
- ☐ **C** 1,1,2,2-tetrafluoroethene, $CF_2{=}CF_2$
- ☐ **D** tetrafluoromethane, CF_4

5 Which is the strongest force between hydrogen chloride molecules?

- ☐ **A** hydrogen bonds
- ☐ **B** covalent bonds
- ☐ **C** permanent dipole forces
- ☐ **D** induced dipole forces

6 Water has a higher boiling point than hydrogen fluoride because

- ☐ **A** the covalent bonds are stronger in water than in hydrogen fluoride
- ☐ **B** water forms more hydrogen bonds than hydrogen fluoride does
- ☐ **C** an H···O hydrogen bond in water is stronger than an H···F hydrogen bond in hydrogen fluoride
- ☐ **D** the oxygen atom is less δ^- than the fluorine atom

7 The bond angle around the hydrogen-bonded hydrogen in liquid ammonia is

- ☐ **A** 180°
- ☐ **B** 120°
- ☐ **C** 109.5°
- ☐ **D** 107°

8 Graphite is less dense than diamond because

- ☐ **A** the carbon–carbon covalent bond length in graphite is less than that in diamond
- ☐ **B** each carbon atom is bonded to only three other carbon atoms, whereas in diamond each carbon atom is bonded to four others
- ☐ **C** the distance between layers in graphite is much greater than the carbon–carbon bond lengths in both graphite and diamond
- ☐ **D** graphite consists of layers of carbon atoms in interlocking planar hexagons, whereas the hexagons in diamond are three-dimensional

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9 Silicon carbide has a similar structure to diamond. It has a high melting temperature because

- ☐ **A** the silicon–carbon covalent bonds are strong
- ☐ **B** there are strong intermolecular forces between silicon carbide molecules
- ☐ **C** it is an ionic compound with strong forces between the silicon cations and the carbon anions
- ☐ **D** the silicon carbide molecules are three-dimensional

10 Hydrogen chloride has a lower boiling temperature than hydrogen iodide because

- ☐ **A** the mass of a hydrogen chloride molecule is less than that of the hydrogen iodide molecule
- ☐ **B** there are fewer protons in a hydrogen chloride molecule than in a hydrogen iodide molecule
- ☐ **C** there are fewer electrons in a hydrogen chloride molecule than in a hydrogen iodide molecule
- ☐ **D** hydrogen chloride is less polar than hydrogen iodide

11 Which has the strongest intermolecular forces?

- ☐ **A** $CH_3CH_2CH_2CH_2CH_3$
- ☐ **B** $CH_3CH_2CH_2CH_3$
- ☐ **C** $(CH_3)_4C$
- ☐ **D** $(CH_3)_2CHCH_2CH_3$

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