

Common answering techniques (Combined Chemistry)

Chemical Bonding

1. Explain why sodium chloride has a high melting point.

Ans: Sodium chloride has a **giant ionic crystal lattice structure**. Large amounts of energy is used to overcome the **strong electrostatic forces of attraction between oppositely charged ions**. Therefore, sodium chloride has high melting points.

2. Explain why ammonia has a low melting point.

Ans: Ammonia has a **simple covalent structure**. Small amounts of energy is used to overcome the **weak intermolecular forces of attraction between molecules**. Therefore, ammonia has low melting points.

Combining 1 & 2 together ...

3. At room temperature and pressure, ammonia exists as a gas while sodium chloride exists as a solid. Explain why.

Ans: Ammonia has a **simple covalent structure**. Small amounts of energy is used to overcome the **weak intermolecular forces of attraction between molecules**. Therefore, ammonia exists as a gas at room temperature and pressure.

Sodium chloride has a **giant ionic crystal lattice structure**. Large amounts of energy is used to overcome the **strong electrostatic forces of attraction between oppositely charged ions**. Therefore, sodium chloride exists as a solid at room temperature and pressure.

4. In molten state, sodium chloride conducts electricity. However, in solid state, sodium chloride is unable to conduct electricity. Explain why.

Ans: In solid sodium chloride, ions are **held together by strong electrostatic forces of attraction**. However, when sodium chloride enters a molten state, the **giant ionic crystal lattice structure is broken down**, and ions are now **mobile to act as charge carriers to conduct electricity**.

5. Why does ammonia not conduct electricity in ANY state?

Ans: Ammonia has a **simple covalent structure**. In this simple covalent structure, all the **electrons have been used up for covalent bonding**. Therefore, there are **no electrons to act as charge carriers**, thus *ammonia cannot conduct electricity*.

Chemical Energetics

1. How will increasing the temperature of the reactants affect the rate of reaction?

Ans: By increasing the temperature of the reactants, the reacting particles will become more energetic, which means they have **higher amounts of kinetic energy**. Therefore, this means that more particles will have energy **equal to or greater than the activation energy**, thus the rate of reaction will increase.

2. Why does grinded magnesium react more quickly than magnesium lumps?

Ans: When magnesium is grinded, it has a smaller particle size, meaning it has a **greater surface area** exposed for collisions. This **increases the frequency of effective collisions**, increasing the rate of reaction.

Maintaining Air Quality

Carbon cycle:

Carbon dioxide is released through combustion of (carbon containing) fuels / respiration / decomposition / decay; Carbon dioxide is taken in through photosynthesis / ocean uptake; If carbon dioxide released is more than carbon dioxide taken in, there will be a net increase in carbon dioxide in the atmosphere / Carbon dioxide released will be balanced by or is equal to the carbon dioxide taken in.