1. The table shows some information about fluorine and lithium fluoride.

Substance	Structure	Melting point (°C)
fluorine	simple covalent	– 220
lithium fluoride	giant ionic	845

Why are the melting points of fluorine and lithium fluoride different?

Put ticks (✓) in the boxes next to the **two** correct answers.

Simple covalent substances have lower melting points than giant ionic substances. ☐

Ions do not attract to each other. ☐

There are weak forces between simple covalent molecules. ☐

Ionic substances dissolve easily. ☐

[2]

2. Some of the materials we use are pure chemicals and some are mixtures of chemicals.

Which of these are pure chemicals and which are mixtures of chemicals?

Put ticks (✓) in the correct boxes.

	Pure chemicals	Mixtures of chemicals
copper		
crude oil		
sodium chloride		

[2]

3. Millions of tonnes of hydrogen are made every year.

The hydrogen is usually made from methane.

The process starts with methane and steam, and makes hydrogen and carbon dioxide.

Write a word equation for this process.

[2]

4. Table 1.1 shows some information about diamond, graphite and carbon dioxide.

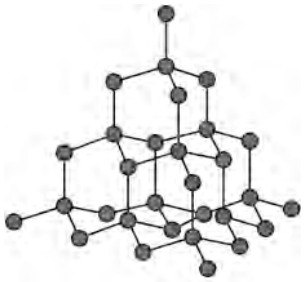
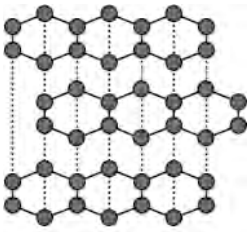
	Diamond	Graphite	Carbon dioxide
Diagram of structure			
Formula	C(s)	C(s)	$CO_2(g)$
Element or compound?	element	element	compound
State at room temperature and pressure	solid		
Structure and bonding	giant covalent	giant covalent	simple covalent

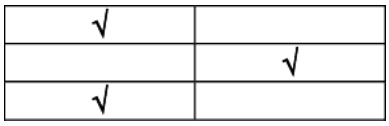
Table 1.1

Diamond and graphite have giant covalent structures.
Carbon dioxide has a simple covalent structure.

Explain how the diagrams of their structures show that these statements are true.

[2]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Guidance
1			simple covalent substances have lower melting points than giant ionic substances ✓ there are weak forces between simple covalent molecules ✓	2	
			Total	2	
2				2	All correct = 2 marks 2 correct = 1 mark Examiner's Comments Candidates could identify that copper was a pure substance and that crude oil was a mixture. The difficulty came with deciding on sodium chloride. Unfortunately, only a small number of candidates could recall that sodium chloride is a pure chemical.
			Total	2	
3			methane + steam ? hydrogen + carbon dioxide	1	reactants in either order Allow water products in either order Allow correctly balanced symbol equation Examiner's Comments Generally answered well by the majority of candidates. Where mistakes were made, it was usually because extra products had been added into the equation.
			Total	1	
4			diamond and graphite contain many atoms (bonded together) / many bonds / lattice ✓ carbon dioxide is a small molecule / contains only a few / 3 atoms (bonded together) / few / 2 bonds ✓	2 (AO 2× 1.1)	IGNORE because they are very big ALLOW 'they are very big molecules'. Examiner's Comments Both structures have covalent bonding, so a good answer is focused on the scale of the structure, with many atoms or bonds in a giant structure and very few in a simple structure.
			Total	2	