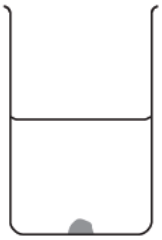
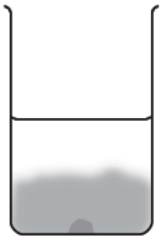
1 Hydrated copper(II) sulfate is a soluble blue solid. A large crystal of this solid is placed at the bottom of a beaker of water.

The diagram shows the beaker immediately after placing the crystal in it, and after two days.



after placing the crystal



after two days

(a) After two days, the crystal becomes smaller and the liquid near the bottom of the beaker becomes blue.

Which statement explains these observations?

(1)

☒ **A** the crystal dissolves

☒ **B** the crystal freezes

☒ **C** the crystal melts

☒ **D** the crystal sublimes

(b) After two weeks, the crystal has disappeared.

Which statement best describes the appearance of the liquid in the beaker after two weeks?

(1)

☒ **A** it is all blue

☒ **B** it is all brown

☒ **C** only the lower part is blue

☒ **D** only the upper part is blue

(c) The formula of the compound in the crystal is $CuSO_4.5H_2O$

(i) How many different elements are shown in the formula?

(1)

.....

(ii) How many atoms are shown in the formula?

(1)

.....

(Total for Question 1 = 4 marks)

2 The table shows the names of some substances. It also shows whether each substance is an element or a compound, and the type of bonding in the substance.

(a) Complete the table. One example of each has been done for you.

(3)

Substance	Element or compound	Type of bonding
ammonia		
hydrogen chloride	compound	
oxygen		covalent
magnesium oxide		

(b) What is the formula of magnesium oxide?

(1)

☒ **A** Mg_2O

☒ **B** MgO

☒ **C** MgO_2

☒ **D** Mg_2O_2

(c) Which state symbol represents the physical state of hydrogen chloride at room temperature?

(1)

☒ **A** aq

☒ **B** g

☒ **C** l

☒ **D** s

(Total for Question 2 = 5 marks)