

**25** Brass is an alloy of copper.

Which statement about brass or copper is correct?

- A** Brass does **not** conduct electricity because it is a compound.
- B** Copper conducts electricity because its atoms are free to move.
- C** Brass is harder than copper because its layers of atoms **cannot** easily slide over each other.
- D** Copper is stronger than brass because it is a pure metal.

**26** Brass is a mixture of copper and zinc.

Which statement describes and explains the relative strength of brass compared to copper?

- A** Brass is stronger than copper because the layers of atoms in brass **cannot** easily slide over each other.
- B** Brass is stronger than copper because the intermolecular forces are greater in brass than in copper.
- C** Brass is weaker than copper because the layers of atoms slide more easily over each other in brass than in copper.
- D** Brass is weaker than copper because the intermolecular forces are weaker in brass than in copper.

**4** Chromium is the element with atomic number 24 in the Periodic Table.

**(a)** The main ore of chromium is chromite. Chromite contains  $\text{FeCr}_2\text{O}_4$ .

$\text{FeCr}_2\text{O}_4$  reacts with carbon.

**(i)** Complete the equation for this reaction.



**(ii)** Suggest **one** disadvantage of extracting chromium by reacting chromite with carbon.

..... [1]

**(b)** Chromium can be mixed with nickel and other elements to form stainless steel.

Name the type of substance formed when a metal is mixed with other elements.

..... [1]

**(c)**  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  is a compound containing chromium.

The negative ion in  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  is  $\text{Cr}_2\text{O}_7^{2-}$ .

**(i)** State the sum of the oxidation numbers in the  $\text{Cr}_2\text{O}_7^{2-}$  ion.

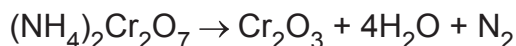
..... [1]

**(ii)** The oxidation number of each O in  $\text{Cr}_2\text{O}_7^{2-}$  ions is  $-2$ .

Determine the oxidation number of each Cr in  $\text{Cr}_2\text{O}_7^{2-}$  ions. Show your working.

..... [2]

(iii) When  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  is heated the following reaction occurs.



Calculate the volume of nitrogen gas produced at r.t.p., in  $\text{cm}^3$ , when 1.26 g of  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  is heated using the following steps.

The  $M_r$  of  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  is 252.

- Calculate the number of moles of  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  used.

..... mol

- Determine the number of moles of  $\text{N}_2$  formed.

..... mol

- Calculate the volume of  $\text{N}_2$  formed at r.t.p. in  $\text{cm}^3$ .

.....  $\text{cm}^3$   
[3]

[Total: 9]

**28** Which statement about alloys is correct?

- A** Alloys are harder than pure metals because they contain strong intermolecular forces.
- B** Brass is an alloy containing mainly copper and tin.
- C** The different-sized atoms in an alloy mean that the layers **cannot** easily slide over each other.
- D** There are no alloys containing carbon because carbon is a non-metal.