

METALS & NON-METALS 1

Q1. The transition metals are a block of elements between Groups 2 and 3 of the periodic table. Transition metals have different properties to Group 1 metals.

Put ticks (✓) next to the three correct statements about transition metals in the table below.

Statement	(✓)
They are harder than Group 1 metals	
They have lower densities than Group 1 metals	
They have higher melting points than Group 1 metals	
They are more reactive with water than Group 1 metals	
They often form coloured compounds, but Group 1 compounds are usually white	

(3 marks)

Q2. State two properties of transition elements that make them more useful than alkali metals for making water pipes.

(2 marks)

Q3. The periodic table may help you to answer this question.

Part of the periodic table is shown below.

																	A	
B												C						
						D												
	E																	

Choose your answers only from the letters shown in the periodic table above.

Which letter, A to E, represents:

- (i) sodium Letter
(1 mark)
- (ii) a non-metal Letter
(1 mark)
- (iii) a Group 2 element Letter
(1 mark)
- (iv) a transition element? Letter
(1 mark)

Q4. Sodium (Na) is in Group 1 of the periodic table.

Nickel (Ni) is a transition element.

Tick (✓) two correct statements about sodium and nickel.

Statement	Tick (✓)
Sodium and nickel are both metals.	
Sodium has a higher melting point than nickel.	
Sodium is more reactive than nickel.	
Sodium is harder than nickel.	

(2 marks)

Q5. The figure shows the positions of eight elements in the modern periodic table.

Group	1	2									3	4	5	6	7	0
	Li													N		
											Al					
	K						Fe			Cu				As		Br

Choose the correct chemical symbols from the figure to complete each sentence.

(a) The two metals that react vigorously with water are and
(1 mark)

(b) The element used as a catalyst in the Haber process is
(1 mark)

(c) Iron has ions with different charges. The other metal that has ions with different charges is
(1 mark)

Q6. The properties of iron and those of the Group 1 metal sodium are different.

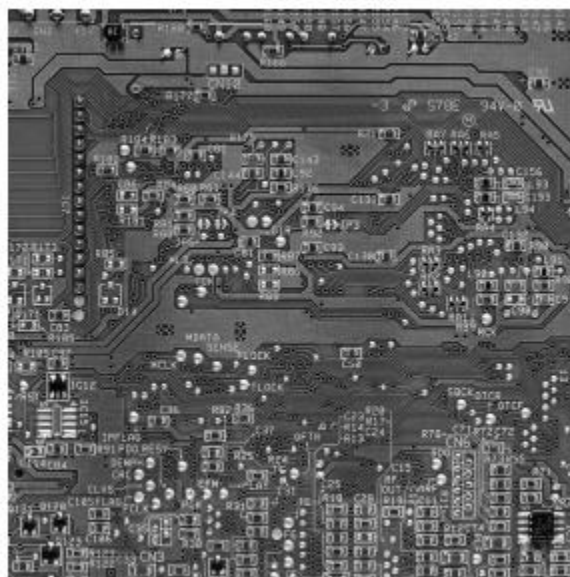
Put a tick (✓) next to the two correct phrases which could complete the following sentence.

Compared to sodium, iron

	(✓)
has a higher melting point	
has a lower density	
is harder	
is more reactive	
is weaker	

(2 marks)

Q7. Etching is a way of making printed circuit boards for computers.



Printed circuit boards are made when copper sheets are etched using iron(III) chloride solution. Where the copper has been etched, only plastic remains.

Copper is a good conductor of electricity. Explain why.

(2 marks)

Q8. Oil rigs are used to drill for crude oil.



Drill heads are made from steel. Steel is an alloy.

Explain why alloys are harder than pure metals.

(3 marks)

Q9. Read this passage about metals.

Metals are crystalline materials. The metal crystals are normally about 20 000 nm (nanometres) in diameter. The atoms inside these crystals are arranged in layers.

A new nanoscience process produces nanocrystalline metals. Nanocrystalline metals are stronger and harder than normal metals.

It is hoped that nanocrystalline metals can be used in hip replacements.



The use of nanocrystalline metals should give people better hip replacements which last longer.

(a) State why metals can be bent and hammered into different shapes.

(1 mark)

(b) How is the size of the crystals in nanocrystalline metals different from the size of the crystals in normal metals?

(1 mark)

(c) Hip joints are constantly moving when people walk.

Suggest and explain why the hip replacement made of nanocrystalline metal should last longer than one made of normal metals.

(2 marks)

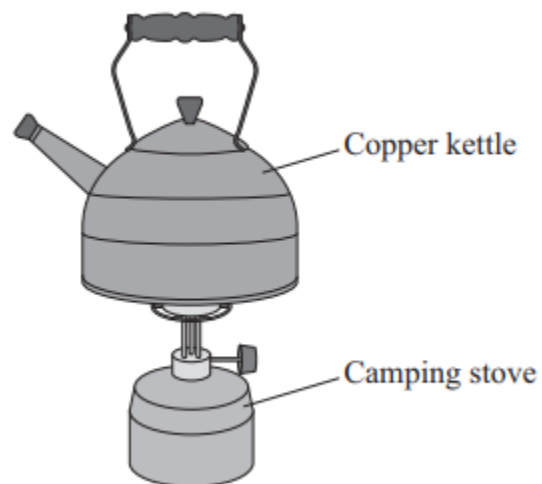
Q10. Explain how metals conduct electricity.

(2 marks)

Q11. The picture shows a copper kettle being heated on a camping stove.

Copper is a good material for making a kettle because:

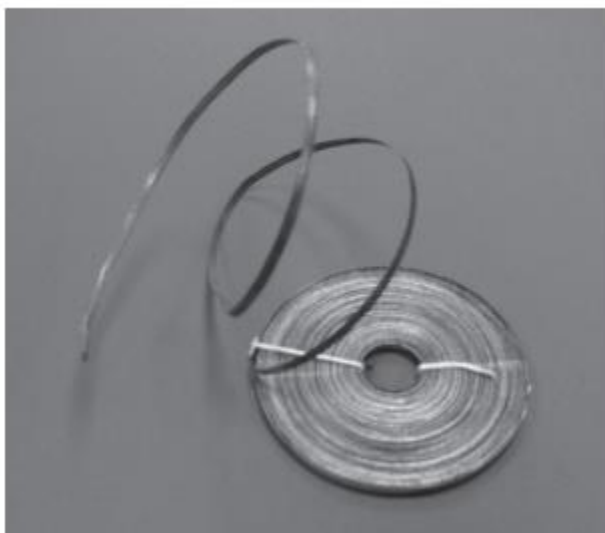
- it has a high melting point
- it is a very good conductor of heat.



Explain why copper, like many other metals, has a high melting point. You should describe the structure and bonding of a metal in your answer.

(4 marks)

Q12. Magnesium metal is shaped to make magnesium ribbon.



Explain why metals can be shaped.

(2 marks)

Total marks (33)