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Turn over for Question 1



1. Plastics can be made in the laboratory or in industry.

(a) When plastics are made there is a rise in temperature in the reaction mixture.

What is the name of the type of reaction that produces heat?

.....
(1)

(b) A catalyst is used in the process used to make plastics.

Why is a catalyst used?

.....
(1)

(c) Waste plastic may be buried in landfill sites, burned or recycled.
Each method of disposal has a disadvantage.

Draw one straight line from each method to its disadvantage.

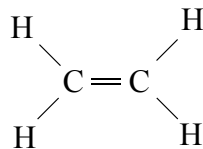
method	disadvantage
buried in landfill site	many plastics are non-biodegradable
burned	plastics must be collected and sorted
recycled	some plastics burn to release toxic fumes

(2)



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(d) This is a diagram of a molecule of ethene.



(i) How many bonds does each carbon atom have in this molecule?

..... (1)

(ii) Which part of the diagram shows that ethene is an alkene?

..... (1)

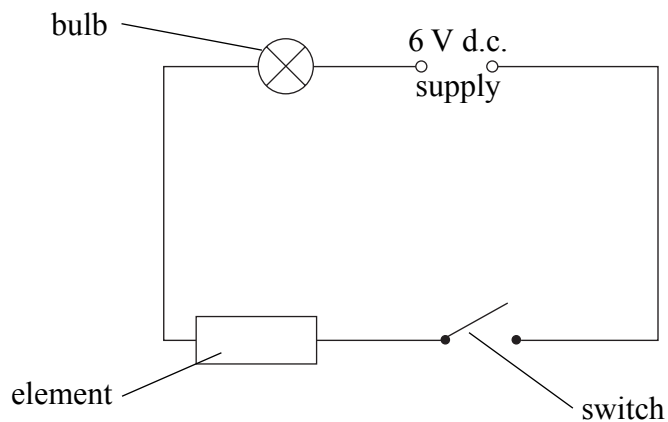
(Total 6 marks)

Q1



2. Magnesium, mercury and sulphur are all elements.
Jane uses an electrical circuit to test if each element conducts electricity.

She used the circuit shown.



When she closed the switch the light bulb lit with magnesium and mercury in the circuit. The light bulb did not light with sulphur in the circuit.

- (a) State which of the elements tested conduct electricity.

..... (2)

- (b) Why do all metallic elements conduct electricity?

Put a cross (☒) in the correct box.

They are solid

They have electrons free to move through the structure

They have high melting points

(1)

- (c) The atomic number of magnesium is 12.

- (i) What is the electronic configuration of magnesium?

Put a cross (☒) in the correct box.

1.9.2

2.8.2

10.2

(1)



(ii) In which group of the periodic table is magnesium?

Put a cross (☒) in the correct box.

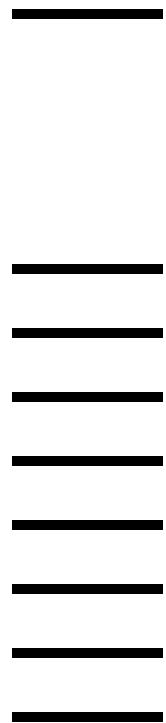
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(1)

Q2

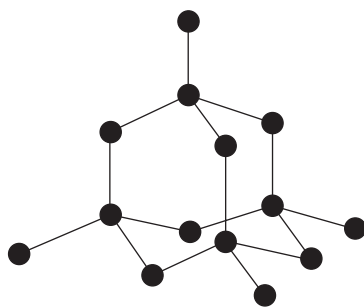
(Total 5 marks)

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3. Carbon is a non-metal. It exists as diamond, graphite and buckminsterfullerene.

(a) The diagram shows part of the giant structure of diamond.



(i) What type of bonding is found in diamond?

Put a cross (☒) in the correct box.

covalent

ionic

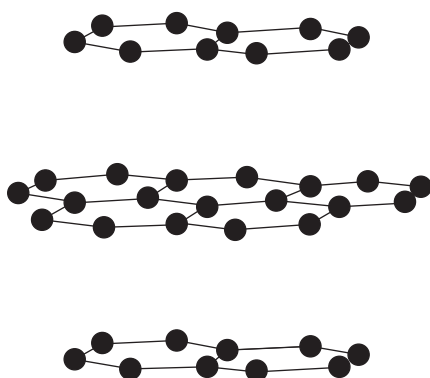
metallic

(1)

(ii) Diamond has a high melting point.
What does this show about the bonds in diamond?

.....
(1)

(b) The diagram shows the structure of graphite.



(i) Why is graphite able to conduct electricity?

Put a cross (☒) in the correct box.

It has electrons able to move through the structure

It is a non-metal

Its layers can slide over one another

(1)



- (ii) Pencils must leave a mark on paper without tearing it.
Use the structure of graphite to explain why it is suitable for use in pencils.

.....
.....
.....
(1)

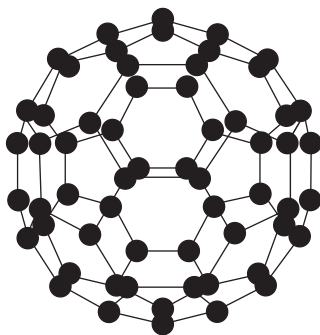
- (c) (i) Some scientists were investigating molecules containing long chains of carbon atoms. The molecules consisted of simple repeating units.

What is the name for this type of molecule?

.....
(1)

- (ii) By chance, Harold Kroto discovered a molecule of a substance that is now called buckminsterfullerene.

The diagram of this molecule is shown.



Suggest one benefit to the scientists who made this chance discovery.

.....
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(1)

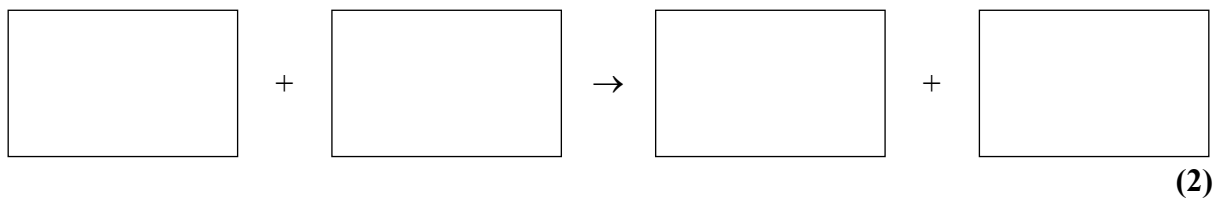
(Total 6 marks)

Q3



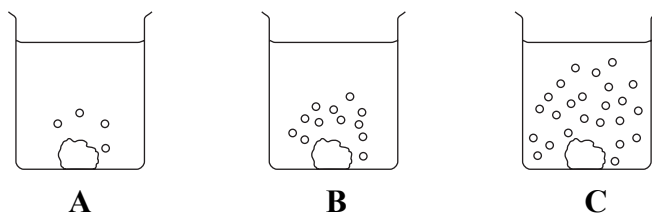
4. Ludwig was investigating the reaction between zinc and dilute hydrochloric acid. He found that the products were zinc chloride and hydrogen.

(a) Write the word equation for this reaction.



(b) He added identical pieces of zinc to beakers containing different concentrations of dilute hydrochloric acid.

The diagrams show the mixtures after ten seconds.



(i) Which beaker contained the acid with the highest concentration?

..... (1)

(ii) Give evidence from the diagram to explain your answer in (i).

..... (1)

(iii) Ludwig wanted to make the reaction in **B** faster. How could he do this without changing the concentration of the acid?

..... (1)

(Total 5 marks)

Q4



5. Nitrogen and hydrogen gases can react, under certain conditions, to form gaseous ammonia, NH₃. The reaction is reversible and can reach equilibrium.

(a) Balance the equation for this reaction and fill in the state symbols.



(b) Describe what is happening when this reaction is at equilibrium.

.....
.....
.....
..... (2)

(c) About 80% of ammonia manufactured is used to make artificial fertilisers. Give an advantage and a disadvantage of using artificial fertilisers to grow food crops.

.....
.....
.....
..... (2)

(d) Ammonia is a simple molecular covalent substance. There are strong covalent bonds between the atoms in each molecule. Ammonia has a boiling point of -33°C. Explain why ammonia has a low boiling point.

.....
.....
.....
..... (2)

(Total 8 marks) **Q5**

TOTAL FOR PAPER: 30 MARKS

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