

The Periodic Table of the Elements

1	2	3	4	5	6	7	0											
7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 Mg magnesium 12	13 Al aluminium 13	14 Si silicon 14	15 P phosphorus 15	16 S sulfur 16	17 Cl chlorine 17	18 Ar argon 18									
19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36	
37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium 43	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54	
55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium 84	85 At astatine 85	86 Rn radon 86	
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[268] Mt meitnerium 109	[277] Hs hassium 108	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated								

1
H
hydrogen
1

Key
relative atomic mass
atomic symbol
name
atomic (proton) number

* The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.



Leave
blank

1. Elements are either metals or non-metals.

(a) Put a cross (☒) to show the correct words to complete the sentences.

(i) A sample of magnesium conducts electricity.

This shows magnesium is a

metal

non-metal

solid

(1)

(ii) A sample of carbon in the form of graphite conducts electricity.

This shows that graphite

is a metal

contains free electrons

is a solid

(1)

(iii) One of the following describes a metal.

The metal is

Buckminsterfullerene

the element that is the main part of steel

an element found on the right hand side of the periodic table

(1)

(b) Two elements, a metal and a non-metal react to form the compound with the formula NaCl.

Identify the **two** elements that react.

..... and

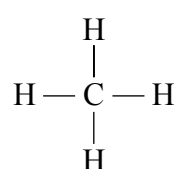
(2)

Q1

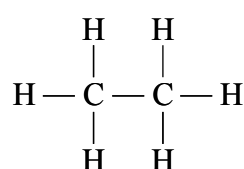
(Total 5 marks)



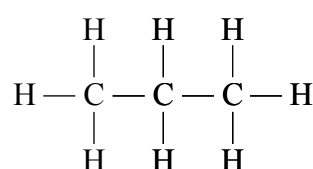
2. The structures of molecules of methane, ethane and propane are



methane



ethane



propane

(a) Are these substances alkanes, alkenes or polymers?

Put a cross (☒) in the correct box.

alkanes

alkenes

polymers

(1)

(b) What is the formula of a molecule of ethane?

Put a cross (☒) in the correct box.

C_2H_4

C_2H_6

C_3H_8

(1)

(c) Carbon forms many more stable compounds than any other element.
What is the best reason for this?

Put a cross (☒) in the correct box.

each carbon atom forms four stable bonds

carbon is a non-metal

carbon exists as diamond and graphite

(1)

(d) Calculate the relative formula mass of methane, CH_4 .
(Relative atomic masses: $\text{H} = 1$, $\text{C} = 12$)

.....

(1)



Leave
blank

(e) Bromine water is used to test for alkenes.

(i) What colour is bromine water?

.....
(1)

(ii) When propane gas is bubbled into bromine water, no colour change occurs.
Explain why.

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

Q2

(Total 6 marks)



Leave blank

3. Luke and Cian were investigating the rate of the reaction of marble chips with dilute hydrochloric acid.
Luke added one marble chip to 50 cm³ dilute hydrochloric acid at room temperature. He measured the time taken for the reaction to finish.
Cian repeated the experiment, except that he used marble powder instead of a marble chip. The mass of marble was the same in both experiments.

(a) Cian's reaction occurred faster.
Explain why.

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

(b) How can Cian make his reaction even faster?

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

(c) Potatoes are a common food.

(i) When a potato is eaten, chemical reactions involving enzymes occur as it is digested.
What is an enzyme?

..... (1)

(ii) Potatoes can be grown using natural fertilisers.
Give an advantage and a disadvantage of using natural fertilisers.

advantage

.....

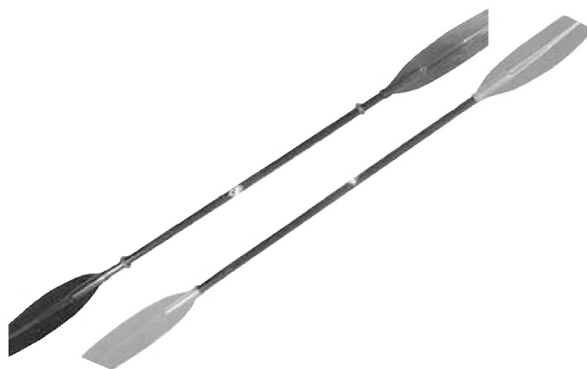
disadvantage

..... (2)

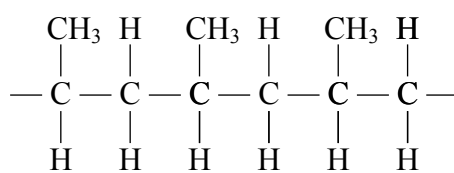
(Total 6 marks) **Q3**



5. Poly(propene) is an addition polymer with many uses. Canoe paddles are often made of poly(propene).



Poly(propene) is formed from propene, C_3H_6 . A section of a poly(propene) chain which is formed from three propene molecules is shown.



- (a) (i) What is a polymer?

.....
 (1)

- (ii) Why is poly(propene) described as an **addition** polymer?

.....
 (1)

- (b) Draw the structure of a propene molecule, C_3H_6 , showing all covalent bonds.

(2)



Leave blank

(c) In terms of the covalent bonds, explain how molecules of propene combine to form a poly(propene) molecule.

.....
.....
.....

(2)

(d) Poly(propene) is a thermoplastic.

If the canoe paddle is heated, but not to a temperature at which it burns, its shape changes.

Explain, in terms of its structure, why this happens.

.....
.....
.....

(2)

(e) The following symbol appears on the canoe paddle to show that the poly(propene) can be recycled.



Give one reason why recycling is important.

.....
.....

(1)

Q5

(Total 9 marks)

TOTAL FOR PAPER: 30 MARKS

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