

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	
Pearson Edexcel International GCSE (9–1)		<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>	
Wednesday 12 June 2019			
Morning (Time: 1 hour 10 minutes)		Paper Reference 4SS0/1C	
Chemistry Unit: 4SS0 Science (Single Award) Paper: 1C			
You must have: Calculator			Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Calculators may be used.
- Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

R60255A

©2019 Pearson Education Ltd.

1/1/1/1/1/1/

The Periodic Table of the Elements

1	2											3	4	5	6	7	0			
																	<div>1 H hydrogen 1</div>	<div>4 He helium 2</div>		
<div>Key</div> <div>relative atomic mass atomic symbol name atomic (proton) number</div>																				
<div>7 Li lithium 3</div>		<div>9 Be beryllium 4</div>												<div>11 B boron 5</div>		<div>12 C carbon 6</div>	<div>14 N nitrogen 7</div>	<div>16 O oxygen 8</div>	<div>19 F fluorine 9</div>	<div>20 Ne neon 10</div>
<div>23 Na sodium 11</div>		<div>24 Mg magnesium 12</div>												<div>27 Al aluminium 13</div>		<div>28 Si silicon 14</div>	<div>31 P phosphorus 15</div>	<div>32 S sulfur 16</div>	<div>35.5 Cl chlorine 17</div>	<div>40 Ar argon 18</div>
<div>39 K potassium 19</div>		<div>40 Ca calcium 20</div>		<div>45 Sc scandium 21</div>	<div>48 Ti titanium 22</div>	<div>51 V vanadium 23</div>	<div>52 Cr chromium 24</div>	<div>55 Mn manganese 25</div>	<div>56 Fe iron 26</div>	<div>59 Co cobalt 27</div>	<div>59 Ni nickel 28</div>	<div>63.5 Cu copper 29</div>	<div>65 Zn zinc 30</div>	<div>70 Ga gallium 31</div>	<div>73 Ge germanium 32</div>	<div>75 As arsenic 33</div>	<div>79 Se selenium 34</div>	<div>80 Br bromine 35</div>	<div>84 Kr krypton 36</div>	
<div>85 Rb rubidium 37</div>		<div>88 Sr strontium 38</div>	<div>89 Y yttrium 39</div>	<div>91 Zr zirconium 40</div>	<div>93 Nb niobium 41</div>	<div>96 Mo molybdenum 42</div>	<div>[98] Tc technetium 43</div>	<div>101 Ru ruthenium 44</div>	<div>103 Rh rhodium 45</div>	<div>106 Pd palladium 46</div>	<div>108 Ag silver 47</div>	<div>112 Cd cadmium 48</div>	<div>115 In indium 49</div>	<div>119 Sn tin 50</div>	<div>122 Sb antimony 51</div>	<div>128 Te tellurium 52</div>	<div>127 I iodine 53</div>	<div>131 Xe xenon 54</div>		
<div>133 Cs caesium 55</div>		<div>137 Ba barium 56</div>	<div>139 La* lanthanum 57</div>	<div>178 Hf hafnium 72</div>	<div>181 Ta tantalum 73</div>	<div>184 W tungsten 74</div>	<div>186 Re rhenium 75</div>	<div>190 Os osmium 76</div>	<div>192 Ir iridium 77</div>	<div>195 Pt platinum 78</div>	<div>197 Au gold 79</div>	<div>201 Hg mercury 80</div>	<div>204 Tl thallium 81</div>	<div>207 Pb lead 82</div>	<div>209 Bi bismuth 83</div>	<div>[209] Po polonium 84</div>	<div>[210] At astatine 85</div>	<div>[222] Rn radon 86</div>		
<div>[223] Fr francium 87</div>	<div>[226] Ra radium 88</div>	<div>[227] Ac* actinium 89</div>	<div>[261] Rf rutherfordium 104</div>	<div>[262] Db dubnium 105</div>	<div>[266] Sg seaborgium 106</div>	<div>[264] Bh bohrium 107</div>	<div>[277] Hs hassium 108</div>	<div>[268] Mt meitnerium 109</div>	<div>[271] Ds darmstadtium 110</div>	<div>[272] Rg roentgenium 111</div>	<div>Elements with atomic numbers 112-116 have been reported but not fully authenticated</div>									

DO NOT WRITE IN THIS AREA

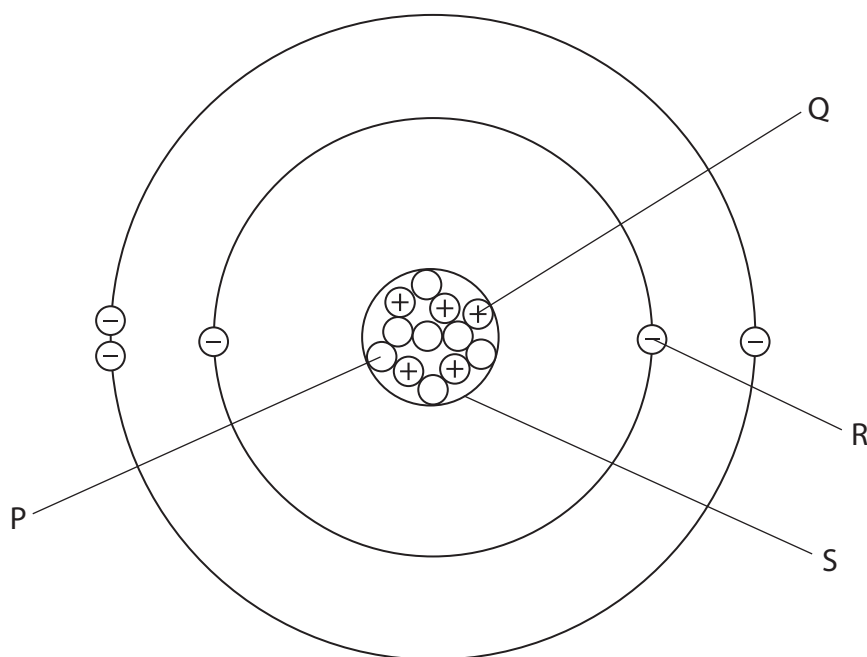
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

Answer ALL questions.

- 1** The diagram shows the particles in an atom of an element.



- (a) Name the particles labelled P, Q and R.

(3)

P

Q

R

- (b) Name the part of the atom labelled S.

(1)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) (i) What is the atomic number of this atom?

(1)

- ☐ **A** 5
- ☐ **B** 7
- ☐ **C** 12
- ☐ **D** 17

(ii) What is the mass number of this atom?

(1)

- ☐ **A** 5
- ☐ **B** 7
- ☐ **C** 12
- ☐ **D** 17

(iii) Identify this element.

(1)

(Total for Question 1 = 7 marks)

2 Iron reacts with dilute sulfuric acid to form a salt called iron(II) sulfate.

The formula of iron(II) sulfate is FeSO_4

(a) (i) How many different elements are there in iron(II) sulfate?

(1)

☐ **A** 2

☐ **B** 3

☐ **C** 4

☐ **D** 6

(ii) Use information from the Periodic Table to calculate the relative formula mass of iron(II) sulfate.

(2)

(b) Some iron filings are added to dilute sulfuric acid. The mixture is warmed and hydrogen gas is given off.

(i) State why the mixture is warmed.

(1)

(ii) State the observation that shows a gas is being given off.

(1)

(iii) Give the test for hydrogen gas.

(1)

(c) When the reaction stops, some iron filings remain.

(i) State why the reaction stops.

(1)

(ii) Give a chemical equation for the reaction between iron and sulfuric acid.

(1)

(Total for Question 2 = 8 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

3 Sodium chloride is a soluble salt.

(a) Name the acid and the alkali that can be used to make sodium chloride.

(2)

acid

alkali

(b) A teacher drops a bottle containing sodium chloride. The bottle breaks when it hits the floor. The teacher sweeps up the mixture of sodium chloride and glass.

Describe how the teacher can obtain a pure, dry sample of sodium chloride from the mixture.

(4)

(Total for Question 3 = 6 marks)

4 Crude oil is a mixture of hydrocarbons, most of which are alkanes.

(a) (i) State what is meant by the term **hydrocarbon**.

(2)

(ii) Give the general formula for the alkanes.

(1)

(b) Name the process used to separate crude oil into fractions.

(1)

(c) One of the fractions obtained from crude oil is fuel oil.

Fuel oil is used to heat homes.

Explain why burning fuel oil in an insufficient supply of oxygen is dangerous.

(2)

(d) Another fraction obtained from crude oil is gasoline.

Gasoline is used to make petrol for cars.

- (i) Explain why it is dangerous to light a match even when standing several metres away from a petrol spillage.

(2)

- (ii) Suggest why a petrol spillage is more dangerous than a fuel oil spillage.

(1)

(Total for Question 4 = 9 marks)

5 This question is about metals in Group 1 of the Periodic Table.

When these metals are added to water, they form hydrogen gas and an alkaline solution.

- (a) A teacher adds a small piece of lithium to a trough of water to form a solution.

She dips a piece of platinum wire into the solution. She then places the wire into a hot Bunsen flame and the flame changes colour.

- (i) State the new colour of the flame. (1)

- (ii) Give the formula of the ion responsible for the new colour. (1)

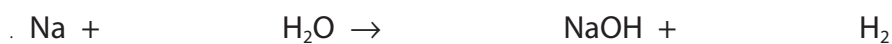
- (iii) The teacher adds a few drops of litmus indicator to the solution.
Explain the colour of the litmus indicator after it is added to the solution. (2)

- (b) The teacher adds a small piece of sodium to a second trough of water.

The sodium floats and moves around the surface of the water as it reacts.

- (i) Give two other observations that are made as sodium reacts with water. (2)

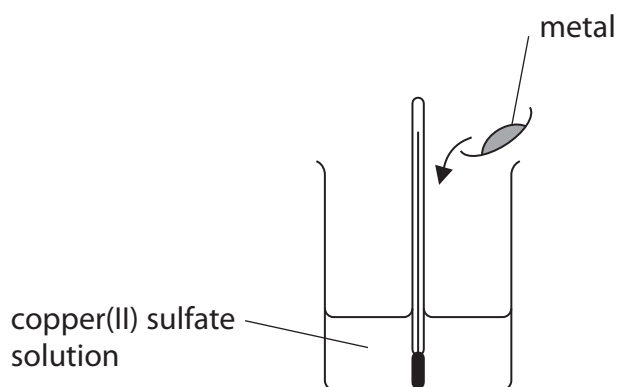
- (ii) Complete the chemical equation for the reaction of sodium with water. (1)



- (c) The teacher adds a small piece of potassium to a third trough of water.
- (i) Give one observation that is different when using potassium instead of sodium. (1)
- (ii) Give a possible pH value for the solution that forms when potassium reacts with water. (1)
- (d) Explain why the reaction of rubidium with water is more vigorous than the reaction of potassium with water. (2)

(Total for Question 5 = 11 marks)

- 6 A student uses this apparatus to investigate the temperature changes that occur when metals are added to copper(II) sulfate solution.



This is the student's method.

- add a sample of aluminium to a beaker containing 25 cm³ of copper(II) sulfate solution
- stir the mixture and record the highest temperature reached

The student repeats the experiment four times, using the same amount of a different metal each time.

- (a) The table shows the thermometer readings for each metal.

	Aluminium	Iron	Magnesium	Silver	Zinc
Thermometer reading					
Highest temperature reached in °C				25.0	

Complete the table by recording the highest temperature reached for each metal, giving all temperatures to the nearest 0.5 °C.

(2)

(b) The initial temperature of the copper(II) sulfate solution in each experiment is 25.0°C.

(i) Suggest why magnesium produces the largest temperature rise. (1)

(ii) Explain why there is no temperature change with silver. (2)

(c) In the experiment with magnesium, using 25 cm³ of solution means that the copper(II) sulfate is in excess.

In another experiment, the student uses the same amount of magnesium but adds it to 50 cm³ of copper(II) sulfate solution.

Explain how the change in volume affects the temperature rise. (2)

(d) In another experiment, the student adds a metal to 45 cm³ of copper(II) sulfate solution and obtains a temperature rise of 15.0°C.

The mass of 1.0 cm³ of the solution is 1.0 g.

The specific heat capacity, c , of the solution is 4.2 J/g/°C.

Calculate the heat energy, Q , in kilojoules (kJ), released in this reaction. (4)

(Total for Question 6 = 11 marks)

- 7 (a) Table 1 shows the formulae of some ions.

It also shows the formulae of some compounds containing these ions.

	Ca^{2+}	Al^{3+}	NH_4^+
F^-		AlF_3	NH_4F
NO_3^-	$\text{Ca}(\text{NO}_3)_2$		NH_4NO_3
SO_4^{2-}	CaSO_4	$\text{Al}_2(\text{SO}_4)_3$	

Table 1

Complete Table 1 by giving the missing information.

(3)

- (b) Table 2 gives information about aluminium fluoride and aluminium bromide.

	Bonding	Structure	Melting point in °C
Aluminium fluoride	ionic	giant lattice	1290
Aluminium bromide	covalent	simple molecular	98

Table 2

Explain the difference between the melting points of aluminium fluoride and aluminium bromide. Refer to bonding and structure in your answer.

(5)

(Total for Question 7 = 8 marks)

TOTAL FOR PAPER = 60 MARKS