



EXAMINATIONS COUNCIL OF ESWATINI  
Eswatini General Certificate of Secondary Education

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**PHYSICAL SCIENCE**

**6888/01**

Paper 1 Short Answers

**October/November 2020**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on the spaces provided.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs, tables or rough working.

Do **not** use staples, paper clips, highlighters, glue or correction fluid.

Do **not** write on the barcode.

Answer **all** questions.

You may use an electronic calculator.

You may lose marks if you do not show your working or if you do not use the appropriate units.

A copy of the Periodic Table is printed on page 11.

The number of marks is given in brackets [ ] at the end of each question or part question.

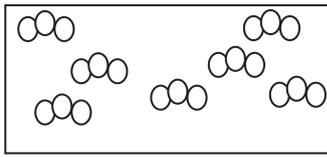
**For Examiner's Use**

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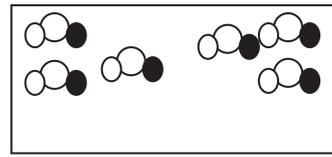
This document consists of 11 printed pages and 1 blank page.

- 1 Fig. 1.1 shows the structures of different molecules.

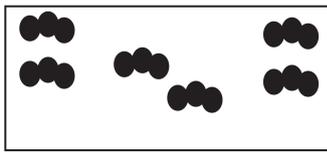
Circle the letter that represents the structure of water molecules.



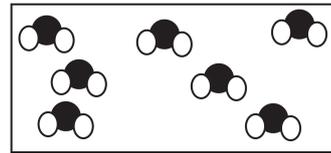
A



B



C



D

[1]

Fig. 1.1

- 2 A car drives up a hill on a straight road with zero acceleration.

(a) Sketch, on Fig. 2.1, the speed-time graph for the motion of the car.

[1]

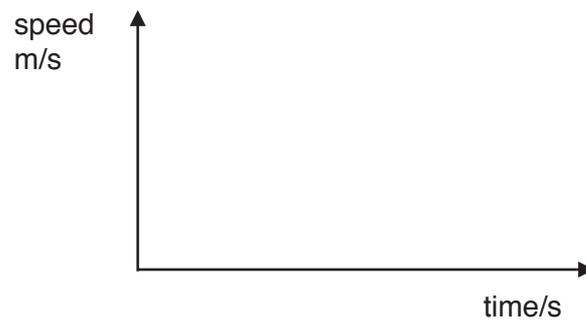


Fig. 2.1

(b) State the value of the resultant force acting on the car.

..... [1]

3 Fig. 3.1 shows some of the interconversions between the three states of matter.

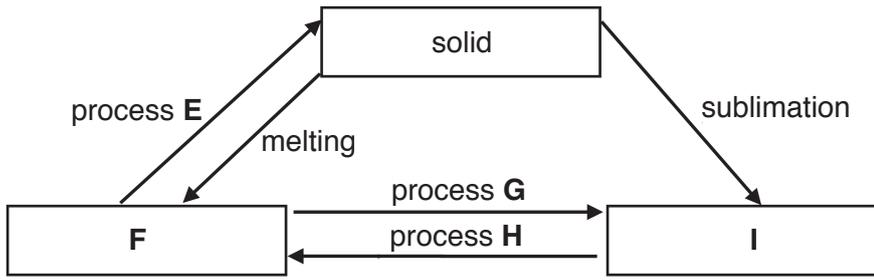


Fig. 3.1

(a) Identify process E.

..... [1]

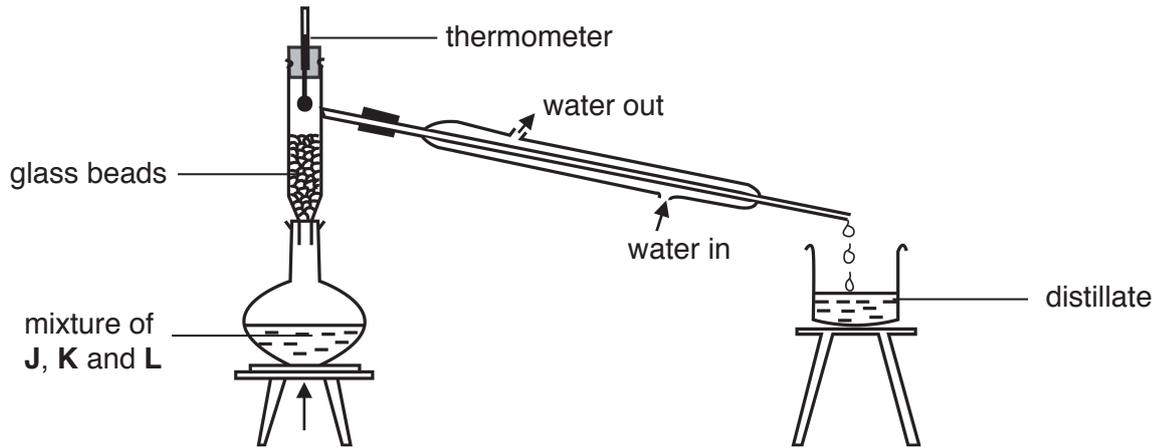
(b) Explain why substances in the solid state have a definite shape.

.....  
.....  
..... [2]

4 State **two** changes that can occur when a force is applied to a body.

1 .....  
.....  
2 .....  
..... [2]

- 5 Fig. 5.1 shows the apparatus used to separate liquids **J**, **K** and **L** from their mixture.



**Fig. 5.1**

Liquid **J** has a boiling point of  $45^{\circ}\text{C}$ , liquid **K** has a boiling point of  $65^{\circ}\text{C}$  and liquid **L** has a boiling point of  $85^{\circ}\text{C}$ .

- (a) Name the method of separation shown in Fig. 5.1.

..... [1]

- (b) When the temperature reading on the thermometer is  $45^{\circ}\text{C}$ , gaseous molecules of **J** and **K** are present in the flask and fractionating column.

Explain why the distillate collected at this temperature is pure liquid **J**.

.....  
 .....  
 ..... [2]

- 6 Fig. 6.1 shows two types of shoes, shoe 1 and shoe 2.

The shoes are of the same height.



**Fig. 6.1**

Explain why shoe 2 is more stable than shoe 1.

.....

.....

..... [2]

- 7 (a) Complete Table 7.1 by naming the type of bond present in each of the substances.

**Table 7.1**

substances	type of bonding
methane	
potassium bromide	
carbon dioxide	

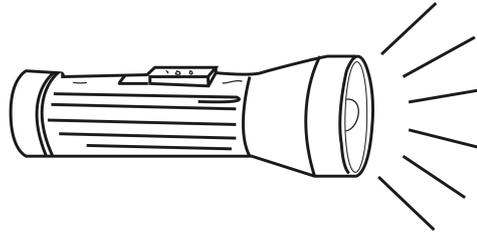
[2]

- (b) Describe how the bonding in graphene enables it to conduct electricity.

.....

..... [1]

- 8 Fig. 8.1 shows a battery-powered torch in use.



**Fig. 8.1**

State the energy changes that occur in the torch.

..... [2]

- 9 The combustion of magnesium is a chemical change.

Respiration is also a chemical change.

- (a) State **one** similarity, in terms of the input gases, between the combustion of magnesium and respiration.

..... [1]

- (b) Describe a property of a chemical change using the combustion of magnesium.

.....  
..... [1]

- 10 The human ear can detect sounds across a wide range of frequencies.

- (a) State the approximate range of audible frequencies.

..... [1]

- (b) State the term used to describe the property of sound that is related to frequency.

..... [1]

- 11 Metal oxides can be classified into basic oxides, amphoteric oxides or neutral oxides.

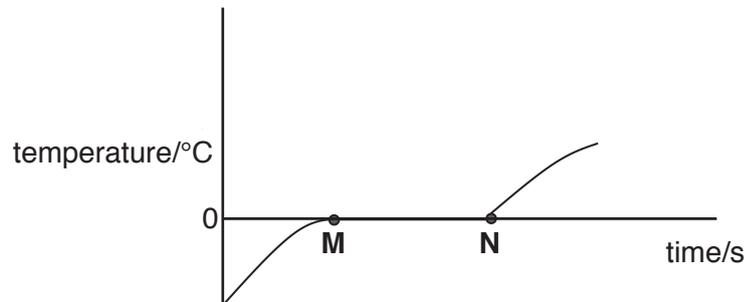
Complete Table 11.1 by using a tick (✓) for a reaction and a cross (X) for no reaction to indicate the differences in reactivity of the three oxides.

**Table 11.1**

type of oxide	reaction with acid	reaction with a base
amphoteric oxide		
basic oxide	✓	
neutral oxide		X

[3]

- 12 Fig. 12.1 shows a section of the heating curve of water.



**Fig. 12.1**

Explain why the temperature does not change between **M** and **N**.

.....  
 .....  
 ..... [2]

13 Fig. 13.1 shows a light bulb.

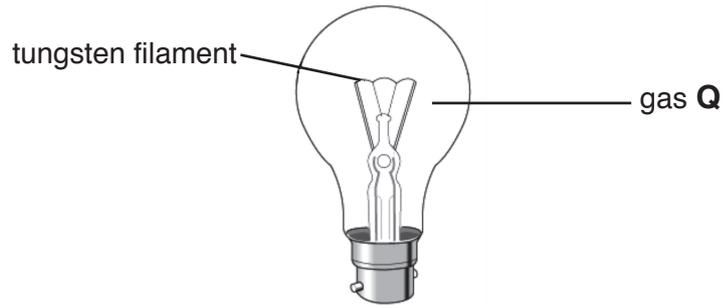


Fig. 13.1

(a) State the name of gas Q.

..... [1]

(b) Tungsten is a transition element.

State **one** physical property of transition elements.

..... [1]

14 Describe the image formed by a plane mirror.

.....  
 .....  
 ..... [2]

15 Fig. 15.1 shows two metal rods inserted in dilute sulfuric acid to form a simple cell.

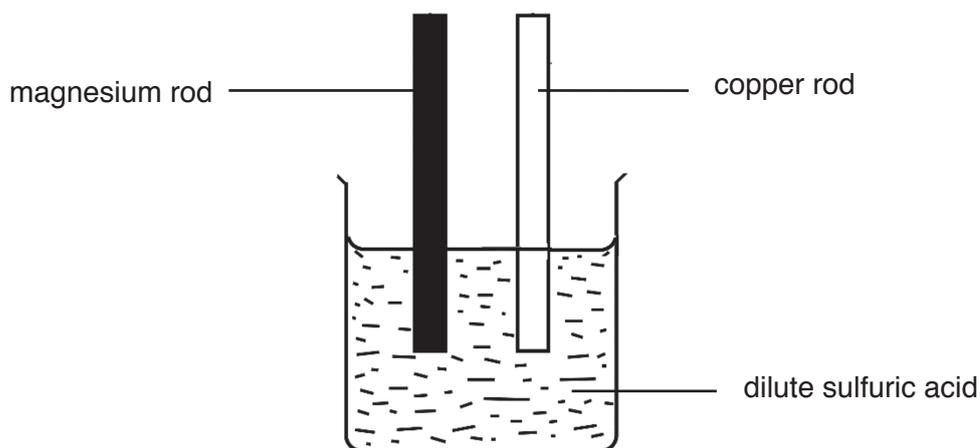


Fig. 15.1

(a) State what will be observed at the magnesium rod.

..... [1]

(b) Fig. 15.2 shows a bulb connected to the simple cell.

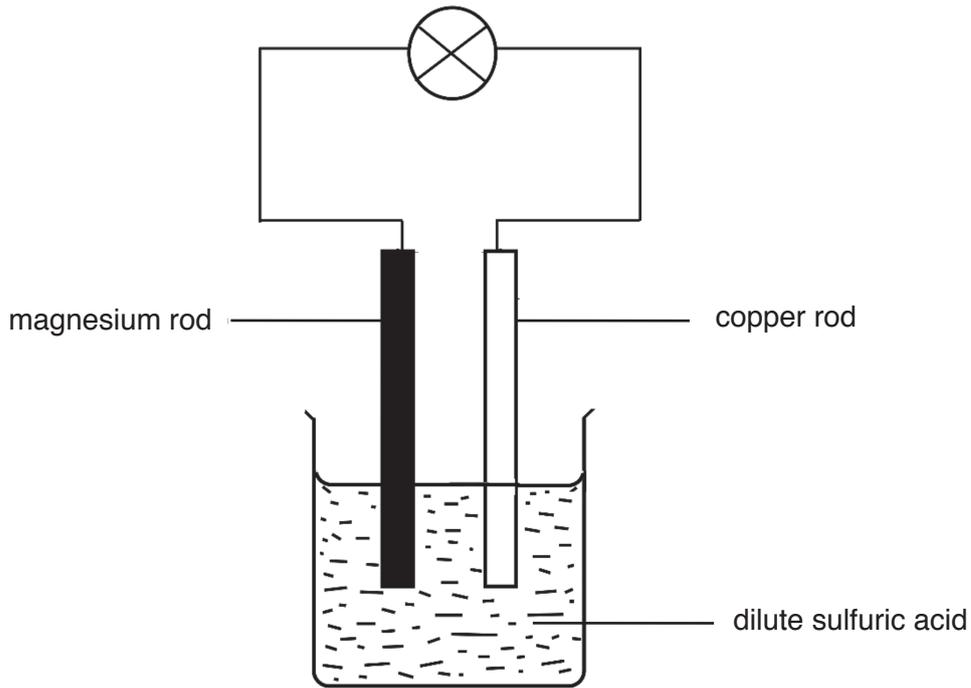


Fig. 15.2

Explain how the simple cell enables the bulb to light.

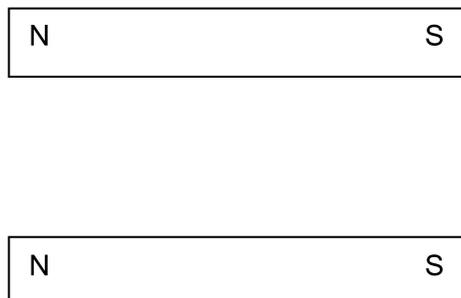
.....

.....

..... [2]

16 Vusi places two permanent magnets side by side as shown in Fig. 16.1.

Draw the magnetic field lines around the magnets.



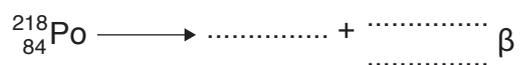
[3]

Fig. 16.1

17 Polonium-218 ( $^{218}_{84}\text{Po}$ ) decays by beta emission.

Complete the nuclear equation for the decay of Polonium-218.

You may use the Periodic Table.



[3]

## DATA SHEET The Periodic Table of the Elements

		Group																	
I	II											III	IV	V	VI	VII	0		
		1 <b>H</b> Hydrogen																	
7 <b>Li</b> Lithium	9 <b>Be</b> Beryllium											11 <b>B</b> Boron	12 <b>C</b> Carbon	14 <b>N</b> Nitrogen	16 <b>O</b> Oxygen	19 <b>F</b> Fluorine	20 <b>Ne</b> Neon		
3 <b>Li</b> Lithium	4 <b>Be</b> Beryllium											5 <b>B</b> Boron	6 <b>C</b> Carbon	7 <b>N</b> Nitrogen	8 <b>O</b> Oxygen	9 <b>F</b> Fluorine	10 <b>Ne</b> Neon		
23 <b>Na</b> Sodium	24 <b>Mg</b> Magnesium											27 <b>Al</b> Aluminium	28 <b>Si</b> Silicon	31 <b>P</b> Phosphorus	32 <b>S</b> Sulfur	35.5 <b>Cl</b> Chlorine	40 <b>Ar</b> Argon		
11 <b>Na</b> Sodium	12 <b>Mg</b> Magnesium											13 <b>Al</b> Aluminium	14 <b>Si</b> Silicon	15 <b>P</b> Phosphorus	16 <b>S</b> Sulfur	17 <b>Cl</b> Chlorine	18 <b>Ar</b> Argon		
39 <b>K</b> Potassium	40 <b>Ca</b> Calcium	45 <b>Sc</b> Scandium	48 <b>Ti</b> Titanium	51 <b>V</b> Vanadium	52 <b>Cr</b> Chromium	55 <b>Mn</b> Manganese	56 <b>Fe</b> Iron	59 <b>Co</b> Cobalt	59 <b>Ni</b> Nickel	64 <b>Cu</b> Copper	65 <b>Zn</b> Zinc	70 <b>Ga</b> Gallium	73 <b>Ge</b> Germanium	75 <b>As</b> Arsenic	79 <b>Se</b> Selenium	80 <b>Br</b> Bromine	84 <b>Kr</b> Krypton		
19 <b>K</b> Potassium	20 <b>Ca</b> Calcium	21 <b>Sc</b> Scandium	22 <b>Ti</b> Titanium	23 <b>V</b> Vanadium	24 <b>Cr</b> Chromium	25 <b>Mn</b> Manganese	26 <b>Fe</b> Iron	27 <b>Co</b> Cobalt	28 <b>Ni</b> Nickel	29 <b>Cu</b> Copper	30 <b>Zn</b> Zinc	31 <b>Ga</b> Gallium	32 <b>Ge</b> Germanium	33 <b>As</b> Arsenic	34 <b>Se</b> Selenium	35 <b>Br</b> Bromine	36 <b>Kr</b> Krypton		
85 <b>Rb</b> Rubidium	88 <b>Sr</b> Strontium	89 <b>Y</b> Yttrium	91 <b>Zr</b> Zirconium	93 <b>Nb</b> Niobium	96 <b>Mo</b> Molybdenum	98 <b>Tc</b> Technetium	101 <b>Ru</b> Ruthenium	103 <b>Rh</b> Rhodium	106 <b>Pd</b> Palladium	108 <b>Ag</b> Silver	112 <b>Cd</b> Cadmium	115 <b>In</b> Indium	119 <b>Sn</b> Tin	122 <b>Sb</b> Antimony	128 <b>Te</b> Tellurium	127 <b>I</b> Iodine	131 <b>Xe</b> Xenon		
37 <b>Rb</b> Rubidium	38 <b>Sr</b> Strontium	39 <b>Y</b> Yttrium	40 <b>Zr</b> Zirconium	41 <b>Nb</b> Niobium	42 <b>Mo</b> Molybdenum	43 <b>Tc</b> Technetium	44 <b>Ru</b> Ruthenium	45 <b>Rh</b> Rhodium	46 <b>Pd</b> Palladium	47 <b>Ag</b> Silver	48 <b>Cd</b> Cadmium	49 <b>In</b> Indium	50 <b>Sn</b> Tin	51 <b>Sb</b> Antimony	52 <b>Te</b> Tellurium	53 <b>I</b> Iodine	54 <b>Xe</b> Xenon		
133 <b>Cs</b> Caesium	137 <b>Ba</b> Barium	139 <b>La</b> Lanthanum	178 <b>Hf</b> Hafnium	181 <b>Ta</b> Tantalum	184 <b>W</b> Tungsten	186 <b>Re</b> Rhenium	190 <b>Os</b> Osmium	192 <b>Ir</b> Iridium	195 <b>Pt</b> Platinum	197 <b>Au</b> Gold	201 <b>Hg</b> Mercury	204 <b>Tl</b> Thallium	207 <b>Pb</b> Lead	209 <b>Bi</b> Bismuth	209 <b>Po</b> Polonium	210 <b>At</b> Astatine	222 <b>Rn</b> Radon		
55 <b>Cs</b> Caesium	56 <b>Ba</b> Barium	57 <b>La</b> Lanthanum	72 <b>Hf</b> Hafnium	73 <b>Ta</b> Tantalum	74 <b>W</b> Tungsten	75 <b>Re</b> Rhenium	76 <b>Os</b> Osmium	77 <b>Ir</b> Iridium	78 <b>Pt</b> Platinum	79 <b>Au</b> Gold	80 <b>Hg</b> Mercury	81 <b>Tl</b> Thallium	82 <b>Pb</b> Lead	83 <b>Bi</b> Bismuth	84 <b>Po</b> Polonium	85 <b>At</b> Astatine	86 <b>Rn</b> Radon		
223 <b>Fr</b> Francium	226 <b>Ra</b> Radium	227 <b>Ac</b> Actinium	†																
87 <b>Fr</b> Francium	88 <b>Ra</b> Radium	89 <b>Ac</b> Actinium	†																

\* 58–71 Lanthanoid series  
† 90–103 Actinoid series

**Key**

a	<b>X</b>
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a = relative atomic mass  
X = atomic symbol

b
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b = atomic (proton) number

140 <b>Ce</b> Cerium	141 <b>Pr</b> Praseodymium	144 <b>Nd</b> Neodymium	147 <b>Pm</b> Promethium	150 <b>Sm</b> Samarium	152 <b>Eu</b> Europium	157 <b>Gd</b> Gadolinium	159 <b>Tb</b> Terbium	163 <b>Dy</b> Dysprosium	165 <b>Ho</b> Holmium	167 <b>Er</b> Erbium	169 <b>Tm</b> Thulium	173 <b>Yb</b> Ytterbium	175 <b>Lu</b> Lutetium
58 <b>Ce</b> Cerium	59 <b>Pr</b> Praseodymium	60 <b>Nd</b> Neodymium	61 <b>Pm</b> Promethium	62 <b>Sm</b> Samarium	63 <b>Eu</b> Europium	64 <b>Gd</b> Gadolinium	65 <b>Tb</b> Terbium	66 <b>Dy</b> Dysprosium	67 <b>Ho</b> Holmium	68 <b>Er</b> Erbium	69 <b>Tm</b> Thulium	70 <b>Yb</b> Ytterbium	71 <b>Lu</b> Lutetium
90 <b>Th</b> Thorium	91 <b>Pa</b> Protactinium	92 <b>U</b> Uranium	93 <b>Np</b> Neptunium	94 <b>Pu</b> Plutonium	95 <b>Am</b> Americium	96 <b>Cm</b> Curium	97 <b>Bk</b> Berkelium	98 <b>Cf</b> Californium	99 <b>Es</b> Einsteinium	100 <b>Fm</b> Fermium	101 <b>Md</b> Mendelevium	102 <b>No</b> Nobelium	103 <b>Lr</b> Lawrencium

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

