



EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

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PHYSICAL SCIENCE

Paper 1 Short Answers

6888/01

October/November 2021

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 in 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 Units of quantities are derived from SI base units.

State the base unit for current.

..... [1]

- 2 Fig. 2.1 shows an underground fuel tank that is fitted with blocks of element **A** to provide sacrificial protection against rusting.

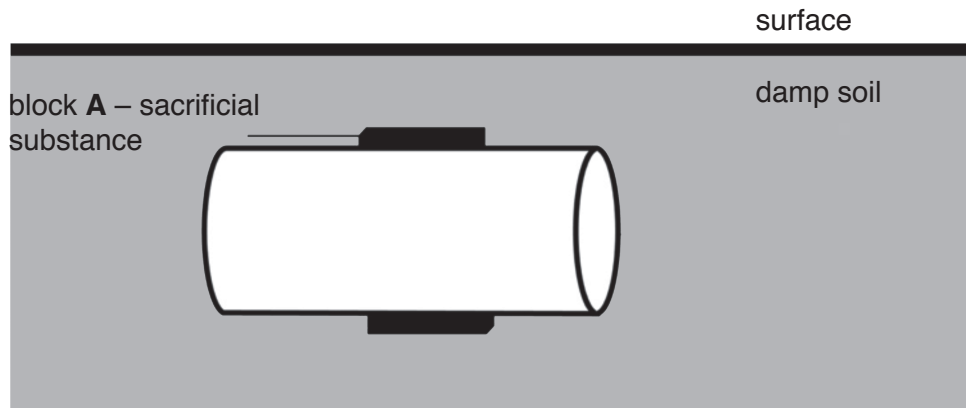


Fig. 2.1

- (a) State the name of the element suitable for use as block **A**.

Give a reason for your answer.

name of element

reason

..... [2]

- (b) Name another method of rust prevention.

..... [1]

- 3 Fig. 3.1 shows the different regions of the electromagnetic spectrum.

radio waves	microwaves	B	visible light	ultra-violet radiation	x-rays	gamma rays
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Fig. 3.1

- (a) Name the region labelled **B**.

..... [1]

- (b) State **two** features common to all the members of the electromagnetic spectrum.

1

.....

2

..... [2]

- 4 Fig. 4.1 shows the energy changes that occur during the neutralisation of hydrochloric acid, HCl , by sodium hydroxide, NaOH .

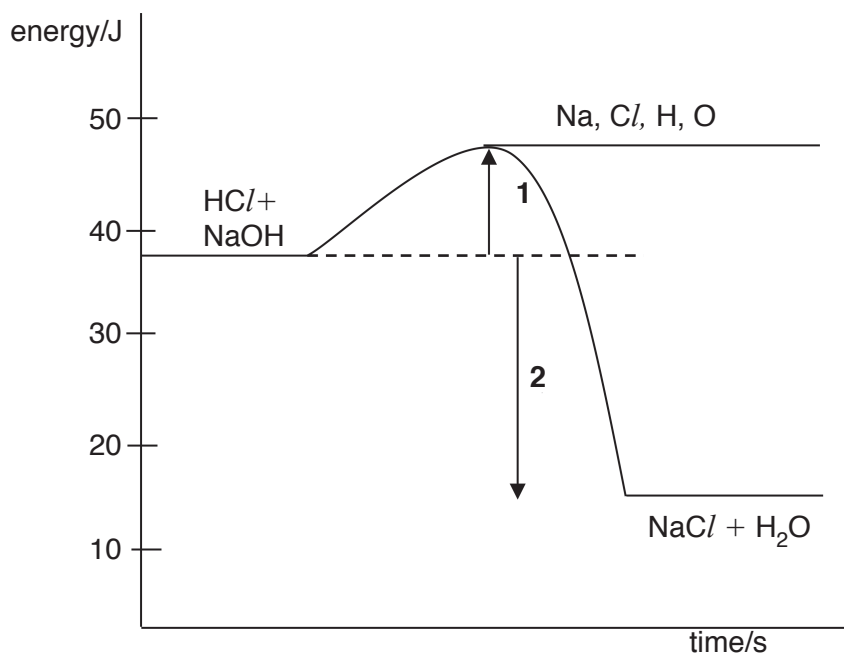


Fig. 4.1

- (a) Explain why arrow 1 represents an endothermic process.

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

- (b) Explain why the overall reaction is exothermic.

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

5 Passengers in a moving car move forward when brakes are suddenly applied.

- (a) State the property of mass that is demonstrated by the forward movement of the passengers as the brakes are applied.

..... [1]

- (b) The brakes are able to stop the car because of the presence of the force of friction.

Describe the force of friction.

.....

 [2]

6 Fig. 6.1 shows the apparatus used to measure the energy released by the combustion of a peanut.

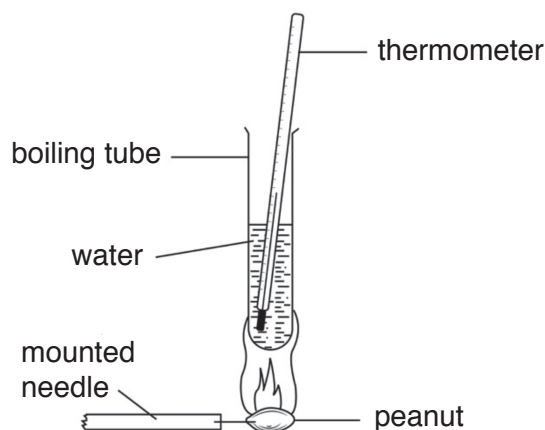


Fig. 6.1

Table 6.1 shows the results obtained.

Table 6.1

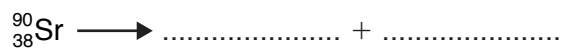
mass of water/g	initial temperature/°C	final temperature/°C
5 g	24	42

Use the formula $q = mc\Delta T$, to calculate the amount of energy used to raise the temperature of the water from 24 °C to 42 °C. [specific heat capacity of water is 4.2 J/g °C]

..... J [3]

- 7 A strontium nucleus, ${}^{90}_{38}\text{Sr}$, decays by emitting an alpha particle.

Complete the nuclear equation to show this decay.



[2]

- 8 Fig. 8.1 shows the electrolytic cell used to extract aluminium from its ore.

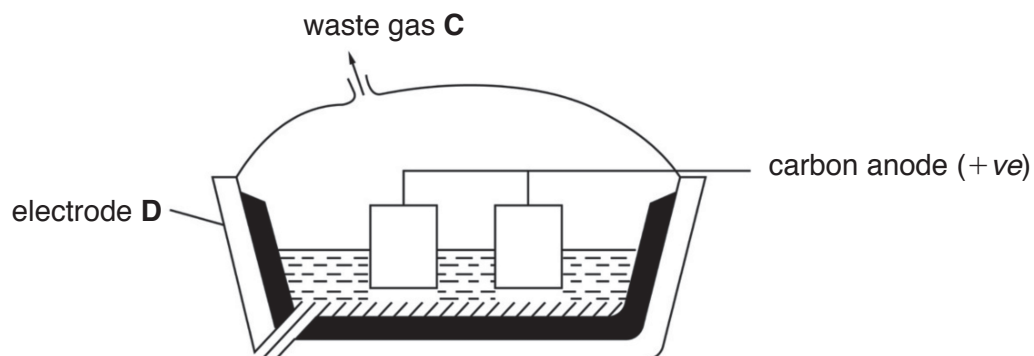


Fig. 8.1

- (a) Suggest the name of waste gas C.

..... [1]

- (b) Explain why aluminium is used in the manufacture of food containers.

.....
 [1]

- 9 Fig. 9.1 shows a diagram of an a.c. motor.

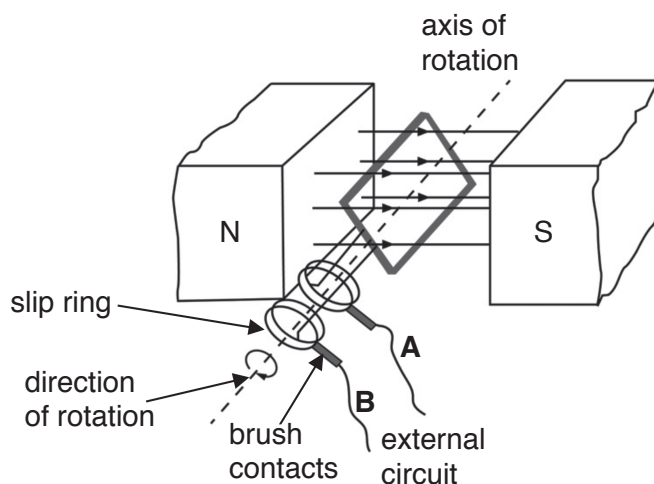


Fig. 9.1

- (a) Explain why the coil in the magnetic field experiences a turning effect when current flows through it.

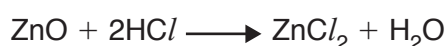
.....

 [2]

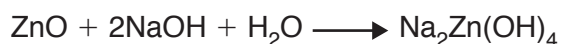
- (b) State **one** way by which the speed of rotation of the motor can be reduced.

..... [1]

- 10 Zinc oxide reacts with dilute hydrochloric acid to form a salt and water as shown in the equation:



Zinc oxide also reacts with sodium hydroxide to form sodium zincate as shown in the equation:



Explain, using this information, why zinc oxide is an amphoteric oxide.

.....

 [2]

- 11 Fig. 11.1 shows water coming out of an irrigation sprinkler.

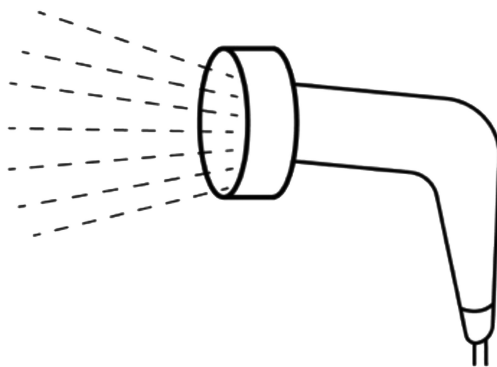


Fig. 11.1

Explain why the water spreads out as it comes out of the sprinkler.

.....

.....

..... [2]

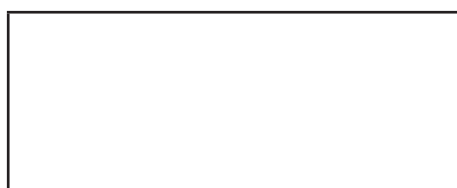
- 12 Methane, CH_4 , is the main constituent of natural gas.

(a) Draw a dot and cross diagram for a methane molecule.

[2]

(b) Methane is a gas at room temperature and pressure.

Draw the arrangement of methane molecules, at room temperature and pressure, in the box below.



[2]

- 13** Fig. 13.1 shows a bar magnet, **E**, placed opposite an iron bar, **F**. The magnet attracts the iron bar.



Fig. 13.1

- (a)** State the process that makes the iron bar, **F**, to be attracted by the magnet, **E**.

..... [1]

- (b)** Indicate, on Fig. 13.1, the poles of the iron bar, **F**.

[1]

- 14** Fig. 14.1 shows fractional distillation apparatus.

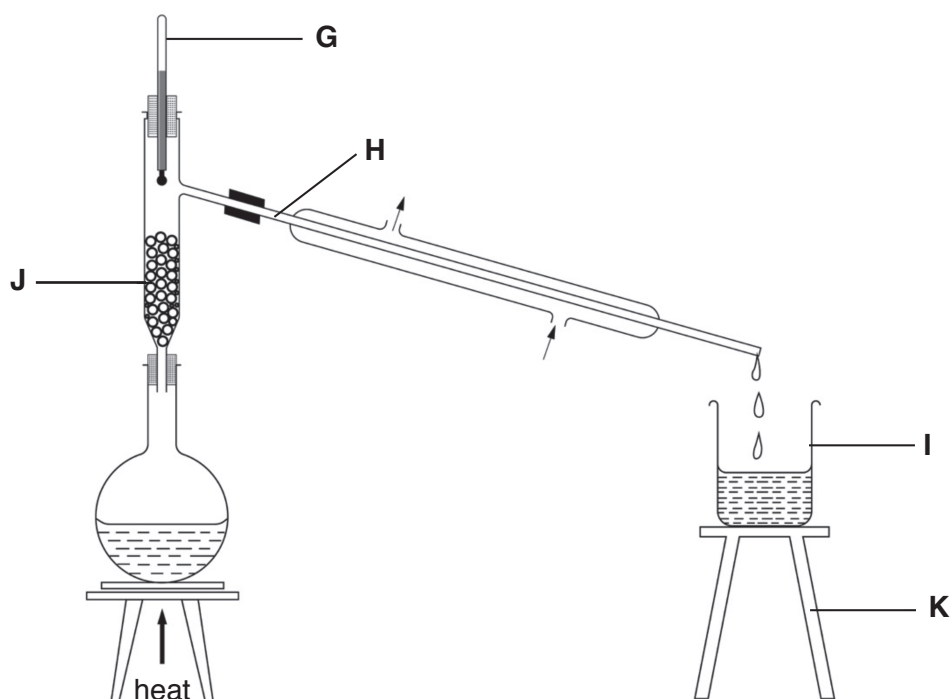


Fig. 14.1

- (a)** In which part, **G**, **H**, **J**, or **K**, do a gas and liquid exist together in Fig. 14.1.

..... [1]

- (b)** Identify the part, **G**, **H**, **I** or **J**, that contains a pure substance in Fig. 14.1.

..... [1]

- 15 The jaws of a micrometer screw gauge must be kept slightly apart when it is stored as shown in Fig. 15.1.

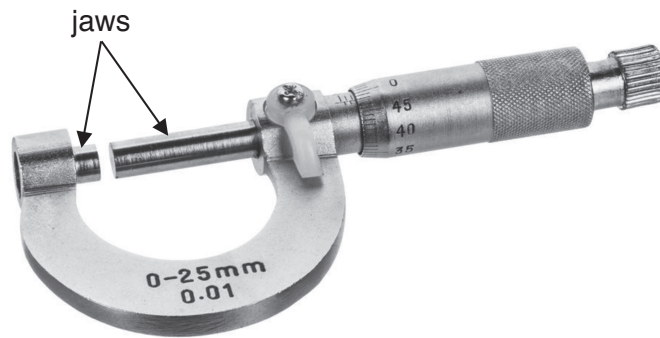


Fig. 15.1

Explain why the jaws are kept slightly apart.

.....
 [1]

- 16 A white crust is formed on the heating element of a kettle used to boil temporary hard water over a long period.

State the chemical name of the white crust.

..... [1]

- 17 Fig. 17.1 shows wave motion on a slinky spring.

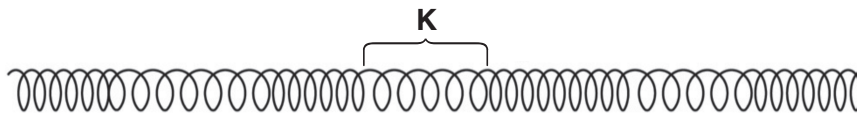


Fig. 17.1

- (a) Name the region labelled **K**, on Fig. 17.1.

..... [1]

- (b) Explain why sound travels faster in solids than in gases.

.....

 [2]

DATA SHEET
The Periodic Table of the Elements

Group																			
I	II													III	IV	V	VI	VII	0
7 Li Lithium 9 Be Beryllium 3		1 H Hydrogen 1												11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	4 He Helium 2
														23 Na Sodium 11	24 Mg Magnesium 12	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36		
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54		
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	209 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86		
223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																	
* 58–71 Lanthanoid series																			
† 90–103 Actinoid series																			
a X a = relative atomic mass X = atomic symbol b = atomic (proton) number 140 Ce Cerium 141 Pr Praseodymium 144 Nd Neodymium 147 Pm Promethium 150 Sm Samarium 152 Eu Europium 157 Gd Gadolinium 159 Tb Terbium 163 Dy Dysprosium 165 Ho Holmium 167 Er Erbium 169 Tm Thulium 173 Yb Ytterbium 175 Lu Lutetium 232 Th Thorium 231 Pa Protactinium 238 U Uranium 237 Np Neptunium 244 Pu Plutonium 243 Am Americium 247 Cm Curium 247 Bk Berkelium 251 Cf Californium 252 Es Einsteinium 257 Fm Fermium 258 Md Mendelevium 259 No Nobelium 260 Lr Lawrencium 90 Th Thorium 91 Pa Protactinium 92 U Uranium 93 Np Neptunium 94 Pu Plutonium 95 Am Americium 96 Cm Curium 97 Bk Berkelium 98 Cf Californium 99 Es Einsteinium 100 Fm Fermium 101 Md Mendelevium 102 No Nobelium 103 Lr Lawrencium																			

