Name……	School ……	Grade 9 ..…

JUNIOR SECONDARY
SEMI-EXTERNAL EXAMINATION

PHYSICAL SCIENCE

PAPER - Written — 2 hours 30 minutes

Marks 130 — **Specimen Paper**

Additional Materials: Soft pencil (HB type is recommended)

Non-programmable calculator

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Learners answer on the Question Paper in the spaces provided.
- Write your Name in the space at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any rough work, diagrams or graphs.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use*.
- Answer **all** questions.
- Answer section **A** on the multiple choice answer sheet provided.
- The number of marks for section **B** is given in brackets [ ] at the end of each question or part question.
- The Periodic Table is printed on page 24.

For Examiner's Use	
Section A	
Section B	
Total	

This document consists of **25** printed pages and **1** blank page.

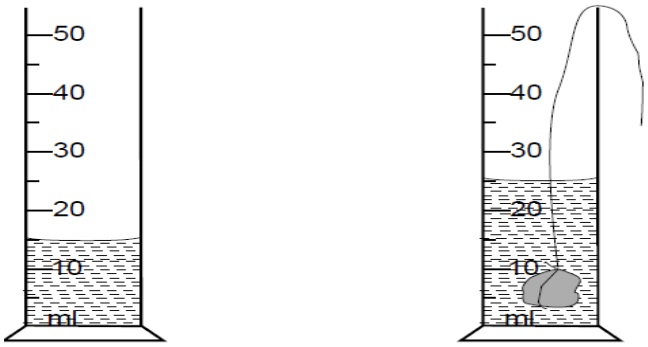
Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

SECTION A: MULTIPLE CHOICE QUESTIONS

- Answer this section on the multiple choice answer sheet provided.
- For each question there are **four** possible answers **A**, **B**, **C** and **D**.
- Choose the one you consider correct and mark your choice in **soft pencil** on the separate answer sheet.
- Each question counts **one** mark.
- If you want to change an answer, erase completely the one you wish to delete.

1 The diagram shows the set up of an experiment.



What is the main purpose of the experiment?

A To find the density of the stone.

B To find the mass of the stone.

C To find the temperature of the stone.

D To find the volume of the stone.

2 Which of the following is a way of finding the exact value of a quantity?

A classification

B estimation

C measurement

D observation

3 How many hours are equivalent to15 minutes?

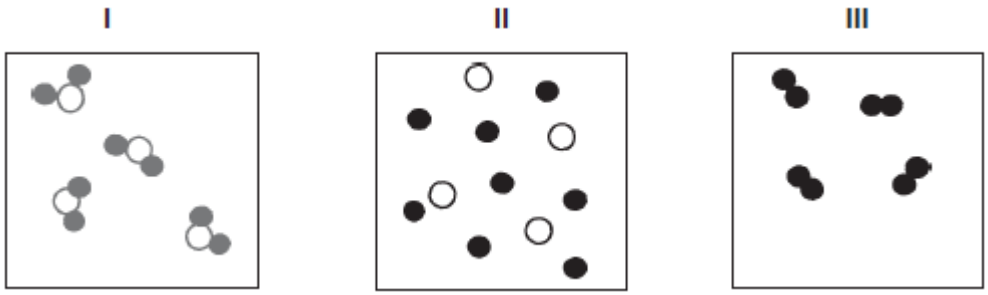
A 0.15 hours

B 0.25 hours

C 15.0 hours

D 900 hours

4 Substances can be classified as elements, compounds or mixtures.



Which diagram(s) represent (s) a mixture?

A **I** and **II**

B **II** and **III**

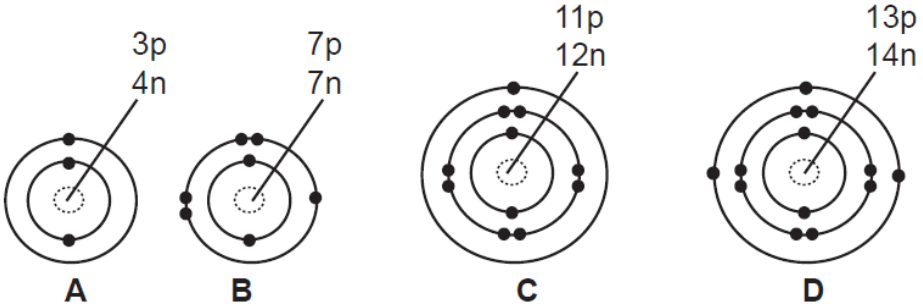
C only **I**

D only **II**

5 The diagram shows the outline of the Periodic Table.

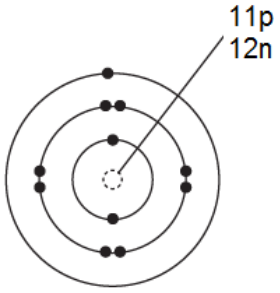
Which letter, **A**, **B**, **C** or **D**, represents an element in **group 2** and **period 3**?

6 The diagrams show structures of different atoms.



Which diagram represents the structure of an aluminium atom?

7 The diagram shows the electronic structure of sodium atom.



What is the nucleon number of sodium atom?

A 11

B 12

C 23

D 24

8 The diagrams show different molecules.
Which diagram shows a diatomic element?

A 

B 

C 

D 

9 Most inorganic fertilisers contain the compound ammonium nitrate. Ammonium nitrate is made up of ammonium (NH_4^+) ions and nitrate (NO_3^-) ions.

What is the chemical formula for ammonium nitrate?

A $(NHNO)_7$

B NH_3NO_4

C NH_4NO_3

D NHNO

10 Acids are common in fruits.
Which acid is found in fruits?

A acetic acid

B citric acid

C lactic acid

D nitric acid

11 What is the colour of a universal indicator in pure water?

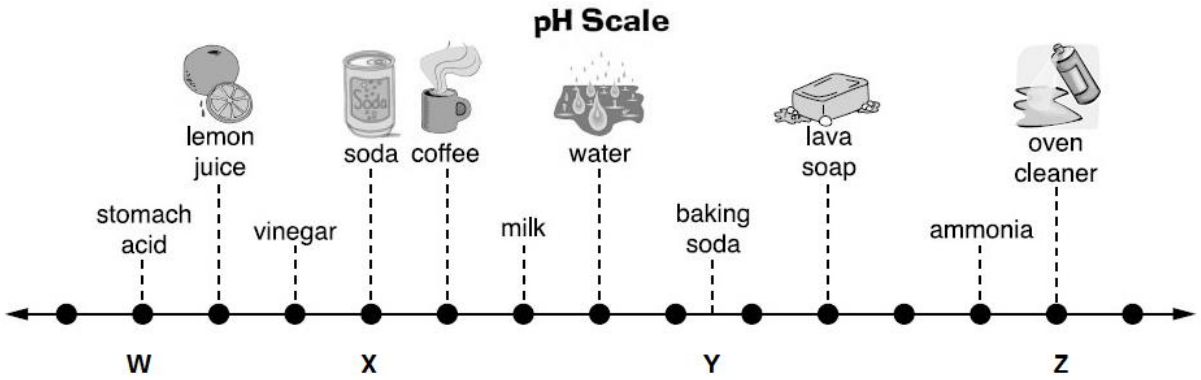
A green

B orange

C red

D violet

12 The diagram shows a pH scale indicating different substances.



Which combination of substances represents a weak acid and a strong base?

A **W** and **Y**

B **W** and **Z**

C **X** and **Y**

D **X** and **Z**

13 Which process can be used to control the pH of acidic soil?

A combustion

B decomposition

C neutralisation

D respiration

14 Which gas is produced when zinc granule reacts with dilute sulfuric acid?

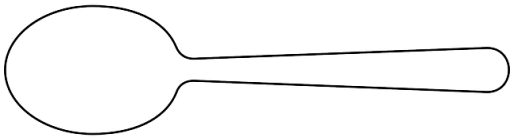
A carbon dioxide

B hydrogen

C oxygen

D sulfur dioxide

15 The diagram shows a spoon made from an alloy.



Which alloy is used to make the spoon?

A alnico

B brass

C bronze

D steel

16 When metals and non-metals react with oxygen they form oxides.

Which of the following is an acidic oxide?

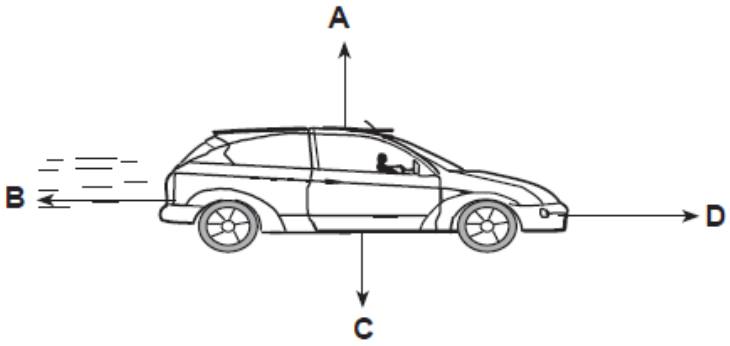
A carbon dioxide

B calcium oxide

C magnesium oxide

D sodium oxide

17 The diagram shows forces **A**, **B**, **C** and **D** acting on a moving car.

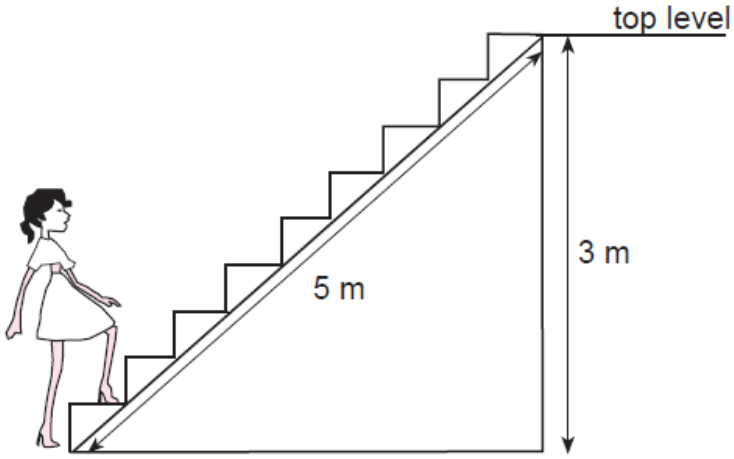


Which arrow **A**, **B**, **C** or **D** represents the **force due to friction**?

18 What is the correct measuring instrument and unit of weight?

	instrument	**unit**
A	beam balance	N
B	beam balance	kg
C	spring balance	kg
D	spring balance	N

19 A girl of 400 N walks up a stair case as shown in the diagram.



How much gravitational potential energy does she gain as she reaches the top level?

A 120 J

B 200 J

C 400 J

D 1200 J

20 The diagram shows a car tyre.

Which statement explains why the car tyres are made with deep grooves on their surfaces?

A To decrease friction.

B To decrease pressure

C To increase pressure.

D To increase friction.

21 Which process is described as the spreading of particles of one substance amongst the particles of another substance?

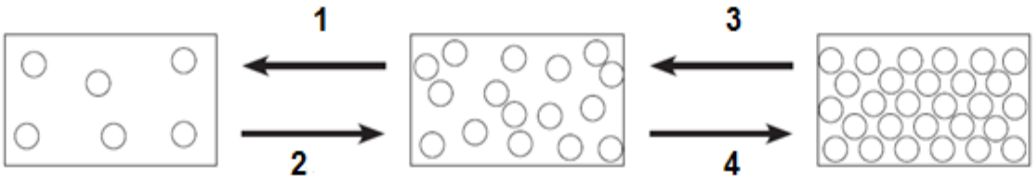
A compression

B contraction

C diffusion

D Expansion

22 The diagram shows phase changes.



In which phase changes do particles gain energy?

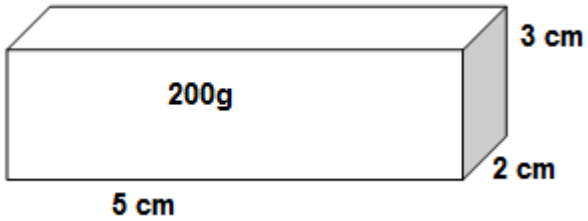
A 1 and 2

B 1 and 3

C 2 and 3

D 3 and 4

23 The diagram shows a 200 g rectangular block with dimensions 5 cm x 2 cm x 3 cm.



What is the density of the rectangular block?

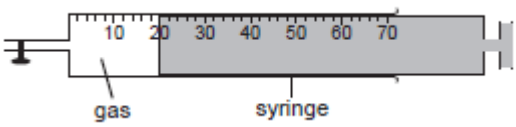
A 0.15 g/cm^3

B 6.67 g/cm^3

C 20.0 g/cm^3

D 33.3 g/cm^3

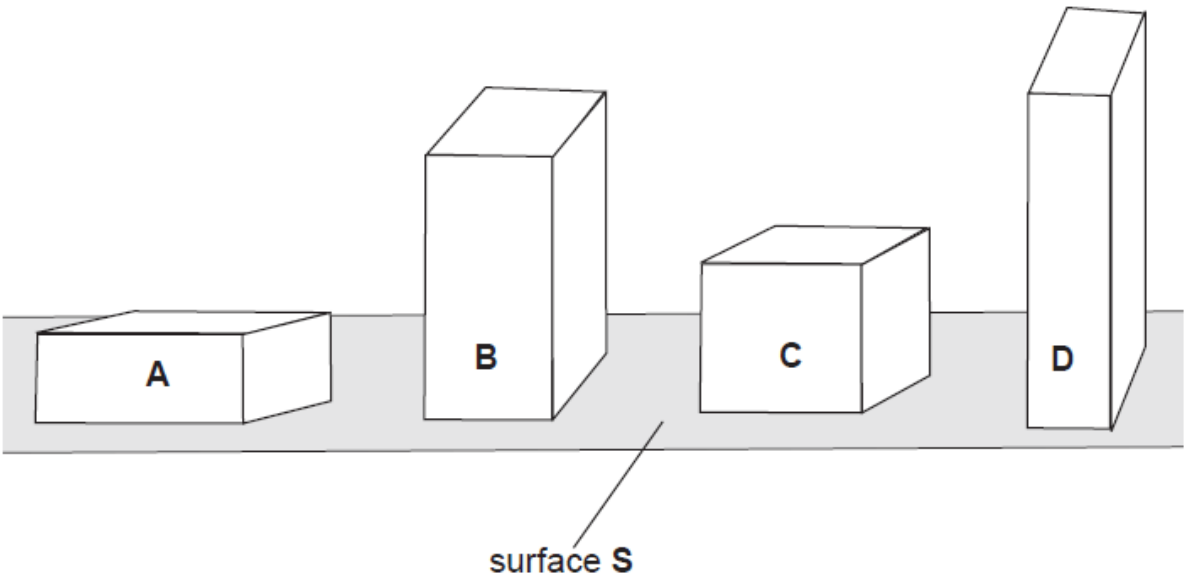
24 A syringe contains a gas of volume 40 cm^3. This volume is reduced to 20 cm^3. The temperature remains the same.



How does the gas pressure and collision of particles in the syringe change?

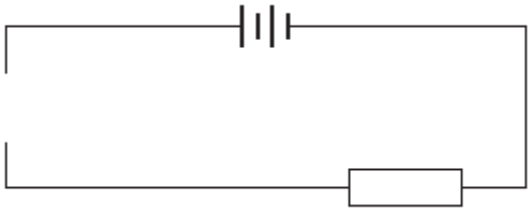
	gas pressure	collisions of particles
A	decreases	decrease
B	decreases	increase
C	increases	increase
D	increases	decrease

25 The diagram shows four objects of the same weight placed on a level surface.



Which object exerts the greatest pressure on the contact surface **S**?

26 The diagram shows an incomplete circuit?



Which component should be connected in the space to measure current?

27 An object can be either positively or negatively charged.

Which statement explains the existence of charge?

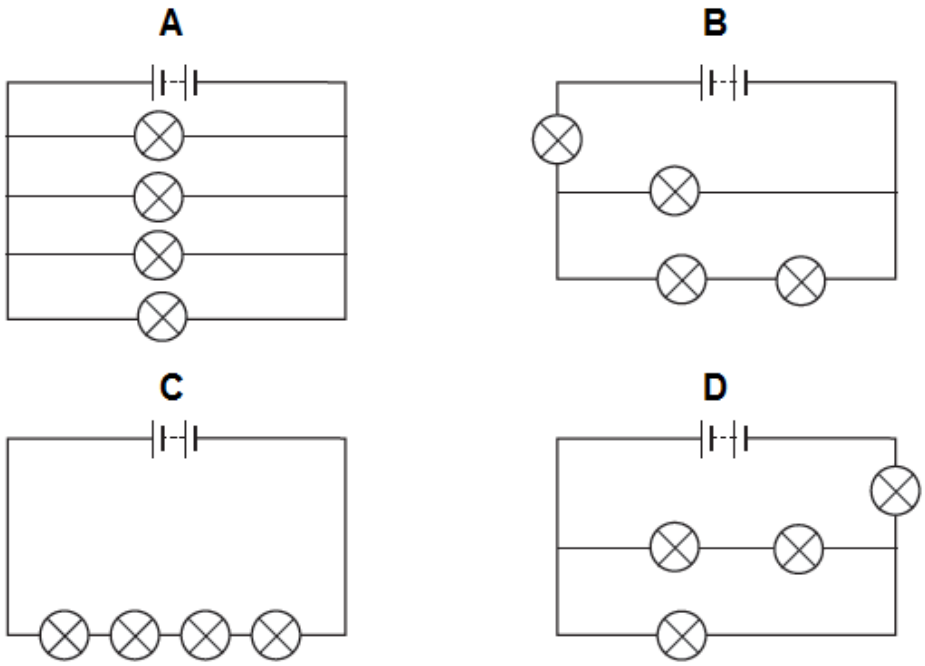
A Balance of electrons and neutrons.

B Balance of protons and electrons.

C Imbalance of protons and electrons.

D Imbalance of protons and neutrons.

28 Which connection ensures that all other bulbs remain lighted after any one of the bulbs breaks?



29 Which of the following is a source of chemical energy that can be used to produce electrical energy?

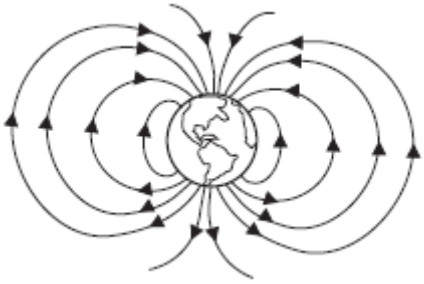
A candle

B cell

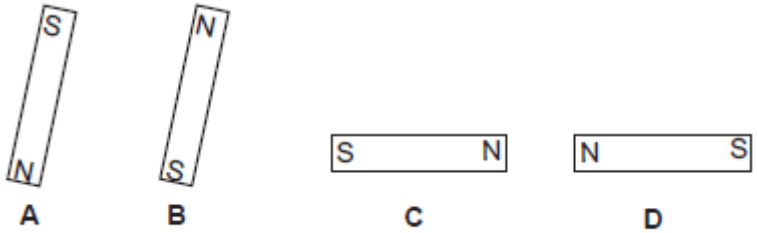
C sun

D water

30 The planet Earth behaves like a bar magnet.



Which diagram shows a bar magnet that represents the Earth's magnet?

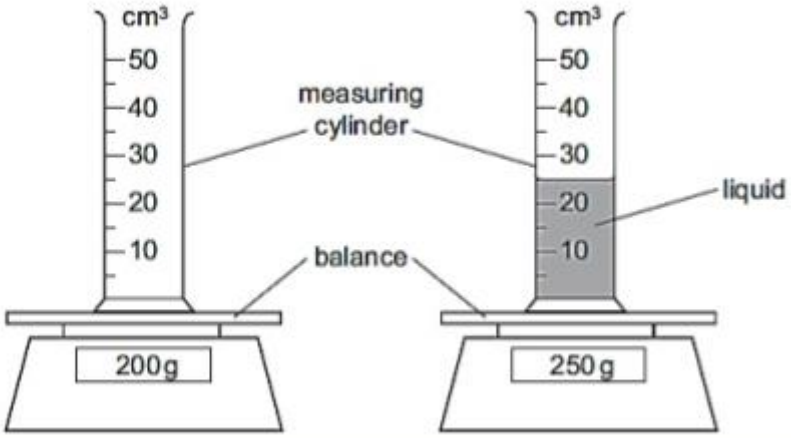


For examiner's Use

SECTION B: STRUCTURED QUESTIONS

- Write your answers in the spaces provided on the question paper.
- Legible handwriting and **neat drawings in pencil**, where required, are essential.
- Answers to numerical calculations **must have the correct unit**.
- Symbols must be written/drawn correctly.
- Incorrect spelling of element names and scientific terminology will be penalised.

1 The diagram shows the setup used to determine the mass of a liquid.



(a) Identify the instrument used to measure the mass of the liquid.

……..…….. [1]

(b) Find the volume of the liquid.

volume…….…… cm^3 [1]

(c) Determine the mass of the liquid. Show your working.

mass …….. g [2]

(d) **(i)** Calculate the density of the liquid.

density =…….…… g/cm^3 [2]

(ii) Deduce whether the liquid will float or sink in water.

Explain your answer.

……...

…… [2]

[8]

For examiner's Use

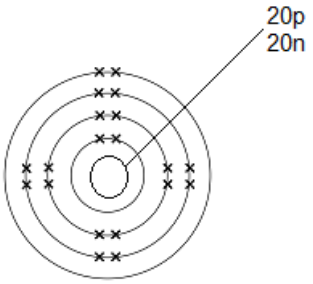
2 The table shows information about different elements **Q**, **R** and **S**.

(a) Use the Periodic Table on **page 24** to complete the table.

element	number of protons	number of electrons	electronic configuration	group number	period number
Q	5	5	**(i)** ……..	3	2
R	**(ii)** ….....	17	2, 8, 7	**(iii)** ……..	**(iv)** ……..
S	20	**(v)** ….....	2, 8, 8, 2	2	4

[5]

(b) The diagram shows the atomic structure of element **X**.



(i) State the name of element **X**.

……..…… [1]

(ii) Draw a **similar** structure of oxygen atom.

[3]

(c) Sodium reacts with oxygen to form sodium oxide.

(i) Name the type of bond formed between sodium and oxygen.

…….... [1]

(ii) Draw diagrams to show how the bond between sodium and oxygen is formed.

[4]

[14]

For examiner's Use

3 Changes in nature can be classified as physical or chemical.

(a) Give **two** differences between a physical and chemical change.

1……

……

2……

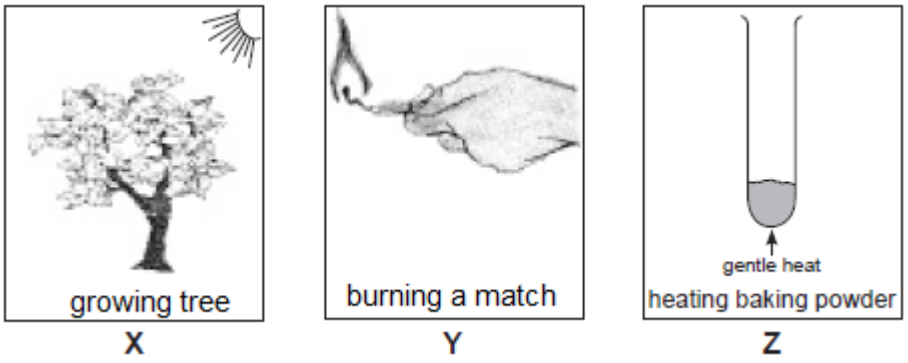
……..... [2]

(b) State whether the following changes are chemical or physical.

(i) fruit ripening …… [1]

(ii) ice cube melting …… [1]

(c) The diagrams **X**, **Y** and **Z** are examples of chemical reactions.



(i) Identify the chemical reactions represented by **X**, **Y** and **Z** as **decomposition**, **synthesis** or c**ombustion** reaction.

X ……

Y ……

Z …….... [3]

(ii) Burning a match is an exothermic reaction.

Explain what is meant by exothermic reaction.

……

…… [1]

[8]

For examiner's Use

4 In an experiment, a learner is given a sample of each of the following substances to determine whether they are **acidic, basic** or **neutral**.

The table shows her results after testing the samples with litmus papers.

sample	**effect on blue litmus paper**	**effect on red litmus paper**	**nature of sample**
fanta cool drink	**(i)** …….	remains red	acidic
distilled water	remains blue	remains red	**(ii)** ……
soap water	remains blue	**(iii)** ……	basic
vinegar	turns red	remains red	**(iv)** ……
eno solution	**(v)** ……	**(vi)** ……..	basic
lemon juice	turns red	remains red	**(vii)** …….

(a) Fill in **(i)**, **(ii)**, **(iii)**, **(iv)**, **(v)**, **(vi)** and **(vii)** to complete the table. [7]

(b) Hydrochloric acid reacts with calcium carbonate to form carbon dioxide gas and **two** other products.

(i) Name the **two** other products formed.

1 ..... [1]

2 ..... [1]

(ii) Describe the test for carbon dioxide gas.

Test……..……..……... [1]

Result ……..……. [1]

(c) Distinguish between weak acids and strong acids in terms of the pH scale.

weak acids …….…….....

..... [1]

strong acids

…….

..... [1]

[13]

For examiner's Use

5 Metals are obtained from their ores found in the Earth crust.

(a) State the metals that are mined at Tsumeb and Rosh Pinah.

Tsumeb ……

Rosh Pinah …….. [2]

(b) State two physical properties of metals.

……

…….. [2]

(c) The table shows the experimental results obtained when some metals were reacted with water and dilute acids.

Fill in the missing information for **(i)**, **(ii)** and **(iii)**.

metal	**reaction with water**	**reaction with dilute acid**
copper	no reaction	**(i)** ……
calcium	**(ii)** ……..	vigorous reaction
zinc	**(iii)** ……..	fast reaction

[3]

(d) Arrange the metals given in **(c)** the order of reactivity, from the most reactive to the least reactive.

1.....

2.....

3..... [2]

For examiner's Use

(e) The diagram shows burning wood. Wood contains carbon.

(i) Complete the word equation for the complete combustion of carbon.

carbon + ……..... ⟶ …… [2]

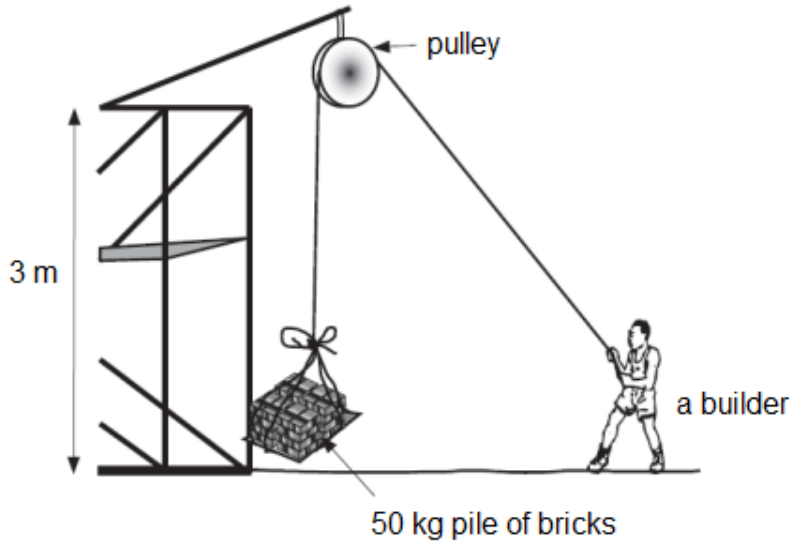
(ii) Suggest the effect of non-metal oxides on rain water.

……..…… [1]

[12]

For examiner's Use

6 The diagram shows a builder using a pulley to lift a 50 kg pile of bricks through a height of 3 m at a construction site.



(a) State the difference between mass and weight.

……

……..

……..

……..…… [2]

(b) Calculate the weight of the 50 kg pile of bricks.

Weight = …….. N [2]

(c) **(i)** State the formula of work done.

…..……... [1]

(ii) Calculate work done by the builder when he lifted the pile to the height of 3 m. State the unit.

Work done = ……. unit …….. [3]

[8]

For examiner's Use

7 **(a)** In an experiment a learner uses his thumb to press a one Namibian dollar coin into a ball of plasticine.

He uses the same force to press the coin on the edge and then on its flat surface as shown on the diagrams.

diagram 1

coin pressed on the edge sinks into the plasticine

diagram 2

coin pressed on the flat surface does not sink into the plasticine

(i) State in which diagram more pressure is exerted on the plasticine.
Explain your answer.

……..

……..

……..... [2]

(ii) The coin in diagram 2 covers an area of 0.0003m^2.
The force applied by the thumb is 15 N.

Calculate the pressure exerted.

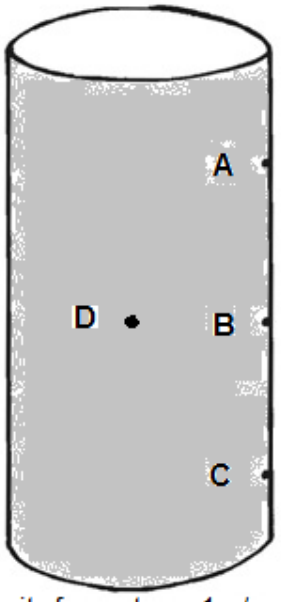
Pressure = ……..…… Pa[2]

(iii) Convert your answer in **(ii)** to kilopascals.

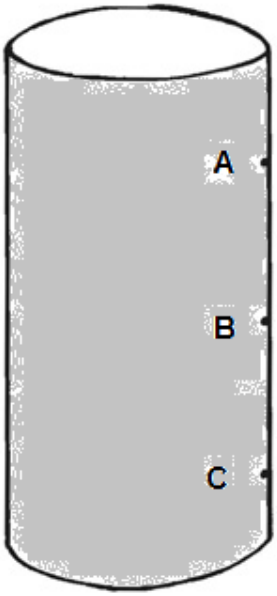
Answer = ……kPa [1]

For examiner's Use

(b) The diagram shows two containers, one filed with water and one with milk.



density for water = 1 g/cm^3



density for milk = 1.04 g/cm^3

(i) Compare the pressure at **B** and **D** in water. Explain your answer.

.....

..... [2]

(ii) Compare the pressure at **C** in water and at **C** in milk. Explain your answer.

……..……

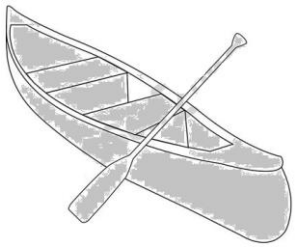
……..…… [2]

(iii) State two applications of hydrostatic pressure in everyday life.

1.....

2..... [2]

(c) A canoe floats in the river as shown in the diagram.



Explain why a canoe floats on water.

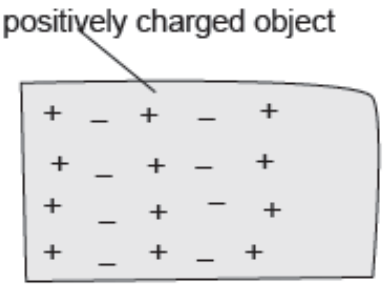
……..……

……. [2]

[13]

For examiner's Use

8 **(a)** The diagram shows a representation of a positively charged piece of material.



(i) Suggest how the piece of material was charged.

……..…..

……..... [1]

(ii) A positively charged balloon is brought near the positively charged object shown.

State, with a reason, what happens between the balloon and the piece of material.

……..…..

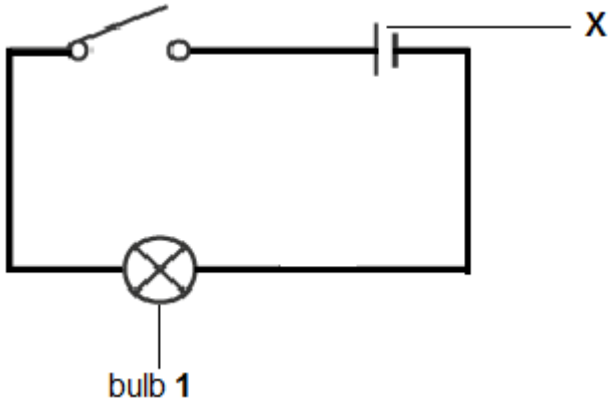
……..…….

……..…….... [2]

(iii) On the diagram, insert enough negative charges (−) to make the object neutral. [1]

For examiner's Use

(b) The diagrams show two electric circuits. All bulbs in the circuits are identical.



(i) State the name of component **X**.

..... [1]

(ii) A second bulb is connected to the circuit in series and the switch is closed.

State how the brightness of bulb **1** changes.

……..……..……..…… [1]

(iii) Give a reason for your answer in **(b) (ii)**.

……..……..……..….. [1]

(c) On the diagram in **(b)**, draw a voltmeter to measure the potential difference of bulb **1**. [2]

(d) State the energy conversion taking place when the circuit is closed.

……..……..

…… [2]

For examiner's Use

(e) Explain how the following factors affect the resistance of a wire.

(i) length

.....

..... [1]

(ii) diameter

.....

..... [1]

(f) Give **two** examples of everyday use of a variable resistor.

.....

..... [2]

[15]

For examiner's Use

9 **(a)** Metals can be classified as magnetic or non-magnetic.

(i) Differentiate between magnetic and non-magnetic materials.

……

…… [2]

(ii) Give two metals that are magnetic.

1 ……

2 …… [2]

(b) A learner is provided with the following materials.

- iron filings
- bar magnet
- sheet of paper

Using the materials above, describe an experiment to determine the magnetic field lines around the bar magnet.

……

……

……

……

……

…… [3]

(c) On the diagram, draw **four** magnetic lines of force (**two** lines on each side) around a bar magnet.

[2]

[9]

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 *Al* Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35,5 *Cl* Chlorine 17	40 Ar Argon 18
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	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	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															
*58 - 71 Lanthanoid series †90 - 103 Actinoid series				140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
Key	a X b	a = relative atomic mass X = atomic symbol b = proton (atomic) number		232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

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

JS Physical Science Semi-External Examination Specimen Paper

For examiner's use

Section A: Multiple choice answer sheet.

Name……	School ……	Grade 9 .....

Record your choice (possible answers, **A**, **B**, **C** or **D**) by **shading** in soft pencil on this answer sheet. If you want to change an answer, thoroughly erase the one you wish to delete.

	A	B	C	D
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