Candidate Number	Candidate Name

JUNIOR SECONDARY CERTIFICATE

PHYSICAL SCIENCE 1210/1

PAPER − Written 2 hour 30 minutes

Marks 130 **2018**

Additional Materials: Non-programmable calculator
Soft pencil (HB type is recommended)

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Make sure that you receive the multiple choice answer sheet with your Candidate Number on it to answer section **A**.
- For section **B**, candidates answer on the Question Paper in the spaces provided.
- Write your Candidate Number and Name in the spaces 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.

- 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 27.

For Examiner's Use

Marker	
Checker	

This document consists of **27** printed pages.

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.
- If you want to change an answer, erase the one you wish to delete completely.
- Each question counts **one** mark.

---

1 Which of the following instruments is used to measure the weight of an object?

A measuring cylinder

B spring balance

C stop watch

D thermometer

2 Which of the following is the unit of mass?

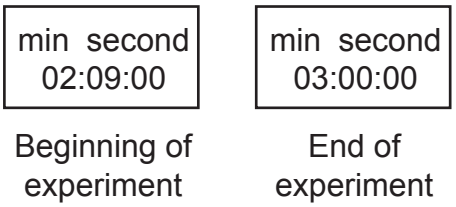
A cubic metres

B kilograms

C kilometres

D millilitres

3 The diagram shows a stopwatch used to determine the duration of an experiment.



How long did the experiment last?

A 51 seconds

B 129 seconds

C 180 seconds

D 209 seconds

4 What is the name given to the bond formed between oppositely charged ions?

A covalent bond

B ionic bond

C metallic bond

D triple bond

5 What is the total number of electrons in calcium ion Ca^{2+}?

A 18

B 20

C 22

D 40

6 The statements below describe elements in one Group of the Periodic Table.

- soft silvery - white colour
- good conductor of thermal energy and electricity
- atom contain a single valence electron

What is the name given to these elements?

A alkali metals

B alkaline earth metals

C halogens

D noble gas

7 Which of the following process is a physical change?

A combustion

B corrosion

C freezing

D respiration

8 Which of the following is a synthetic polymer?

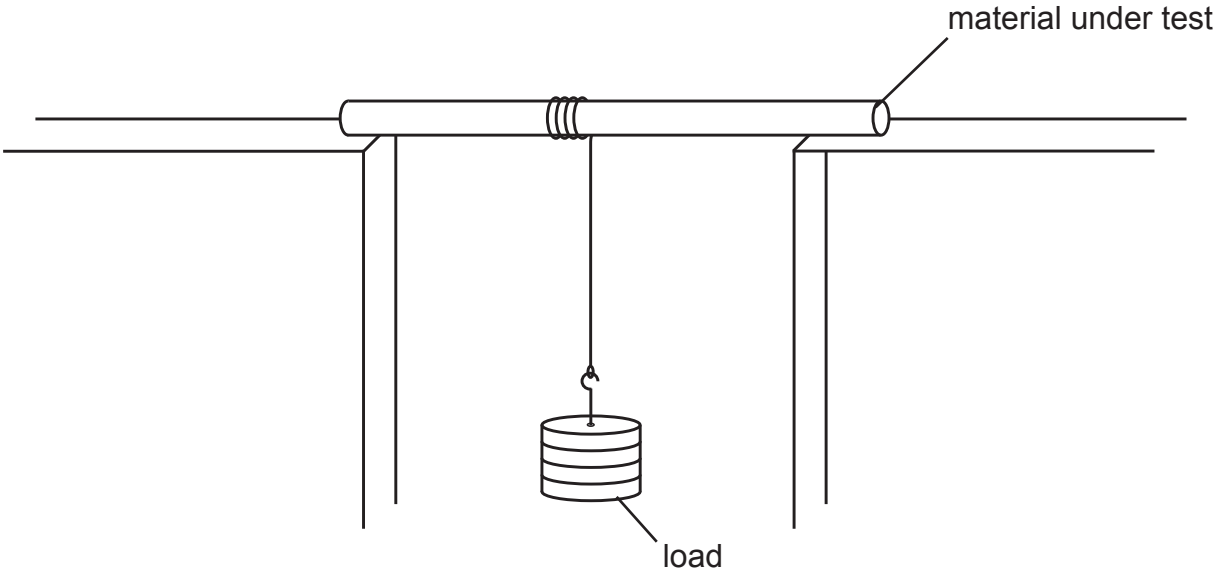
A metal

B plastic

C wood

D wool

9 The diagram shows a material under test.



Which property is being tested?

A compressive strength

B elasticity

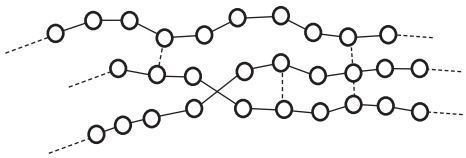
C hardness

D tensile strength

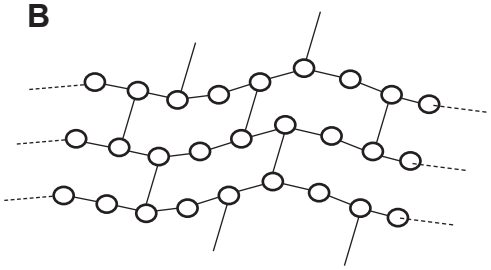
10 The diagram shows structures of different polymers.

Which structure is found in wood?

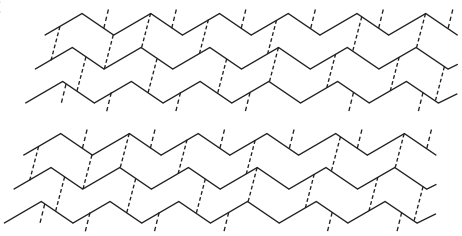
A



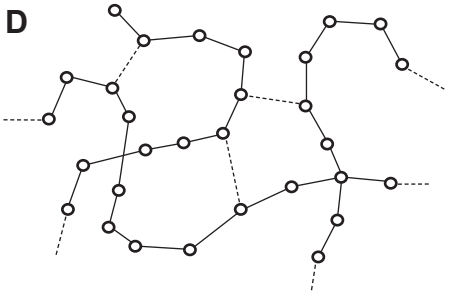
B



C



D



11 Which of the following is an example of a decomposition reaction?

A calcium carbonate ⟶ calcium oxide + carbon dioxide

B carbon + oxygen ⟶ carbon dioxide

C iron + sulfur ⟶ iron sulfide

D nitric acid + zinc ⟶ zinc nitrate + hydrogen

12 Which of the following substances is an alkali?

A hydrochloric acid

B sodium hydroxide

C vinegar

D water

13 Which of the following methods is used in preparing salts?

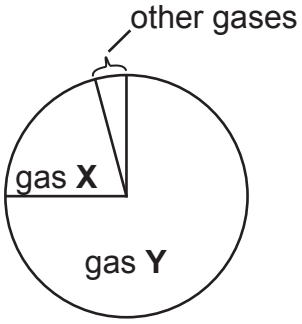
A combustion

B decomposition

C neutralisation

D synthesis

14 The diagram shows the composition of air.



Which of the following gasses is gas **Y**?

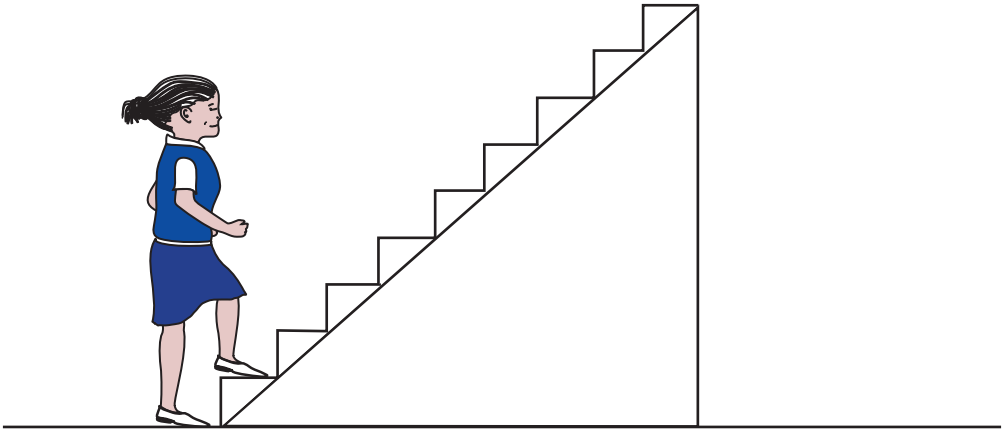
A argon

B carbon dioxide

C nitrogen

D oxygen

15 A girl weighing 400 N takes 4 seconds to run up the 3 m stairs case shown in the diagram.



What is her average speed?

A 0.75 m/s

B 0.8 m/s

C 1.25 m/s

D 1.33 m/s

16 Which of the following equations is used to calculate force?

A force = frequency x wavelength

B force = mass x gravitational field strength

C force = power x time

D force = pressure ÷ area

17 In which of the following examples is the greatest pressure exerted?

A a brick resting on the ground

B a book resting on a table

C a knife cutting through a piece of meat

D an elephant standing on the ground

18 Which of the following quantities is calculated by multiplying force by a distance?

A power

B pressure

C velocity

D work

19 Which type of energy may be released when a nucleus of an atom breaks?

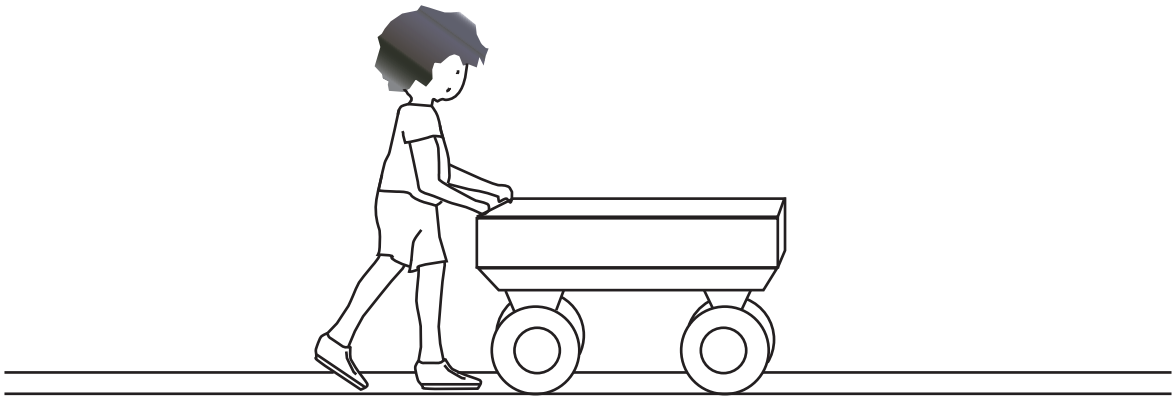
A geothermal energy

B hydroelectric energy

C nuclear energy

D solar energy

20 A boy pushes a cart along a level road and then lets it to go.



What are the energy conversions taking place when the cart starts moving?

A chemical ⟶ heat

B electrical ⟶ kinetic

C kinetic ⟶ chemical

D potential ⟶ kinetic

21 What is the amount of current produced when a 0.005 C charge is allowed to flow for 0.2 seconds?

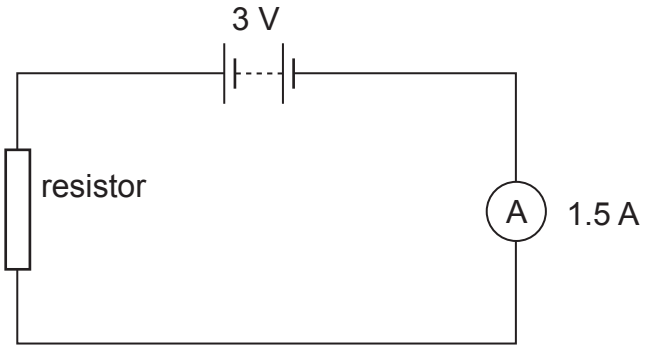
A 0.001 A

B 0.025 A

C 0.205 A

D 0.400 A

22 The diagram shows an electric circuit, where a 3 V battery is connected to a resistor and an ammeter reading 1.5 A.



What is the resistance in the circuit?

A 0.5 Ω

B 1.5 Ω

C 2.0 Ω

D 4.5 Ω

23 Which of the following is the unit for electrical energy consumed?

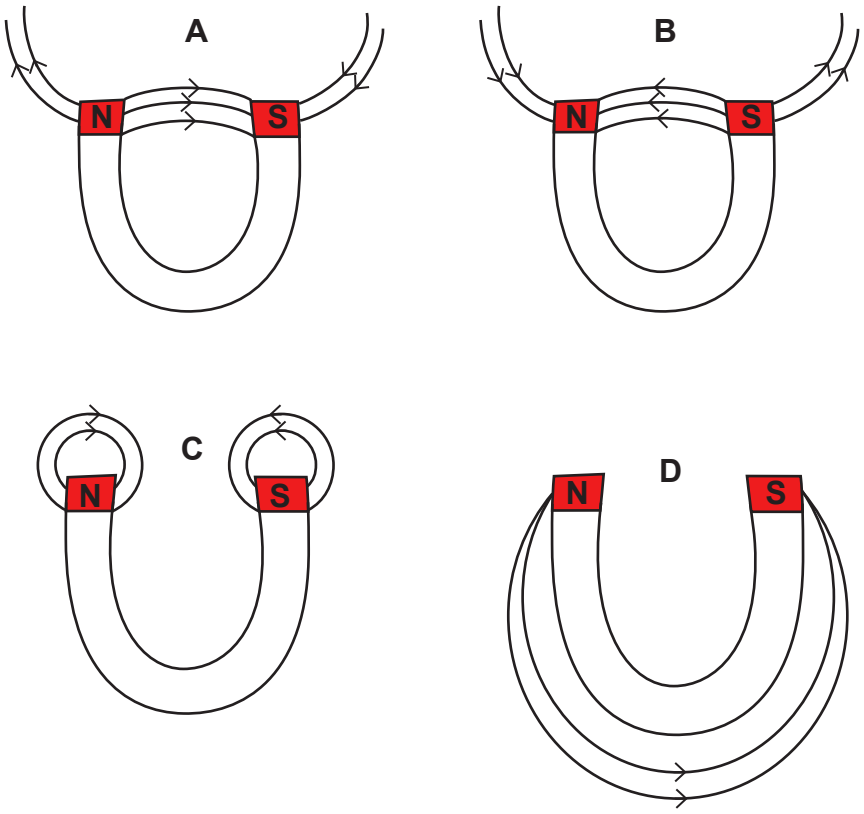
A amperes

B kilowatt

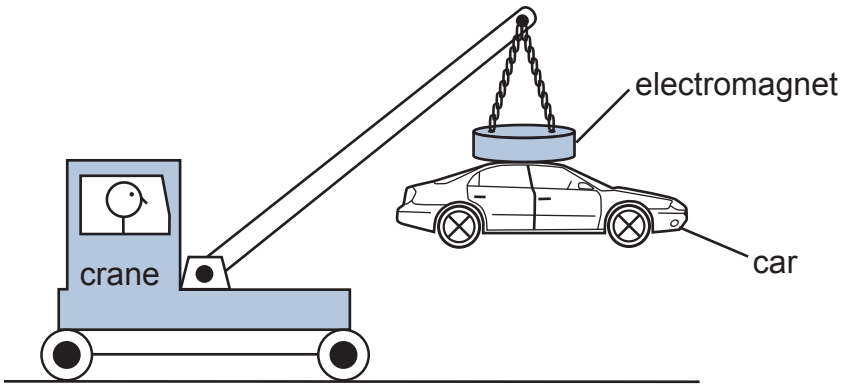
C kilowatt-hour

D watt

24 Which diagram shows the correct pattern of field lines around a horse-shoe magnet?



25 The diagram shows a crane lifting a car at a scrap yard. When current is switched on, an electromagnet is made.



What type of material is most suitable for use as an electromagnet?

A cobalt

B iron

C nickel

D steel

26 What type of wave is sound?

A electromagnetic wave

B longitudinal wave

C radio wave

D transverse wave

27 A diagram shows a girl with her shadow cast on the ground.

Which property of light causes the formation of shadows?

A light travels in a vacuum

B light travels in a straight line

C light can be dispersed

D light can be transmitted

28 Which row in the table shows the properties of an image produced by a pin-hole camera and by a mirror?

	pin-hole	**mirror**
A	larger	smaller
B	same distance	same size
C	virtual	inverted
D	inverted	virtual

29 A short-sighted person cannot see far object in focus.

Which of the following can be used to correct short-sightedness?

A concave lens

B convex lens

C concave mirror

D convex mirror

30 Which property of light leads to the formation of a spectrum of colours?

A absorption

B reflection

C refraction

D transmission

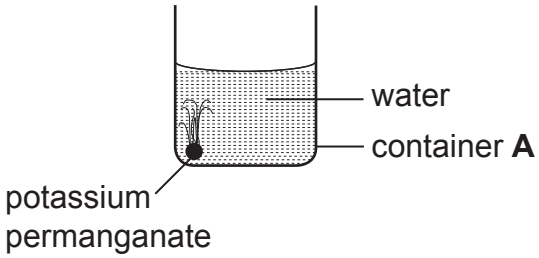
SECTION B: STRUCTURED QUESTIONS

For Examiner's Use

- 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 a crystal of potassium permanganate, a purple chemical, placed at the bottom of container **A**.



(a) Give the name of container **A**.

..... [1]

(b) State and explain what observation will be made after sometime, if potassium permanganate is left in water as shows above.

Observation.....

Explanation .....

.....

..... [2]

(c) Suggest the name of the process investigated above.

..... [1]

[4]

2 The table shows isotopes of 3 elements from the Periodic Table.

Isotope	Element	Mass number	Atomic number	Neutron number
C	carbon	12	6	6
C	carbon	14	6	8
C*l*	chlorine	35	17	18
C*l*	chlorine	37	17	**(i)**
U	uranium	235	92	**(ii)**
U	uranium	**(iii)**	92	146

(a) Give the meaning of the term *isotopes.*

.....

.....

.....

..... [2]

(b) Complete the table by filling in the missing information for **(i)**, **(ii)** and **(iii)**. [3]

(c) Outline the use of isotopes of carbon and isotopes of uranium.

Carbon .....

..... [1]

Uranium .....

..... [1]

(d) State the name of a mine in Namibia which mines uranium.

..... [1]

(e) Explain what happens when a radioactive isotope goes through radioactive decay.

.....

..... [2]

[10]

For Examiner's Use

3 The list shows the elements in Group 7 of the Periodic Table.

$$\overset{19}{\underset{9}{F}} \qquad \overset{35,5}{\underset{17}{Cl}} \qquad \overset{80}{\underset{35}{Br}} \qquad \overset{127}{\underset{53}{I}} \qquad \overset{-}{\underset{85}{At}}$$

(a) State the name given to Group 7 elements.

..... [1]

(b) Group 7 elements are said to be diatomic molecules.

Explain the meaning of the term *diatomic*.

.....

..... [2]

(c) Fluorine reacts with magnesium to form magnesium flouride as shown by the equation below.

$Mg + F_2 \longrightarrow MgF_2$

(i) Draw a structure that illustrates the bonding in magnesium flouride.

[4]

(ii) State the type of bonding in magnesium flouride.

..... [1]

[8]

4 The table shows information about three metals.

Metal	Name of ore	Method of extraction
aluminium	bauxite	**(i)**
(ii)	chalcopyrite	roasting in air
iron	**(iii)**	heating with carbon

(a) Complete the table above by filling in the missing information for **(i)**, **(ii)** and **(iii)**. [3]

(b) Give **one** reason why aluminium is used for making cooking pots.

.....

..... [1]

(c) Steel is a common alloy of iron.

(i) Explain the meaning of the term *alloy*.

.....

..... [1]

(ii) Suggest the reason why steel has more uses than pure iron.

.....

..... [1]

(d) State **one** use of copper.

..... [1]

[7]

For Examiner's Use

5 In the laboratory, Mary was given three colourless liquids to test using a universal indicator.

(a) Suggest the colour change when the universal indicator is added to an acid.

..... [1]

(b) Hydrochloric acid reacted with calcium carbonate to produce a salt and other two products.

Write the word equation for the reaction.

..... [3]

(c) Hydrochloric acid is a strong acid.

(i) Suggest its pH value.

..... [1]

(ii) State **one** property of a strong acid.

.....

..... [1]

(d) Water is one of the products of a reaction between an acid and a base.

Outline the chemical test for water.

Test .....

.....

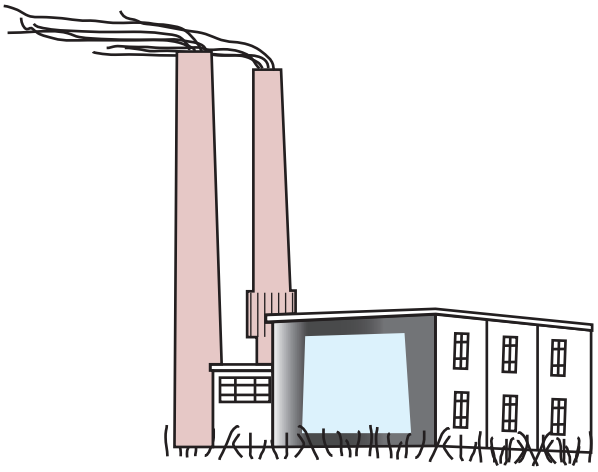
Result.....

..... [2]

[8]

For Examiner's Use

6 The diagram shows a coal burning power station. Carbon monoxide and sulfur dioxide are some of the main air pollutants emitted.



(a) (i) State the danger of carbon monoxide on humans.

.....

..... [1]

(ii) Explain the effect of sulfur dioxide on the environment.

.....

.....

.....

..... [2]

(b) Another source of air pollution is vehicle exhaust emission. One way of reducing pollution is by fitting catalytic converters.

(i) Suggest **one** other way of reducing the emitted pollution.

.....

..... [1]

(ii) Explain the role of catalytic converters.

.....

..... [1]

(c) Discuss the dangers of lead pollution.

.....

..... [1]

[6]

For Examiner's Use

7 Mr Bock bought a new engine for his car. The engine has a mass of 2 250 kg.

(a) The gravitational field strength on Earth is about 10 N/kg.

Calculate the weight of the engine.

Weight..... N/kg [2]

(b) It takes a pulley 30 seconds to lift the engine into the car, through a height of 1.2 m.

Calculate

(i) the work done by the pulley.

Work done .....J [2]

(ii) power of the pulley. State the unit.

Power.....unit ..... [3]

For Examiner's Use

(c) On the ground, the engine covers an area of 0.85 square meter (m^2).

(i) Write down the formula for calculating pressure.

..... [1]

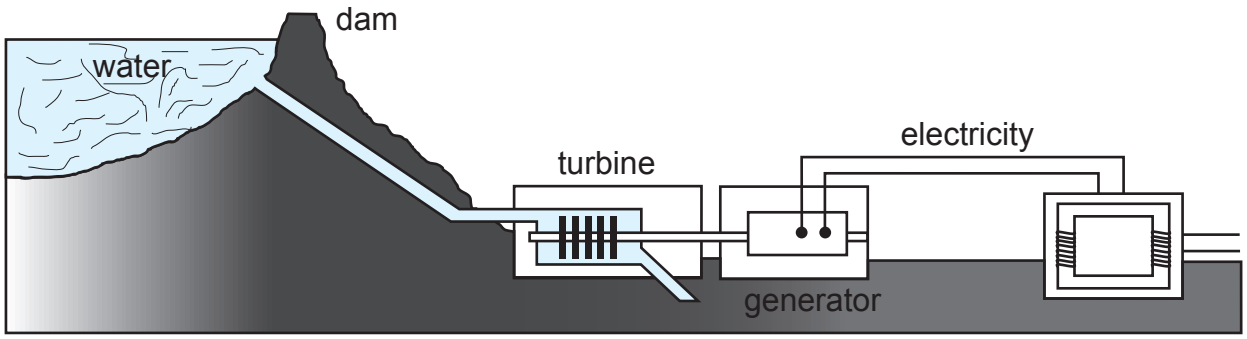
(ii) Calculate the pressure exerted by the engine on the ground.

Pressure .....N/m^2 [2]

[10]

For Examiner's Use

8 The diagram shows a hydroelectric power station.



(a) State the advantage of producing electricity this way.

.....

..... [1]

(b) Show the energy conversion in the generator.

.....

..... [2]

(c) **(i)** A light bulb which takes in 80 J electrical energy produces only 50 J of light energy.

Calculate the efficiency of this bulb.

Efficiency ..... % [2]

(ii) Explain why the bulb is not 100% efficient.

.....

..... [1]

(d) State **two** non-renewable sources of energy.

1 .....

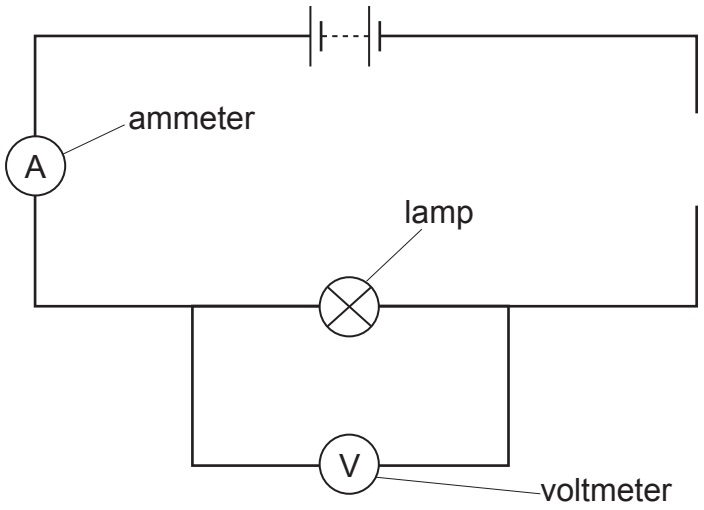
2 ..... [2]

[8]

For Examiner's Use

9 Jane investigates how the resistance of a bulb changes as she increased the current by using a variable resistor, and record the corresponding potential difference.

The diagram represents the circuit.



(a) Draw a circuit symbol of a variable resistor in the space provided on the diagram. [1]

(b) State the type of connection between the

(i) ammeter and the lamp,

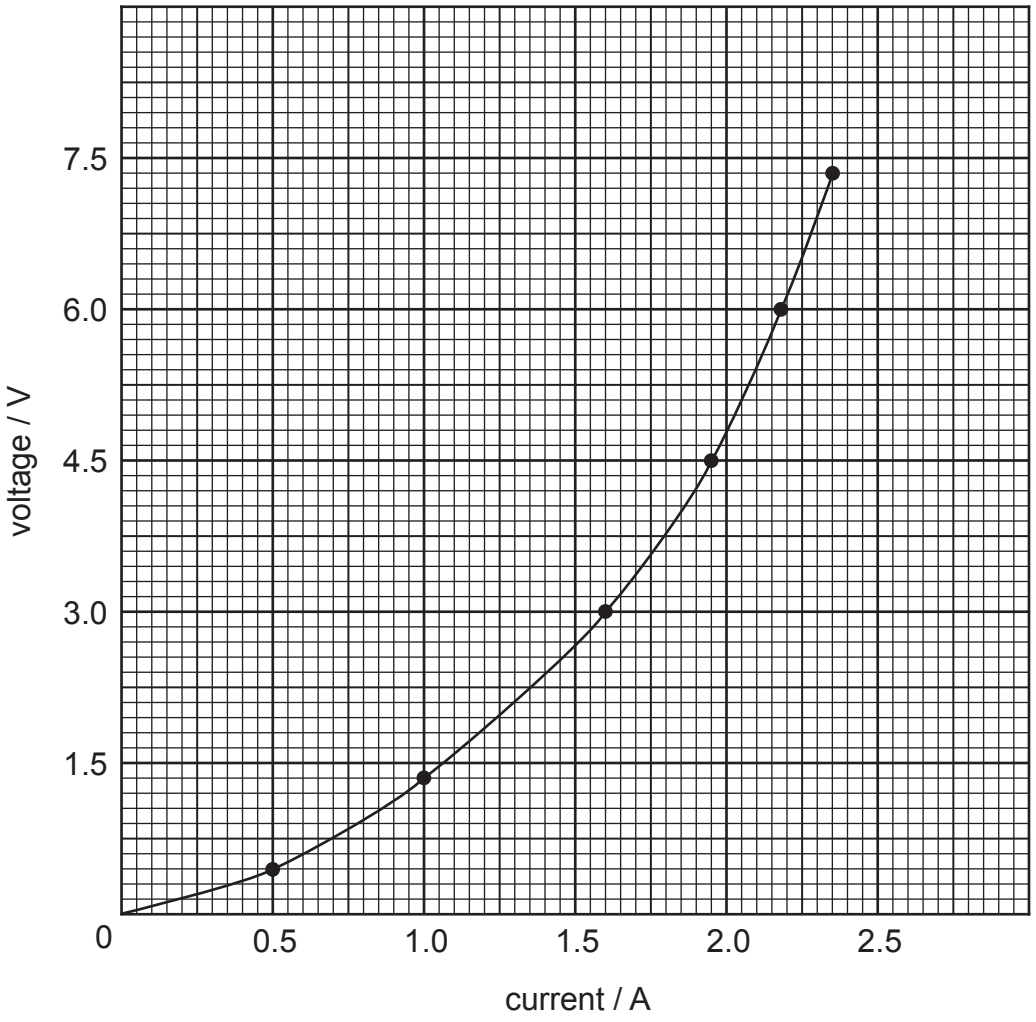
..... [1]

(ii) lamp and the voltmeter.

..... [1]

For Examiner's Use

(c) Jane then plots the graph below.



Use the graph to

(i) find the value of the current when the voltage is 3.0 V.

..... [1]

(ii) calculate the resistance of the bulb when the voltage is 3.0 V.

Show your working.

Resistance ..... [2]

(iii) Interpret the relationship between the current and voltage of the bulb and give a reason for your answer.

Relationship .....

.....

Reason.....

..... [2]

(iv) State whether the bulb is an ohmic or a non-ohmic conductor.

..... [1]

(d) Outline **two** ways to increase the resistance of a conductor.

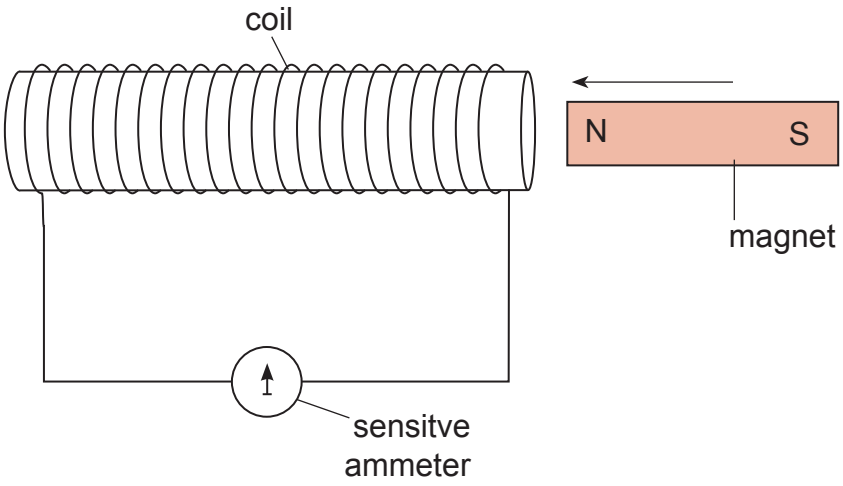
1 .....

2 ..... [2]

[11]

For Examiner's Use

10 The diagram shows a simple experiment on how electricity can be generated.



(a) (i) Describe how the electrical current is produced in the experiment shown in the diagram.

.....

.....

.....

..... [2]

(ii) State the observation made that confirms that an electric current is being produced.

..... [1]

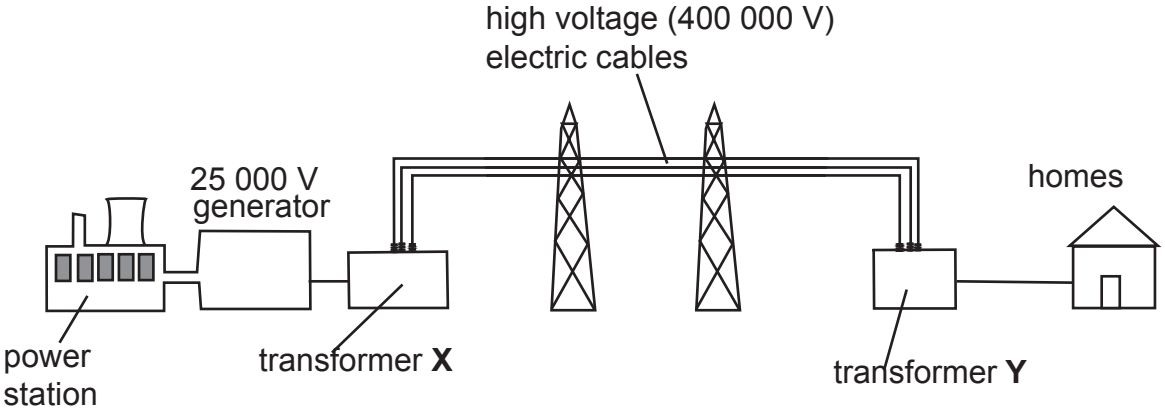
(iii) State **two** ways to increase the amount of induced current.

1 .....

2 ..... [2]

For Examiner's Use

(b) After electricity is generated at a power station it is transmitted using transformers.



(i) Identify the type of transformer **Y** and give its use.

.....

..... [1]

(ii) Suggest the reason why electricity is transmitted at high voltage.

.....

..... [1]

(c) One of the common domestic appliances using electrical energy in the homes is a kettle.

(i) Calculate the current flowing in a kettle if it has a power rating of 2 000 W and uses a voltage of 240 V.

Current..... A [2]

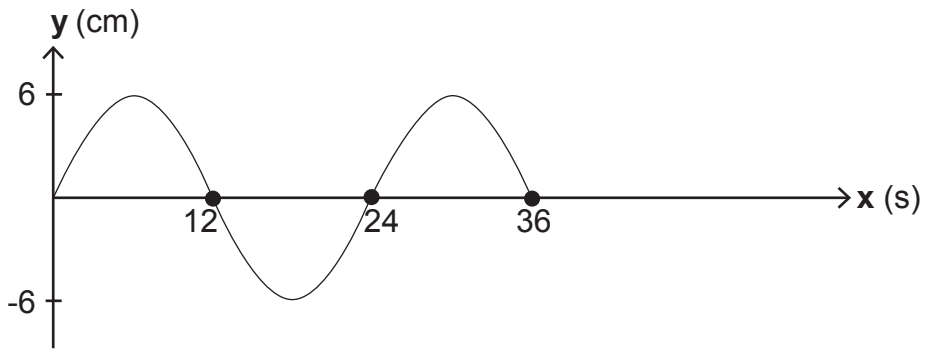
(ii) State **one** danger of electricity at home.

.....

..... [1]

[10]

11 The diagram shows a wave motion of a source having a frequency of 2 Hz.



(a) Identify the type of the wave above.

..... [1]

(b) Use the above diagram to determine the value of the

(i) wavelength.

..... [1]

(ii) amplitude.

..... [1]

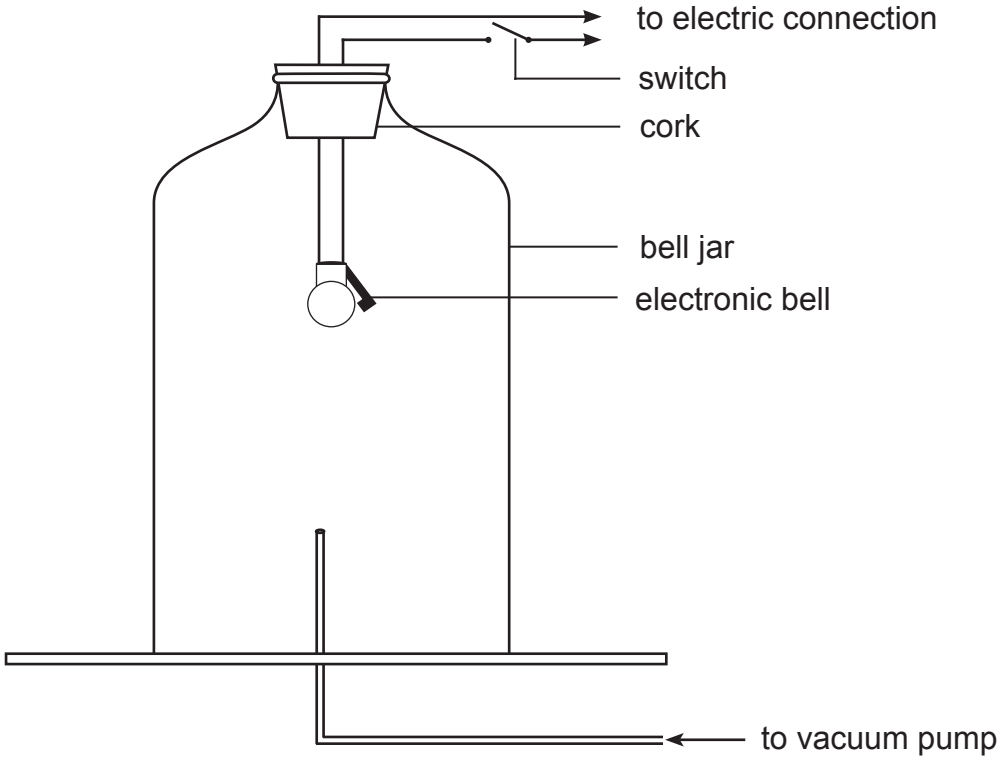
(c) Calculate the speed of the wave.

Speed = ... cm/s [3]

[6]

For Examiner's Use

12 The diagram shows the apparatus used to demonstrate how sound wave travels.



The air is pumped out of the bell jar to create a vacuum.

(a) Explain why sound cannot be heard in a vacuum.

.....

..... [2]

(b) Human and animals hear sound of different frequency range.

(i) State the range of audible frequency for human.

..... [2]

(ii) Describe how the ear receives sound wave.

.....

.....

.....

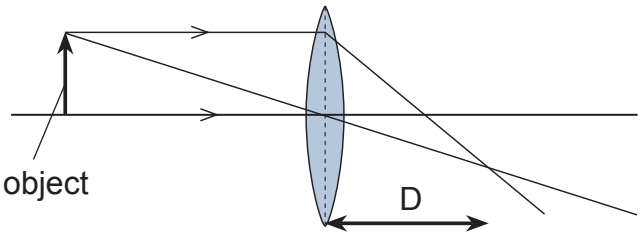
..... [2]

[6]

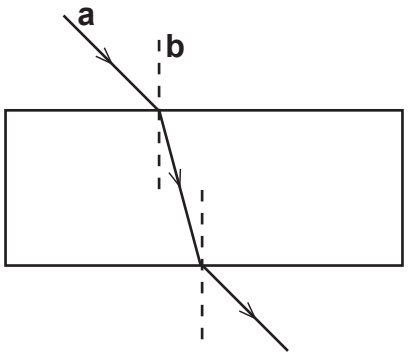
For Examiner's Use

13 Light is refracted when travelling through different media.
Diagram **A** and **B** show different cases of refraction.

A



B



(a) In diagram **B**, give the name of the ray labelled **a**.

..... [1]

(b) Describe **two** properties of the image formed in diagram **A**.

1 .....

.....

2 .....

..... [2]

(c) On diagram **A**, draw the image to indicate its position. [2]

(d) In diagram **B**, state the name of line **b**.

..... [1]

[6]

DATA SHEET
The Periodic Table of the Elements

Group I	Group II						Group III	Group IV	Group V	Group VI	Group VII	Group 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
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

Key

a
X
b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

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