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Name

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2NT

LOWER SECONDARY SCIENCE

SEMESTER ONE EXAMINATION

May 2019

Additional Materials:

Approved calculator, OTAS

1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Do not start reading the questions until you are told to do so.

Write your name, class, and index number on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

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

This paper consists of **Section A** and **Section B**.

Section A consists of multiple choice questions.

Answer **all** questions. For each question, there are four possible answers,

A, B, C and **D**. Choose the **one** you consider correct and record your

choice in soft pencil on the separate **OTAS** answer sheet.

FOR EXAMINER'S USE

Section	Marks
A	/ 30
B	/ 45
Total	/ 75

Section B consists of structured questions. Answer all questions on the lines provided.

INFORMATION FOR CANDIDATES

You are advised not to spend more than **30 minutes on Section A**

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

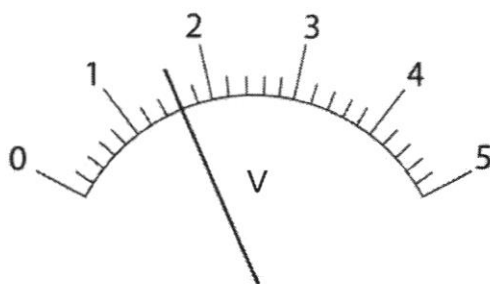
Candidates are reminded that **all** quantitative answers should include appropriate units.

Candidates are advised to show all their working in a clear and orderly manner.

SECTION A: Multiple Choice Questions (30 marks)

For each question, choose the most suitable answer and shade with a 2B pencil the correct answer (**A**, **B**, **C** or **D**) on the OTAS given.

- 1 The diagram below shows a ammeter



Which of the following shows the correct reading of this lab apparatus?

- A** 1.3 A
- B** 1.3 V
- C** 1.6 A
- D** 1.6 V

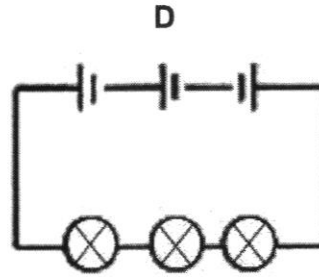
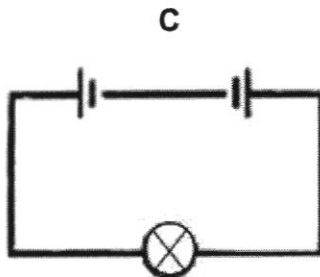
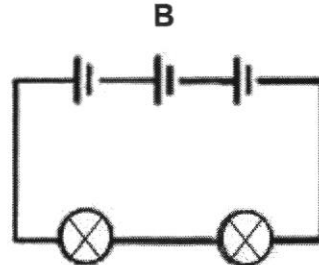
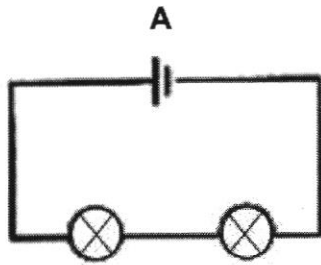
- 2 Which of the following shows the correct units of resistance and voltage?

	Resistance	Voltage
A	Ohm	Volt
B	Ohm	Ampere
C	Ampere	Volt
D	Volt	Ohm

- 3 What is the purpose of adding a resistor to an electrical circuit?

- A** To create a series circuit.
- B** To develop a parallel current.
- C** To reduce the flow of current.
- D** To increase the flow of voltage.

- 4 Which of the following circuit arrangements produces the brightest bulb(s)?



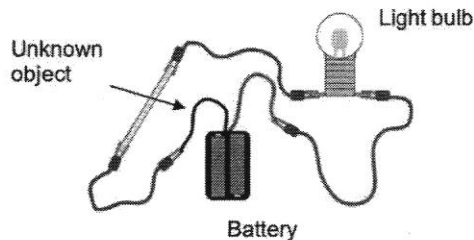
- 5 What is an advantage of connecting electrical fans in parallel in the classrooms?

- A** All electrical fans can be switched on with one switch
- B** Lower power will be consumed.
- C** Overloading of a plug can be prevented.
- D** The electrical fans can be switched on or off individually.

- 6 Which of the following is a good practice of using electricity?

- A** continue to use electrical appliances when the wires of the cord is exposed
- B** do regular check-up and repair or replace damaged electrical appliances
- C** pull the cord to disconnect a plug from a socket while the switch is still on
- D** switch off the lights using wet hands after we use the toilet

- 7 The diagram below shows an experimental set-up.



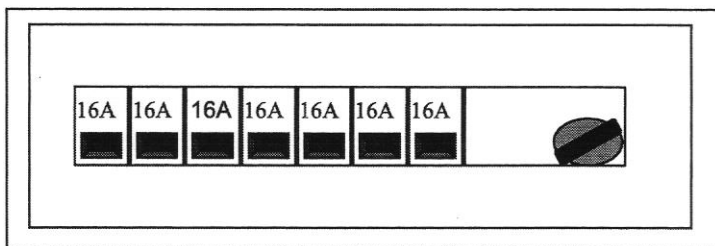
Five different objects are used to connect to the set-up. The five objects tested are made up of iron, glass, rubber, aluminium and steel.

How many objects will light up the bulb?

- A 2
 - B 3
 - C 4
 - D 5
- 8 "An electric shock is felt when _____."

Which of the following correctly fills in the blank above?

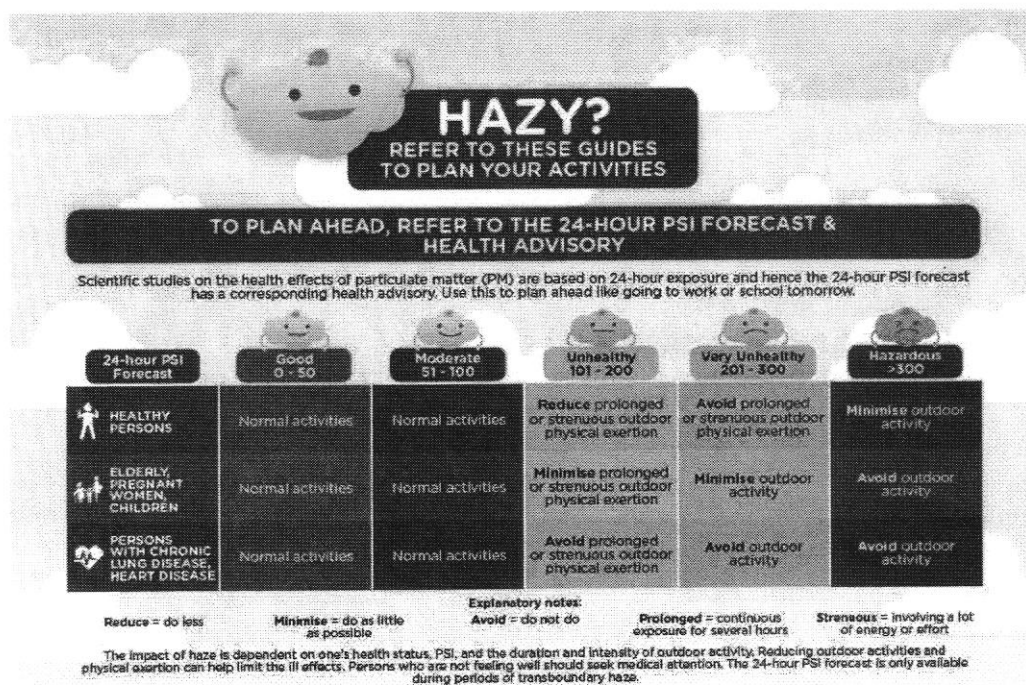
- A electric current flows through our body
 - B electric current flows out from the earth
 - C electric current flows straight into the earth
 - D electric current flows through an electrical appliance
- 9 The diagram shows an electrical safety feature.



What is the name of the above electrical safety feature?

- A fuse
- B resistor
- C main switch
- D miniature circuit breaker

For Questions 10 and 11, refer to the poster shown below from the national website on haze.



10 The term *PSI* is used many times in the poster.

What does *PSI* refer to?

- A Pollutant Standards Index
- B Pollution and Smell Index
- C Pollution and Soot Index
- D Public Standards Index

11 Aaron wishes to spend time with his friends on a day when the *PSI* is 167. He recalls that one of his friends had a heart attack recently.

Based on the guidelines in the poster, which of the activities can Aaron and his friends do on that day?

- A Enjoy a game of soccer for three hours at an open field and play rugby for another two hours.
- B Have a picnic at the park for two hours and watch a movie after that.
- C Run a distance of 21 km followed by a dragon-boating competition.
- D Take photographs of planes at the beach for five hours followed by a game of beach volleyball.

12 Which effect is **not** due to air pollution?

- A asthma
- B food poisoning
- C irritating eye and nose
- D poor visibility

13 The list below shows some activities that produce pollutants.

- I lightning activity
- II combustion of fossil fuels
- III volcanic eruptions

Which of the activities produce sulfur dioxide?

- A I and II
- B I and III
- C II and III
- D I, II and III

14 Which of the following is an air pollutant?

- A carbon monoxide
- B nitrogen
- C oil
- D oxygen

15 The table gives the relative concentrations of polluting gases in the air in four different industrialised cities.

In which city are limestone buildings most threatened by air pollution?

	sulfur dioxide	carbon monoxide
A	17	23
B	32	30
C	38	11
D	45	21

16 Which of the following is a consequence of acid rain?

- A** Car drivers cannot see the surroundings clearly.
- B** Headache and breathlessness occur in human beings.
- C** Metal structures wear off and corrode.
- D** Surrounding temperatures increase sharply.

17 Which part of the cell contains genes which can be passed down from parents to their children?

- A** cell membrane
- B** cell wall
- C** cytoplasm
- D** nucleus

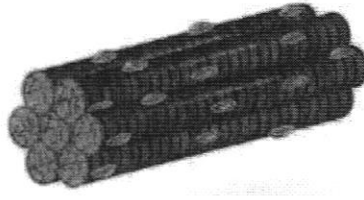
18 The instrument below is used to help us take a look at the features of an extremely small mosquito head.



What is the name of this instrument?

- A** magnifying glass
- B** microscope
- C** mirror
- D** retort stand

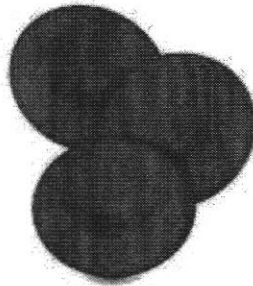
19 The diagram shows a type of tissue.



Which of the following describes the function of the tissue shown above?

- A It carries food substances to all parts of the body.
- B It carries water to all parts of the body.
- C It contains a lot of calcium and phosphates to keep our bones strong.
- D It expands and contracts to bring about movement.

Use the diagram of red blood cells below to answer questions 20 and 21.



20 Which structure cannot be found in red blood cells?

- A cell membrane
- B cytoplasm
- C haemoglobin
- D nucleus

21 "The part that allows red blood cell to carry oxygen is called _____."

Which of the following correctly fills in the blank above?

- A artery
- B haemoglobin
- C nucleus
- D platelets

22 Which of the following is an example of the process of heredity?

- A** Passing of characteristics of fur colour from adult tigers to their young.
- B** Passing of characteristics from children to their parents.
- C** Passing of diseases from adults to a friend's children.
- D** Passing of instructions from grandparents to grandchildren.

23 Which item in our diet is needed for the healthy growth of bones in the body?

- A** calcium
- B** carbohydrates
- C** fats
- D** fibre

24 What is the role of enzymes in the digestive system?

- A** to allow large pieces of food to be cut into smaller pieces
- B** to allow pieces of food to be transported from the stomach to the small intestine
- C** to break down food into smaller, simpler and soluble substances
- D** to kill bacteria in food

25 Where does physical digestion occur in the human body?

- A** gullet
- B** mouth
- C** large intestine
- D** liver

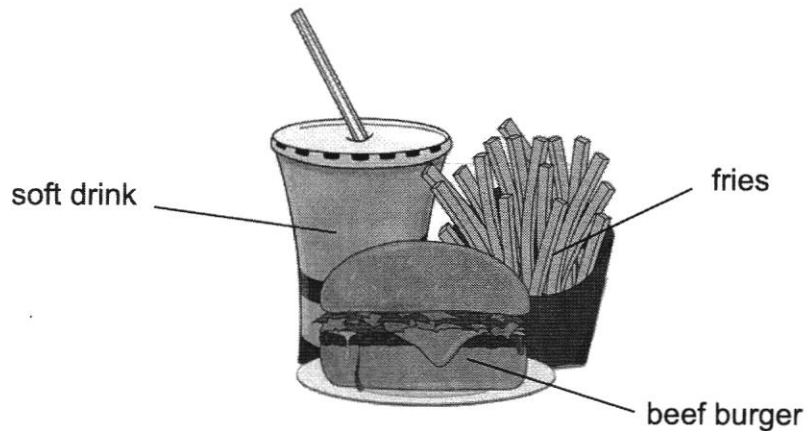
26 In which organ of the digestive system would food be completely digested?

- A** anus
- B** large intestine
- C** small intestine
- D** stomach

27 In which order does food travel through the digestive system?

- A Mouth → Oesophagus → Stomach → Intestines → Rectum
- B Mouth → Stomach → Intestines → Oesophagus → Rectum
- C Mouth → Stomach → Oesophagus → Intestines → Rectum
- D Oesophagus → Mouth → Stomach → Intestines → Rectum

28 Alan bought a beef burger set meal for his lunch.



Why is this **not** a balanced meal?

- A The meal has too little carbohydrates.
- B The meal has too little fats.
- C The meal has too little proteins.
- D The meal has too little vitamins and minerals.

29 Which one of the following produces acid that kills bacteria in food?

- A large intestine
- B oesophagus
- C small intestine
- D stomach

30 The table below shows the nutritional composition of some food.

food	energy/ kJ	protein/ g	fat / g	carbohydrate/ g	fibre /g
banana	466	1.5	0.4	27	4.9
candy bar	458	2.1	3.3	19	1.1
cucumber sandwich	1054	19	7.3	27	6.1
orange juice	163	0.1	0.0	9.4	0

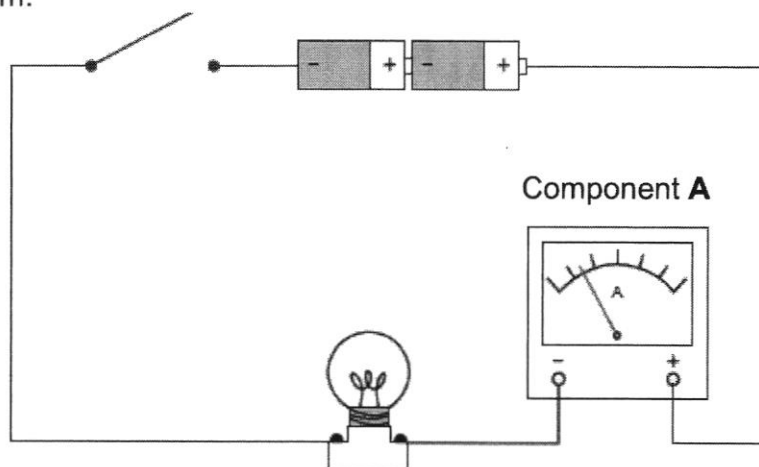
Which food would be most effective in preventing constipation?

- A** banana
- B** candy bar
- C** cucumber sandwich
- D** orange juice

--- END OF SECTION A ---

Section B [45 Marks]**Answer ALL questions in the spaces provided.**

1. The figure below shows how the different electrical components are arranged in a circuit diagram.



- (a) Draw the electric circuit diagram of the set up in the space provided.

[4]

- (b) Name and describe the use of component A.

Name:.....

Describe:.....

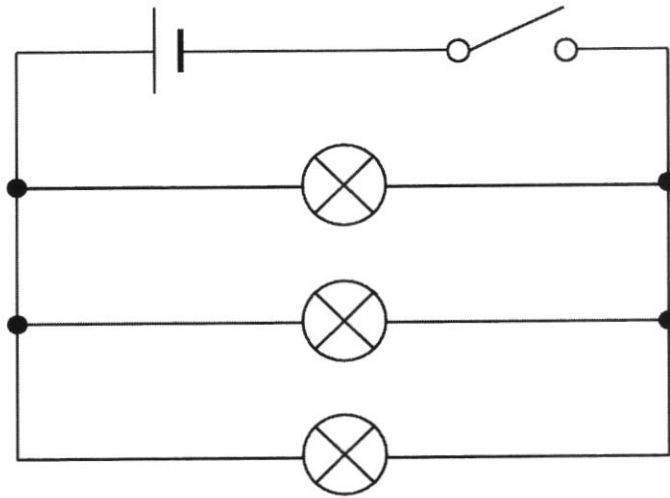
.....

[2]

- (c) In your electrical diagram in (a), draw the electrical component which can be used to determine the potential difference (voltage) of both the dry cells.

[1]

2. A pupil fitted three identical light bulbs in a circuit as shown. Study the diagram carefully and answer the following questions.



- (a) Are the light bulbs arranged in series or in parallel?

..... [1]

- (b) One of the bulbs is damaged.

Will the other bulbs light up?

..... [1]

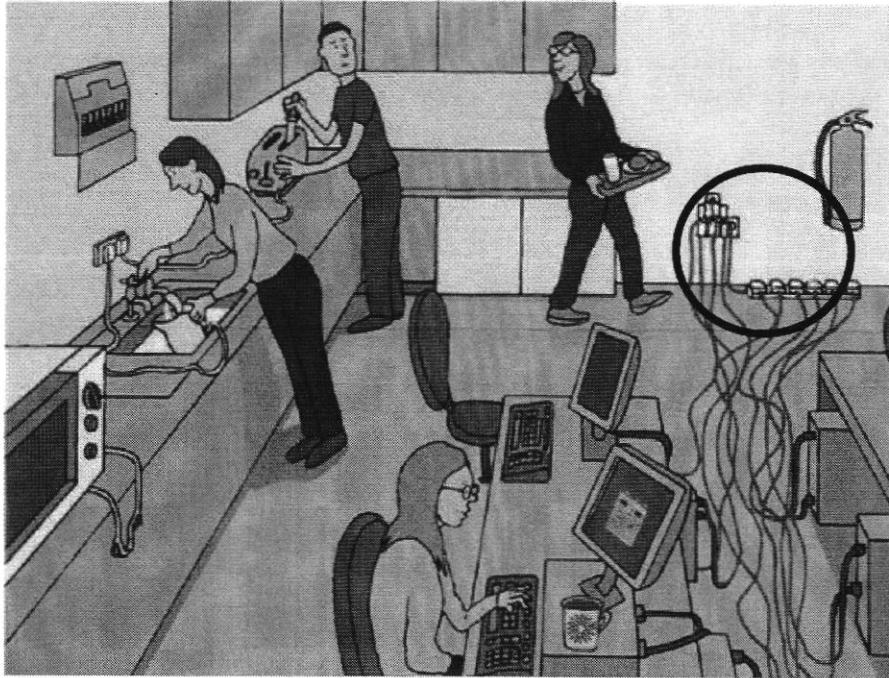
- (c) Explain your answer in part (c).

..... [1]

3. The use of electricity has improved the quality of our lives. Electricity can be harmful if it is not used properly. The figure below shows some electrical hazards. One of the hazards has been circled for you.

(a) Circle **two** other electrical hazards in the figure below.

[2]



(b) Explain the danger of the hazard which is circled for you.

.....

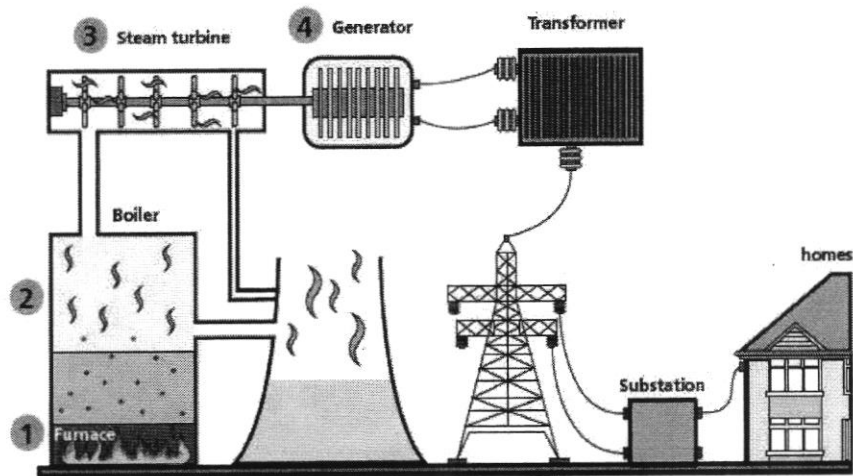
[1]

(c) Give a suggestion to prevent the electrical hazards in the figure above.

.....

[1]

4. The diagram below shows a coal-fired power station.

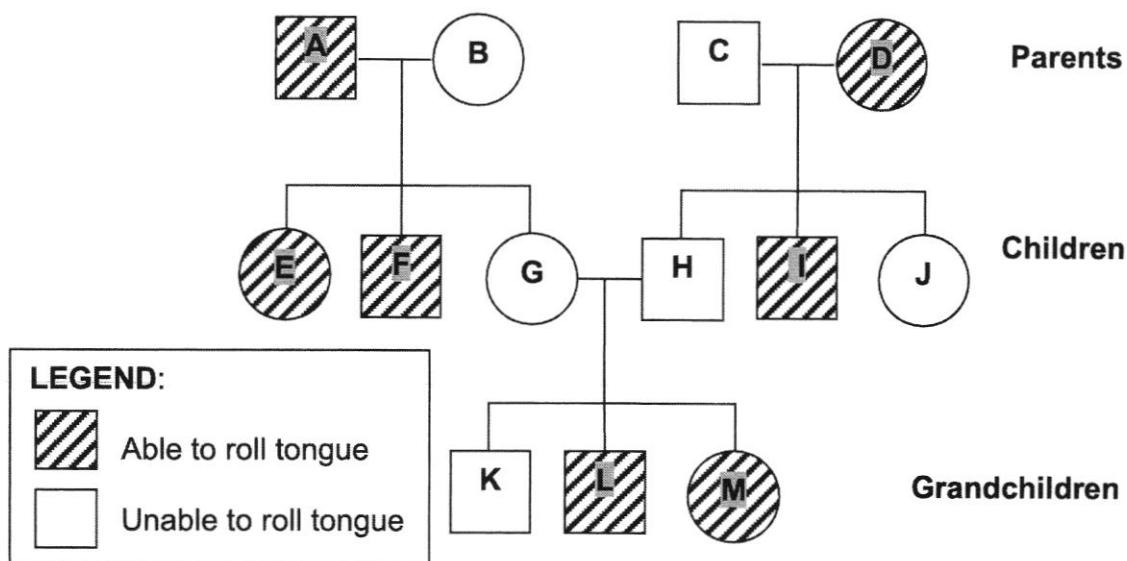


Complete the following energy conversions at each of the numbered sections of the power station.

[3]

Section of the power station	Energy Conversions
1. At furnace	Chemical energy →
2. At boiler	 → Kinetic energy
3. At steam turbine	Kinetic energy → Kinetic energy
4. At generator	Kinetic energy →

5. The following inheritance diagram shows whether 13 related people (**A, B, C, D, E, F, G, H, I, J, K, L** and **M**) are able to roll their tongue or unable to do so. Circles represent females, while squares represent males.



- (a) Which of **D**'s grandchildren are able to roll their tongues?

..... [1]

- (b) How many of **K**'s uncles and aunts are able to roll their tongues?

..... [1]

- (c) Fill in the blanks in the statement below to explain how tongue-rolling can be inherited. Some helping words are given in the box below.

..... [3]

characteristics	nucleus	cytoplasm	genes	heredity
-----------------	---------	-----------	-------	----------

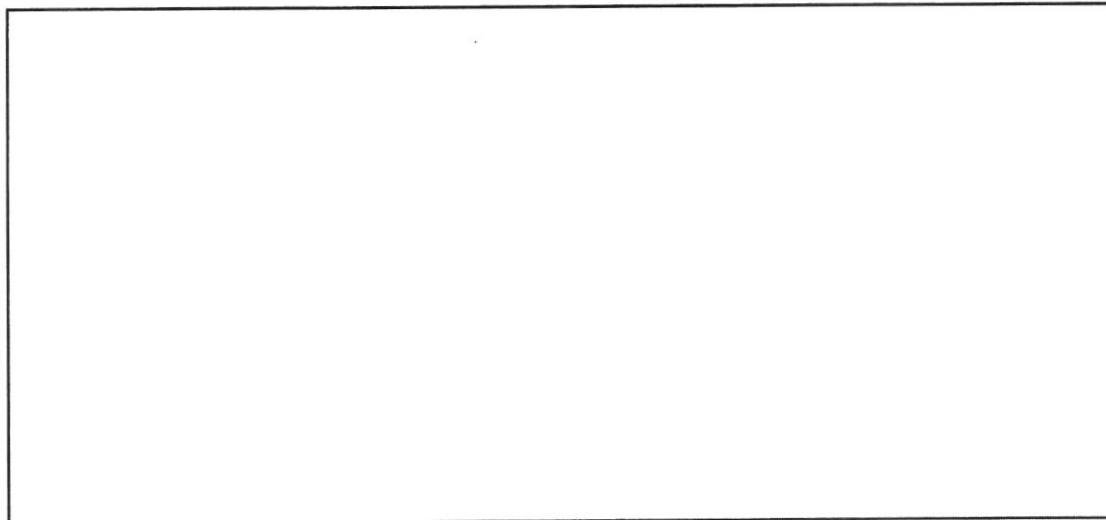
..... is the process where traits are passed on from parents to children. The genetic information is found in the inside the

6. Draw a diagram of a human cheek cell in the box below. Label the cell using the following words.

cytoplasm	cell membrane	nucleus
------------------	----------------------	----------------

You should use a pencil for your drawing.

[3]

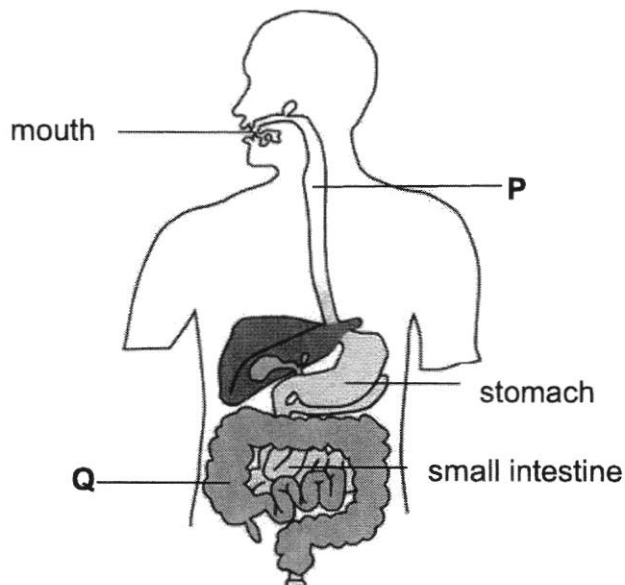


7. The function of some cell parts is found in the table below. Complete the table with the cell part.

[3]

part of the cell	function
	control all activities within the cell
	Allow some substances to move into or out of the cell
	jelly-like substance where chemical reactions take place.

8. The figure below shows the human digestive system.



(a) Name parts **P** and **Q**.

P: **Q**:

[2]

(b) State the function of the teeth and the rectum.

Teeth:

.....

Rectum:

.....

[2]

(c) Michael learnt that there are digestive juices in different parts of the digestive system. The presence of digestive juices helps in the breaking down of food.

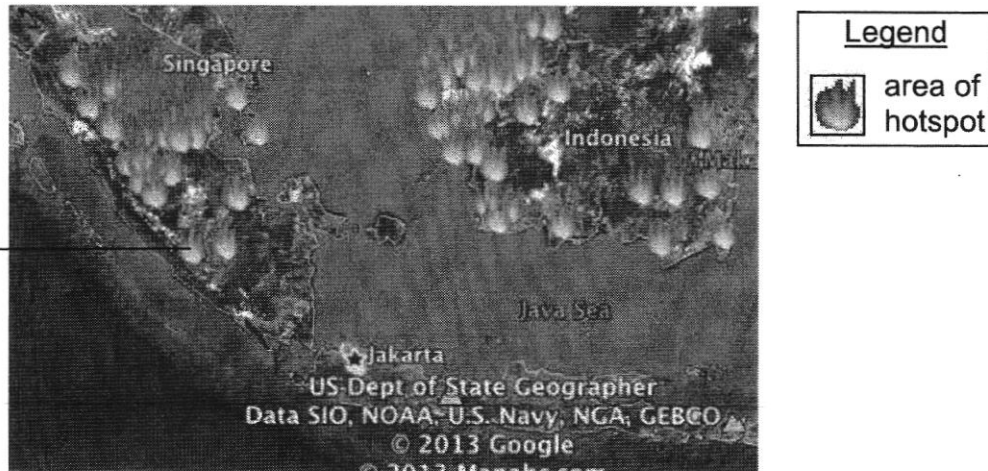
- (i)** Name the chemical substance found in digestive juices that is responsible for the digestion of food.

..... [1]

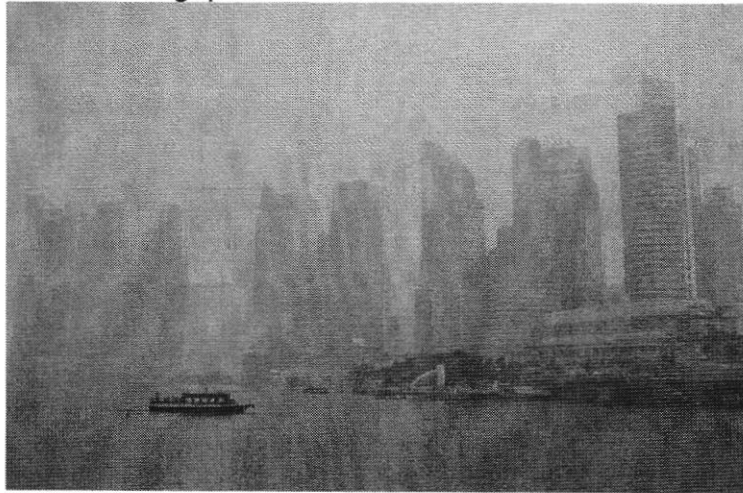
- (ii)** Explain why must food be digested into simpler, soluble molecules using the chemical substances in **(b)(i)**.

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

9. Hotspots are areas of intense heat, usually caused by fires. They can be seen using special equipment on airplanes. The figure below shows how many hotspots there were in a forest in Indonesia.



- (a) At the same time, Singapore experienced a change in air quality. The photo below shows what Singaporeans would have seen at that time.



- (i) State two reasons that could have led to so many hot spots in Indonesia at that time.

Reason 1:

.....

Reason 2:

.....

- (ii) State one air pollutant that is released into the air in Indonesia that caused the quality of air to change in Singapore, as shown in the photograph.

[1]

- (iii) Other than having trouble seeing and moving around, state one health problem that Singaporeans may have faced at that time.

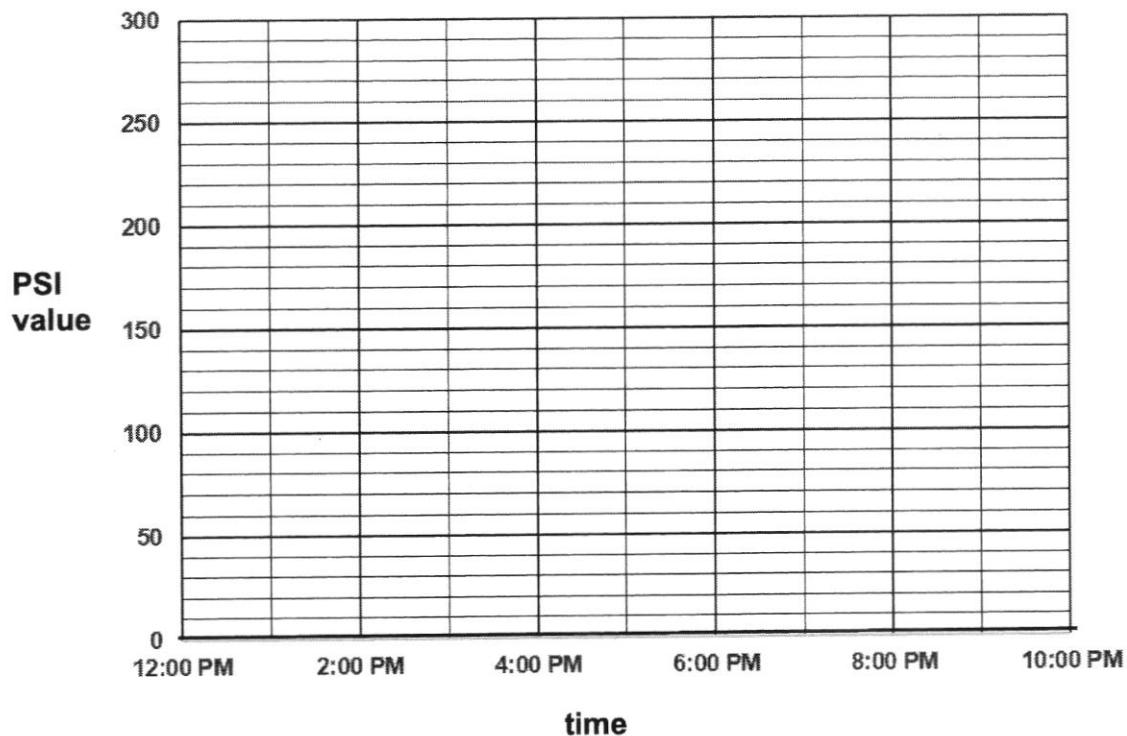
[1]

- (b) The table contains the PSI reading for a period of 12 hours in Singapore.

Time / hr	12:00	14:00	16:00	18:00	20:00	22:00
PSI value	50	100	150	250	150	50

- (i) Plot the data on the grid.
Join each point to the next point with a straight line.

[3]



[Turn Over]

- (ii) The table below shows the PSI value and the corresponding air quality descriptor.

PSI Value	Air Quality Descriptor
0 – 50	Good
51 – 100	Moderate
101 – 200	Unhealthy
201 – 300	Very Unhealthy
Above 300	Hazardous

From what time should a person begin to stay indoors as the air quality is unhealthy?

..... [1]

- (iii) Suggest two things people can do if they have to go outside when PSI values are high.

1:

2: [2]

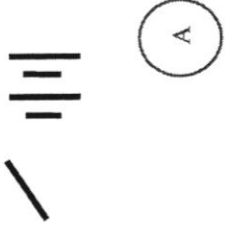
--- END OF SECTION B ---

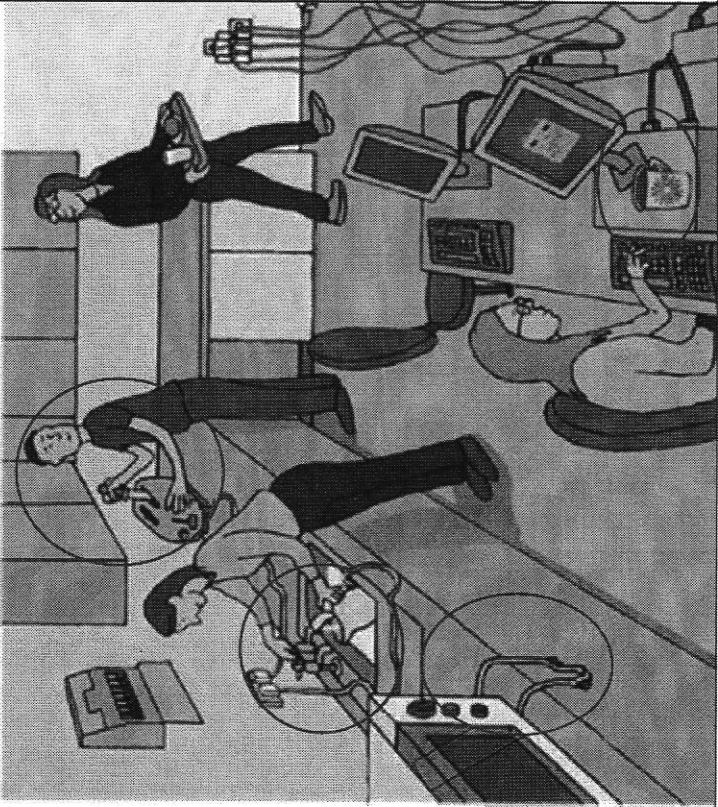
--- END OF PAPER ---

Section A: 30 MCQs (30 marks)

1.	D	9.	D	17.	D	25.	B
2.	A	10.	A	18.	B	26.	C
3.	C	11.	B	19.	D	27.	A
4.	B	12.	B	20.	D	28.	D
5.	D	13.	C	21.	B	29.	D
6.	B	14.	A	22.	A	30.	C
7.	B	15.	D	23.	A		
8.	A	16.	C	24.	C		

Section B:Answer all questions (35 marks)

Qn	Part	Answers	Mark allocated	Markers Feedback
1	a	 1m for ammeter 1m for bulb 1m for batteries 1m for connection	4	
	b	Ammeter Measure current	1	
	c	Draw <u>parallel</u> to the two dry cells,	1	

2	a	Parallel	1	
	b	Current has more than 1 path	1	
	c	Yes	1	
	d	Current is still able to flow to other bulbs	1	
	a		2	
	b	Electrical fire	1	

	c	Not to connect so many plugs in the socket To install more power points		
4		Heat energy Heat energy Electrical energy	1 1 1	
5	a	L and M	1	
	b	3	1	
	c	Heredity Genes Nucleus	1 1 1	
6		Draw a cell with • Nucleus • Cell membrane • Cytoplasm Minus 1 mark if not drawn well (sketchy lines, openings, not labelled properly)	1 1 1	

7		part of the cell	function		
		Nucleus	control all activities within the cell	1	
		cell membrane	Allow some substances to enter or leave the cell	1	
		cytoplasm	jelly-like substance where chemical reactions take place	1	
8	a	P: oesophagus or gullet Q: Large intestine 1m each (reject obvious spelling mistake)		2	

b	Teeth: to chew/ break up/ grind/ cut/ bite the food/ particles into smaller pieces Rectum: to store faeces/ undigested food	1 1	
c	Enzyme(s)	1	
d	To allow them to enter the blood stream and carried to all parts of our body Need to have both points	1 1	
9 ai	Burning of forests / setting fires to forest / slash and burn” + trees / forests ; , Forest fires due to hot weather [The actions must show separately that one of them is caused by nature (1m) while the other is caused by man (1m).]	1 1	

	aii	Soot and dust ;	1	
	aiii	Breathing difficulties / asthma	1	
	bi	1m for correctly plotted points 1m for joining the points with a straight line 1m for using ruler and pencil to draw the lines	1	
	bii	14:00 hrs / 2 p.m.	1	
	biii	• Wear a N95 mask • Stay in air-conditioned areas if possible • Avoid exercising outside • Any logical answer (any 2)	2	