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BARTLEY SECONDARY SCHOOL

END-OF-YEAR EXAMINATIONS

LOWER SECONDARY SCIENCE

Sec 1 Normal (Academic)

13 October 2016

2 hours

Candidates answer on the Question Paper.
Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write your class, register number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Section A

There are **thirty** questions in this section. 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 Answer Sheet.

Section B and Section C

Answer **all** the questions in the spaces provided.
The number of marks is given in brackets [] at the end of each question or part question.
A copy of the Periodic Table is printed on page 24.

At the end of the examination, submit this question paper and the Multiple Choice Answer Sheet separately

For Examiner's Use	
Section A	
Section B	
Section C	
Total	

This document consists of **23** printed pages and **1** blank page.

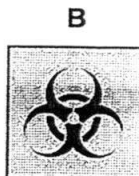
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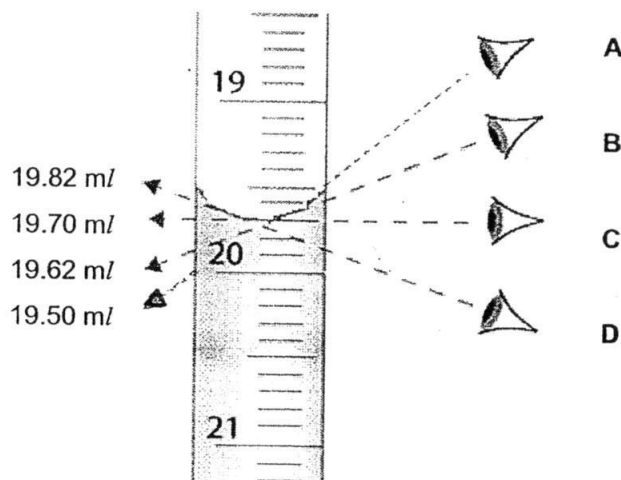
Section A (30 marks)Answer **all** questions.

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 Answer Sheet.

- 1 Which hazard symbol should be used to label a bottle of corrosive liquid chemical?



- 2 Where should the position of the eye be in order to obtain a reading without parallax error?



- 3 Which row represents the correct S.I. unit for the measured quantity?

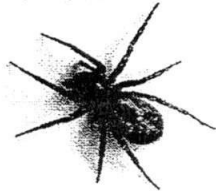
	quantity	S.I. unit
A	energy	kJ
B	force	N
C	mass	g
D	pressure	N/cm ²

- 4 Mary carried out the experiment in the Science laboratory during Science lesson.

Which was the **incorrect** practice while she was doing the experiment?

- A** She brought the test tube closely to her nose to smell the gas produced.
B She disposed off the excess chemicals instead of pouring them back into the bottle.
C She read all instructions carefully before carrying out the experiment.
D She wore goggles when heating the chemicals.

- 8 The diagram below shows two organisms, a spider and a beetle



spider



beetle

Which characteristic is **not** true for spider and beetle?

	spider	beetle
A	has external skeleton	has external skeleton
B	has more than three pairs of legs	has more than three pairs of legs
C	has no backbone	has no backbone
D	has two body parts	has three body parts

- 9 What is the function of red blood cells?

- A kill bacteria and fight against infection
- B transmit nerve signals to the brain
- C transport nutrients to the body cells
- D transport oxygen around the body

- 10 Which statement correctly describes why the heart is an organ?

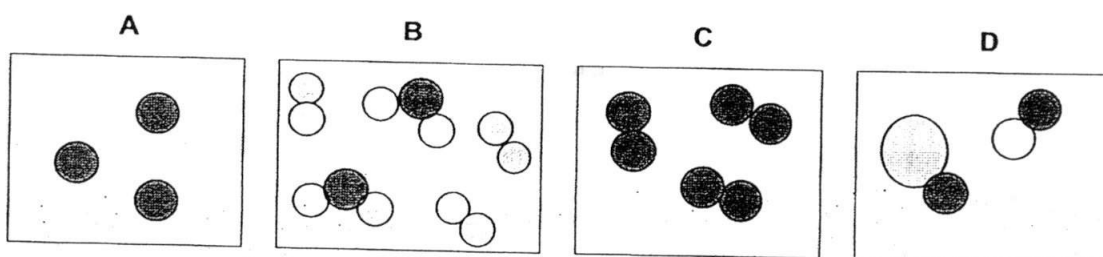
- A It is made up of different types of cells performing the same job.
- B It is made up of different types of organelles performing the same job.
- C It is made up of organ systems working together to perform a function.
- D It is made up of several tissues working together to perform a function.

- 11 Which row in the table shows the sequence of organisation from the simplest to the most complex?

	simplest → most complex			
A	cells	organs	organ systems	tissues
B	cells	tissues	organs	organ systems
C	organ systems	organs	tissues	cells
D	tissues	cells	organs	organ systems

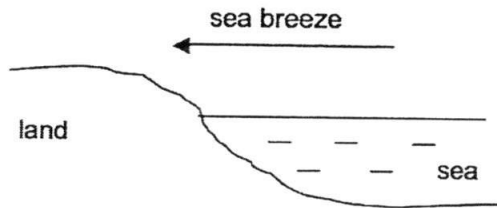
- 12 Which statement correctly describes the properties of a compound?
- A A compound is a substance which is made up of two or more different elements chemically combined together.
 - B The components of a compound can be separated by physical method.
 - C The elements that make up a compound are not combined in fixed proportion.
 - D The properties of a compound are usually the same as the substances that it is made up of.
- 13 Which physical property does **not** describe metals?
- A They are brittle.
 - B They are good conductors of heat.
 - C They are shiny in appearance
 - D They have relatively high boiling point except mercury.
- 14 Brass is an alloy of copper and zinc.
- Why is an alloy considered as a mixture?
- A An alloy consists of only metals.
 - B An alloy consists of only non-metals.
 - C An alloy is made from its constituents through a chemical reaction.
 - D An alloy need not be made from its constituents with a fixed composition.

- 15 Which diagram best represents a mixture of element and compound?

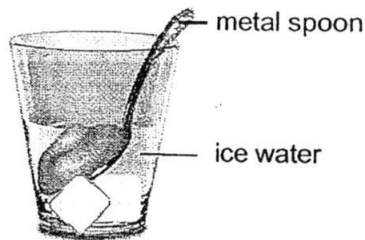


- 16 Which is the most important physical property to consider when using steel to make bridges?
- A electrical conductivity
 - B hardness
 - C melting point
 - D strength

- 17 Why is the sea breeze blown during the day as shown below?



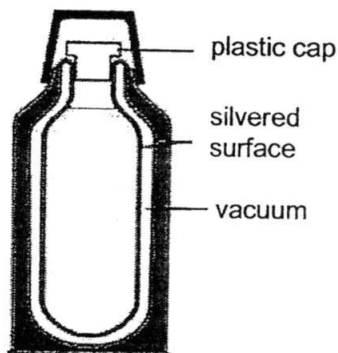
- A During the day, hot air above the sea moves towards the land as it is cooler there.
- B During the day, hot air from the sea moves up into the sky.
- C During the day, the land heats up faster than the sea.
- D During the day, the sea heats up faster than the land.
- 18 A metal spoon at room temperature is cold to touch if it is placed into a glass of ice water as shown below.



Which statement best describes the transfer of heat energy between the metal spoon and the glass of ice water?

- A Coolness is transferred from the ice water to the metal spoon.
- B Thermal energy is produced by the metal spoon.
- C Thermal energy is transferred from the ice water to the metal spoon.
- D Thermal energy is transferred from the metal spoon to the ice water.
- 19 In cold countries, animals usually grow thicker layers of fur in winter to keep themselves warm.
- Which statement best explains why?
- A Fur is a poor conductor of heat.
- B Fur is a good conductor of heat.
- C Thicker fur traps more air which is a good conductor of heat.
- D Thicker fur traps more air which is a poor conductor of heat.

- 20 A vacuum flask as shown below is used to store hot liquids.



What is the purpose of the vacuum in the flask?

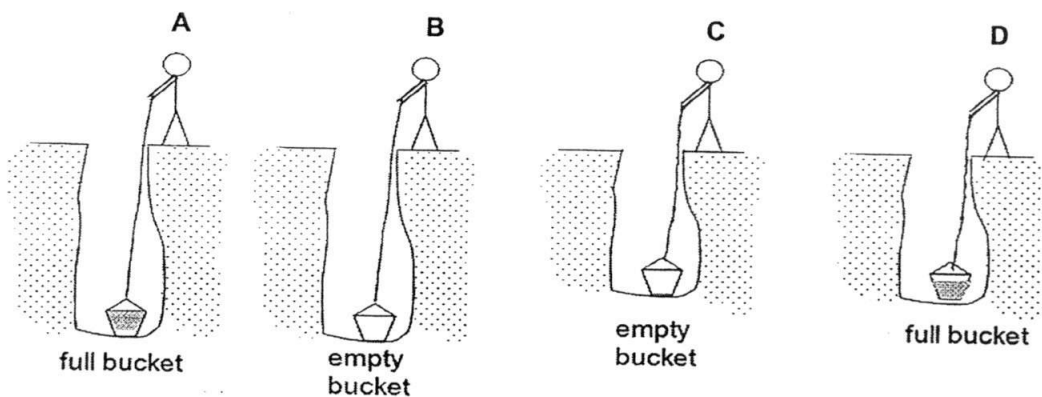
- A It reduces heat loss by conduction and convection only.
 B It reduces heat loss by conduction, convection and radiation.
 C It reduces heat loss by convection only.
 D It reduces heat loss by radiation only.
- 21 An astronaut with a mass of 80 kg on Earth can jump 1 m high off the surface of the Earth. Which reason explains why he is able to jump higher on the moon?
- A He has lesser mass on the moon than on the Earth.
 B He has lesser weight on the moon than on the Earth.
 C He has more mass on the moon than on the Earth.
 D He has more weight on the moon than on the Earth.
- 22 The picture below shows a girl holding a balloon above her head.



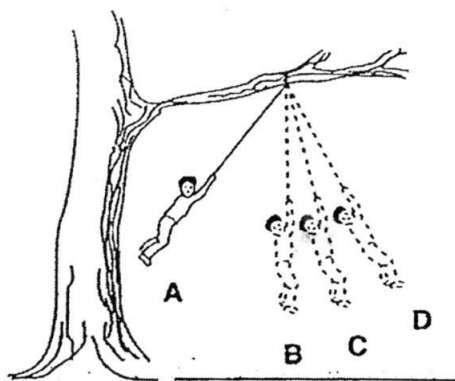
What type of force is acting on her hairs?

- A electrostatic force
 B frictional force
 C gravitational force
 D magnetic force

- 27 Four men each have to lift a bucket from the bottom of a well.
Which man does the most work?



- 28 Which source of energy is non-renewable?
- | | | | |
|---|----------------|---|--------------|
| A | bio-mass fuels | B | fossil fuels |
| C | solar energy | D | wind energy |
- 29 A boy swings on a rope tied to a branch of a tree.
At which position is the student's kinetic energy the greatest?

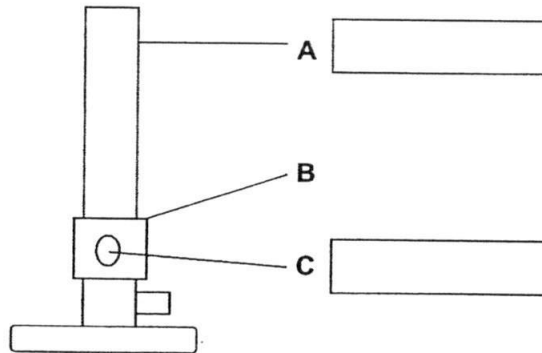


- 30 Which statement about energy is **false**?
- | | |
|---|--|
| A | Energy can be changed from one form to another. |
| B | Energy can neither be created nor destroyed. |
| C | Energy has mass and occupies space. |
| D | There are renewable and non-renewable sources of energy. |

Section B [40 marks]

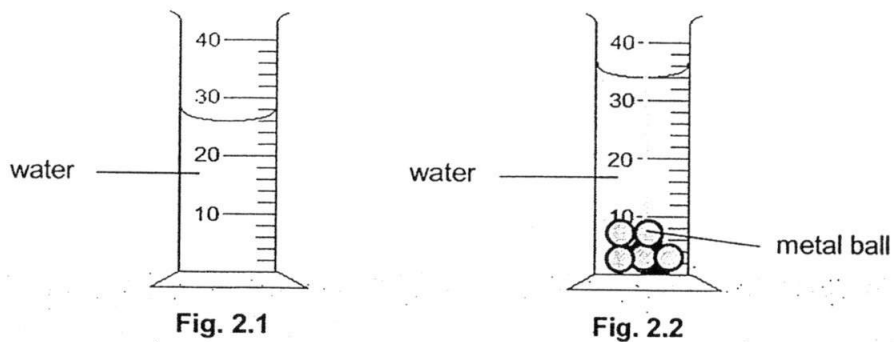
Answer **all** the questions in the spaces provided.

B1 The diagram below shows a Bunsen burner.



- (a) Label parts **A** and **C** in the diagram above. [2]
- (b) State the function of part **B** of a Bunsen burner. [1]
- (c) Give a reason for using a non-luminous flame for heating in an experiment. [1]

B2 (a) Judy wanted to conduct an experiment to find the density of the metal ball. Fig. 2.1 shows the amount of water she filled in a measuring cylinder and Fig. 2.2 shows five identical metal balls being submerged in the measuring cylinder.



- (i) What is the volume of water in the measuring cylinder shown in Fig. 2.1? [1]
- (ii) What is the volume of one metal ball? Show your working clearly.

volume of one metal ball = cm³ [1]

- (iii) Given that the mass of a metal ball is 12.0 g, calculate the density of the metal ball. Show your working clearly.

density of the metal ball =g/cm³ [1]

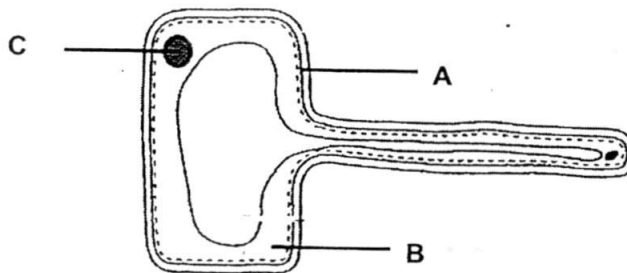
- (b) A pair of Vernier calipers is used to measure the diameter of a metal cylinder. The reading on the Vernier calipers is shown below.



What is the diameter of the metal cylinder?

..... [1]

- B3 The diagram below shows a cell.



- (a) Name the parts labelled A and B.

A:

B:

[2]

- (b) Is the cell above a plant cell or an animal cell? Give a reason for your answer.

..... [1]

- (c) State the function of the part labelled C.

..... [1]

- B4 (a)** The table below gives the information about two substances **Q** and **R**.

Identify the nature (element, mixture or compound) of the substances and write your answer in the table.

substance	observation	element / mixture / compound
Q	A pale yellow solid which is split into silver and bromine upon reaction with light.	
R	A colorless liquid which separates into water and sugar upon evaporation.	

[2]

- (b)** The following statements describe properties of two substances.

From the list of substances given below, choose the one that is best described by each statement.

steel sea water magnesium carbon dioxide air

- (i) a mixture of elements and compounds

.....

- (ii) a compound which exists as a gas at room temperature

..... [2]

- B5** Refer to the Periodic Table on page 23 and answer the following questions.

- (a) Write the symbol of an element which is in Period 4 and same group as Ba.

..... [1]

- (b) Write the symbol of one element which is a non-metal in Period 5.

..... [1]

- (c) Study the chemical formula of the compound shown below.



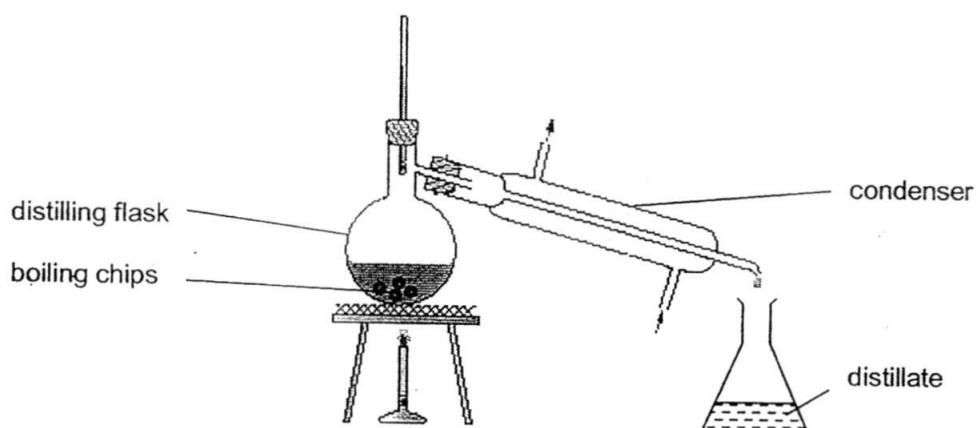
- (i) Name the elements in the compound.

..... [1]

- (ii) Which of the elements in the compound is able to conduct electricity?

..... [1]

B6 The set-up shows the technique used to separate a pure liquid from a solid-liquid mixture.



- (a) Name the technique of separation shown above. _____ [1]
- (b) Why are boiling chips added into the flask? _____ [1]
- (c) What are the **two** processes involved in the above technique? _____ [1]

B7 (a) Table 7.1 lists some situations that involved forces.

Identify the type of force: electrostatic force, frictional force, gravitational force or magnetic force, acting in each situation described below. Write your answers in Table 7.1.

Table 7.1

	situation	type of force
(i)	Maglev train floating on its track when moving.	
(ii)	Satellite orbiting around the Earth.	

[2]

(b) State one effect of forces for each of the following situations.

- (i) A boy squeezing a piece of sponge in his hand. _____ [1]
- (ii) A footballer kicks a rolling soccer ball in the field. _____ [1]

B8 (a) Fig. 8.1 shows a hydroelectric power station.

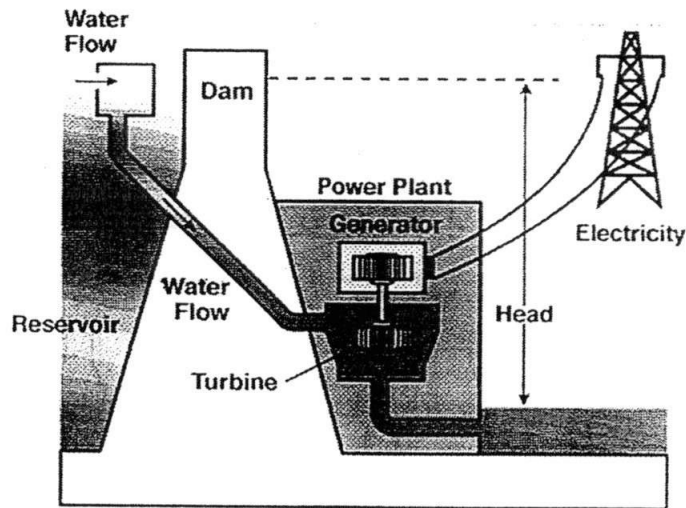
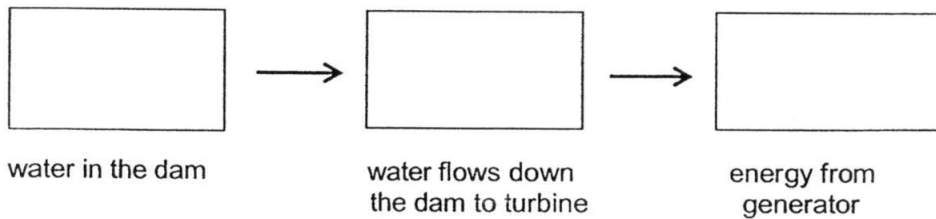


Fig. 8.1

(i) Is the energy source in the power station shown above renewable or non-renewable?

[1]

(ii) Describe the energy changes involved in the hydroelectric power station in Fig. 8.1.

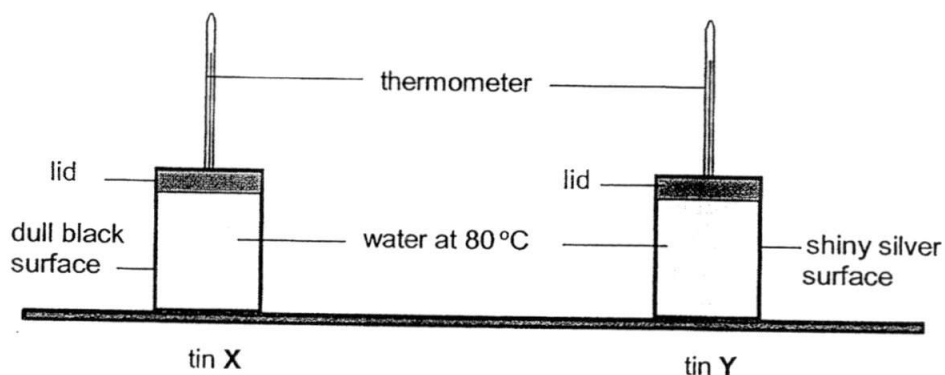


[2]

(iii) State one disadvantage of using the source of energy shown above.

[1]

- (b) Alice wanted to find out if the nature of a surface of an object affects the rate of heat transfer. She filled two identical metal tins X and Y with same amount of hot water at 80 °C as shown below. She left the tins in the room for 15 minutes and recorded the temperatures of the water in both tins.



- (i) After 15 minutes, the water in which tin, X or Y, would be cooler? [1]
-
- (ii) State one possible reason for your answer in b(i). [1]
-
-
- (iii) Name the process of heat transferred shown in this experiment. [1]
-

- B9 (a) A lady carries a baby to the supermarket. She pushes a trolley with a force of 200 N. It moves through a distance of 8 m.



- (i) What is the work done by the lady on the trolley? Show your workings clearly.

work done on the trolley = Nm [1]

(ii) Explain why there is work done on the trolley.

_____ [1]

(iii) Is there work done on the baby by the 200 N pushing force? Give a reason.

 _____ [1]

(b) The diagram below shows a boy riding on a bicycle. The total mass of the boy and the bicycle is 90 kg.



(i) Assuming the gravitational field strength of Earth is 10 N/kg, what is the combined weight of the boy and his bicycle?

combined weight =N [1]

(ii) The total contact area between the tyres and the ground is 25 cm².





What is the pressure exerted on the ground due to their combined weight?
 Show your workings clearly.

pressure exerted on the ground =N/cm² [2]

Section C (30 marks)

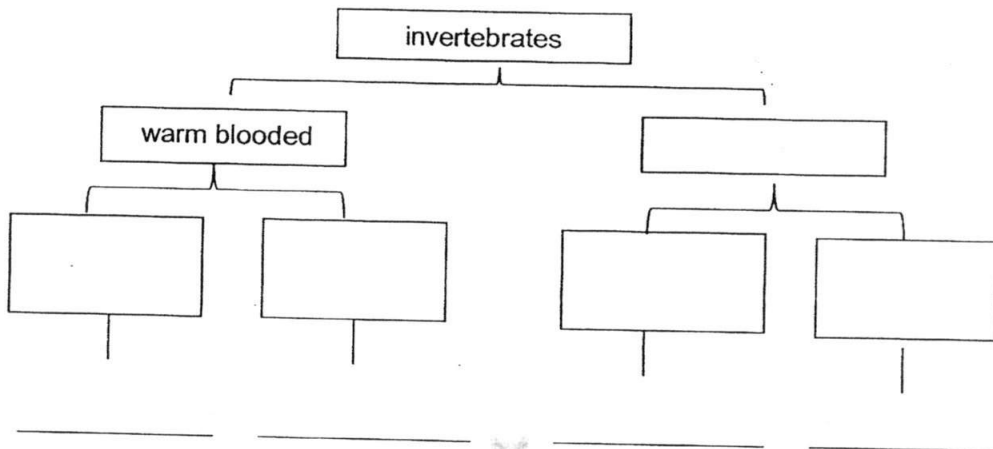
Answer **all** the questions in the spaces provided.

C1 (a) Create a dichotomous key to classify the animals shown below.

			
parrot	crocodile	frog	whale

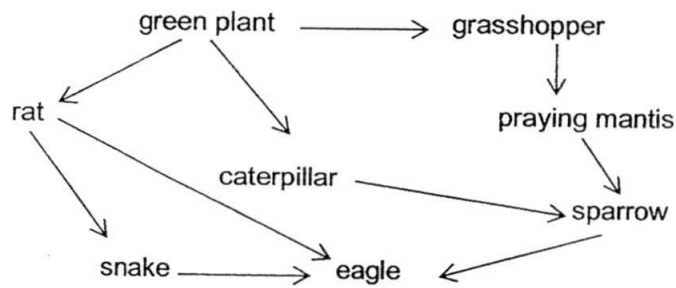
Use the features or characteristics shown in the table below to help you complete the dichotomous key and identify the animals.

cold blooded	with hair	no hair
with dry scale	with moist skin	warm blooded



[4]

(b) The diagram below shows a food web.

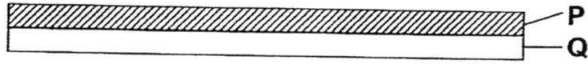


- (i) Identify the producers in the food web above and explain how a producer obtains its food.

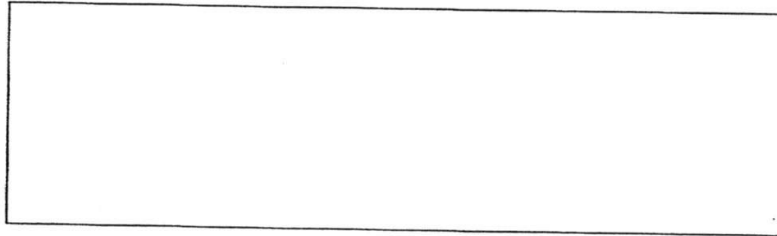
 _____ [2]
- (ii) Write the longest food chain found in the above food web.

 _____ [1]
- (iii) Name **two** primary consumers from the food web above.
 _____ [1]
- (iv) What is the relationship between the rat and the snake shown in the food web above?
 _____ [1]
- (v) In a particular year, all the sparrows were killed by a disease.
 Describe what will happen to the eagle population.
 _____ [1]

- C2 (a) The diagram below shows a bimetallic strip which is made up of metals P and Q. Metal P expands more than Q when heated.

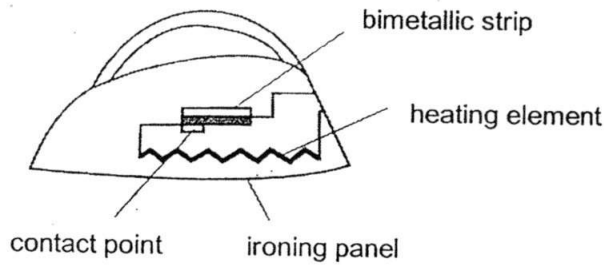


Draw and label in the box below, how the bimetallic strip would look like after being heated up.



[1]

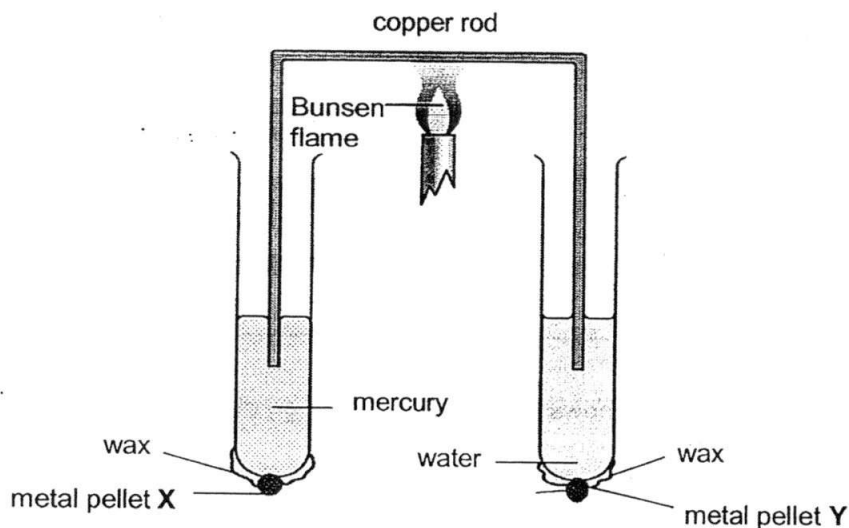
- (b) The diagram below shows the electric circuit in an electric iron.



- (i) What is the purpose of installing a bimetallic strip in the electric iron?
 [1]
- (ii) What will happen to the bimetallic strip if the temperature of the iron gets too high?
 [1]
- (iii) Why is the ironing panel made of metal?
 [1]
- (iv) Suggest a material that is suitable for making the handle of the electric iron. Explain.

 [2]

- (c) The diagram below shows two test tubes filled with equal volumes of water and mercury. A metal pellet is attached to the bottom of each test tube using wax. The two ends of a thin copper rod are dipped into the liquids. The middle of the copper rod is then heated with a Bunsen flame until one of the metal pellets drops.



- (i) Which metal pellet, X or Y, will drop first?

..... [1]

- (ii) Explain your answer in (i).

.....

 [2]

- (iii) Name the process by which heat is transferred through the thin copper rod.

..... [1]

- C3 (a) Jason and Alex cannot agree on certain terms. Jason states that the cup of milo that he has prepared is a solution, whereas Alex states that the milo is a suspension.

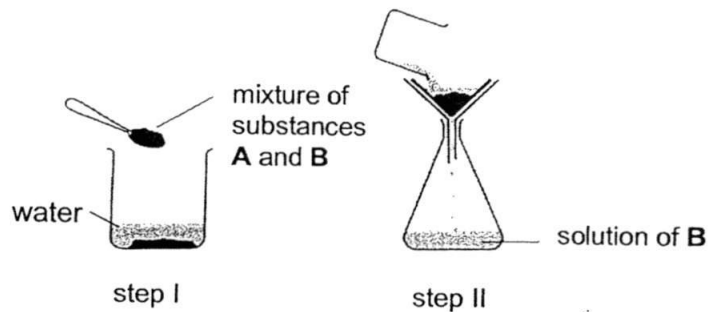
(i) Who is correct?

_____ [1]

(ii) Give a reason to support your answer in (a)(i).

_____ [1]

- (b) Two unknown solid substances **A** and **B** are mixed together. Only substance **B** is soluble in water. The diagrams below show the steps that a student carries out.



(i) Why is step II necessary in this experiment?

_____ [1]

(ii) Which substance is collected as a residue?

_____ [1]

(iii) State **two** ways to increase the rate of dissolving substance **B** in the beaker of water.

_____ [2]

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DATA SHEET
The Periodic Table of the Elements

Group		I	II	III	IV	V	VI	VII	0
		1 H Hydrogen 1							
7	9	Li Lithium 3	Be Beryllium 4						He Helium 2
11	12	Na Sodium 11	Mg Magnesium 12						Ne Neon 10
19	20	K Potassium 19	Ca Calcium 20	Sc Scandium 21	Ti Titanium 22	V Vanadium 23	Cr Chromium 24	Mn Manganese 25	Fe Iron 26
37	38	Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44
55	56	Cs Cesium 55	Ba Barium 56	La Lanthanum 57	Hf Hafnium 72	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76
87	88	Fr Francium 87	Ra Radium 88	Ac Actinium 89					
					59	60	61	62	63
					64	65	66	67	68
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					84	85	86	87	88
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					669	670	671	672	673
					674	675	676	677	678
					679	680	681	682	683
					684	685	686	687	688
					689	690	691	692	693
					694	695	696	697	698
					699	700	701	702	703
					704	705	706	707	708
					709	710	711	712	713
					714	715	716	717	718
					719	720	721	722	723
					724	725	726	727	728
					729	730	731	732	733
					734	735	736	737	738
					739	740	741	742	743
					744	745	746	747	748
					749	750	751	752	753
					754	755	756	757	758
					759	760	761	762	763
					764	765	766	767	768
					769	770	771	772	773
					774	775	776	777	778
					779	780	781	782	783
					784	785	786	787	788
					789	790	791	792	793
					794	795	796	797	798
					799	800	801		

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Marking scheme

Section A: (30 marks)

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

Section B: (40 marks)

B1	(a)	A – barrel	C -- air-hole	1,1
	(b)	Function of B – To control the size of the air-hole. OR To control the amount of air from entering		1
	(c)	It does not produce soot / It is hotter.		1
B2	(a)	(i)	26 cm ³	1
		(ii)	34-26 = 8 cm ³ 8 / 5 = 1.6 cm ³	1
		(iii)	Density = Mass / volume 12.0 / 1.6 = 7.5 g/cm ³	1
	(b)	1.85 cm		1
B3	(a)	A – cell membrane B -- cytoplasm		1 1 1
	(b)	Plant cell -- as it has cell wall / it has one large centralised vacuole. (no mark awarded if there is no/wrong reason.		1
	(c)	To control all activities in the cell / Responsible for reproduction (any 1)		1
B4	(a)	Q – compound R – mixture		2
	(b)	(i)	air / sea water	1
		(ii)	carbon dioxide	1

B5	(a)		Ca / Calcium	1
	(b)		Te / I / Xe (any 1)	1
	(c)		sodium, hydrogen, sulfur and oxygen (all correct 1 m)	1
	(d)		Na (sodium)	1

B6	(a)		simple distillation	1
	(b)		To spread the heat and ensure smooth boiling.	1
	(c)		evaporation / boiling and condensation	1

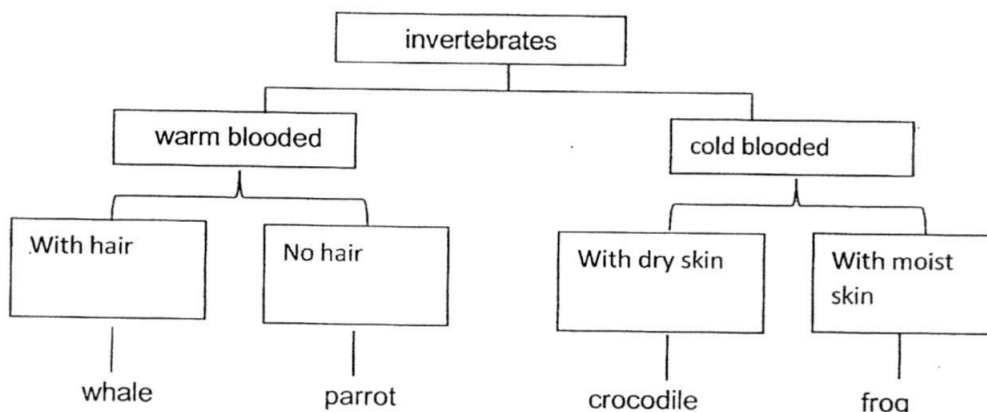
B7	(a)	(i)	magnetic force	1
		(ii)	gravitational force	1
	(b)	(i)	change the shape / change the size of sponge. (any one)	1
		(ii)	Change the direction of the soccer ball. Change the speed of the soccer ball. (any one) Stop the soccer ball from rolling.	1

B8	(a)	(i)	Renewable source of energy	1
		(ii)	gravitational potential energy \rightarrow kinetic energy \rightarrow electrical energy [1 m for 1 st conversion 1 m for 2 nd conversion]	1 1
		(iii)	disadvantage <ul style="list-style-type: none"> • Large area of land is required to build a dam. (any 1) • High cost to build a dam • Need constant rain fall to collect water • Building dam destroy wildlife habitats • During the construction of hydroelectric dams, the damming of the river can cause extensive flooding in large areas of forest, wildlife habitats and farmland. • Ecosystems around the hydroelectric power stations are greatly affected. • The dams prevent the flow of sediments and nutrients down rivers, 	1
	(b)	(i)	Tin X	1
		(ii)	A dull black surface <u>radiates heat away</u> (lose heat by radiation) <u>faster than that of the shiny silvery surface.</u>	1

		(iii)	radiation	1
B9	(a)	(i)	Work done = force x distance moved = 200 x 8 = 1600 Nm	1
		(ii)	The trolley <u>moves in the same direction as the force</u> when the force is acting on the trolley.	1
		(iii)	No, as the 200 N pushing force does not act on the baby.	1

	(b)	(i)	90 x 10 = 900 N	1
		(ii)	Pressure = force / area = 900 / 25 = 36 N/cm ²	1 1

C1 (a)



(1 m for identify each animal)

4

	(b)	(i)	Green plant Make food during photosynthesis	1 1
		(ii)	Green plant → grasshopper → praying mantis → sparrow → eagle	1
		(iii)	rat , caterpillar grasshopper (any 2)	1
		(iv)	prey and predator	1
		(v)	decreases	1
C2	(a)		The strips bend downwards	1
	(b)	(i)	To maintain a constant temperature / to prevent electric iron from getting too hot.	1

		(ii)	It will bend away from the contact / it will bend up	1
		(iii)	To conduct the heat quickly to the cloth / metal is a good conductor of heat.	1
		(iv)	Plastic It is a poor conductor of heat / To prevent heat from reaching user's hand.	1 1
	(c)	(i)	Pellet X will falls first.	1
		(ii)	<u>Heat</u> from the Bunsen flame is transferred through the copper rod to the mercury and water. Since <u>mercury is better conductor of heat than water</u> , thus <u>the wax on the test tube with mercury will melt faster than the wax on the test tube filled with water</u> . This causes the pellet X to fall first.	1 1
		(iii)	Conduction	1
C3	(a)	(i)	Alex is correct	1
		(ii)	<ul style="list-style-type: none"> The milo is non-homogeneous The milo particles will settle down after sometime. It does not allow light to pass through. (any one) 	1

	(b)	(i)	To separate substance A from B.	1
		(ii)	Substance A	1
		(iii)	Increase the temperature of water. Break/ grind the solid B to smaller pieces/tpowder. (any 2) Stir the mixture.	2
	(c)	(i)	X, Y, Z	1
		(ii)	Z, It moves the fastest / it moves the furthest away from the starting line.	1 1
		(iii)	No, As F1 contain W / illegal dyes	1

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4	A	9	D	14	D	19	D	24	D	29	B
5	D	10	D	15	B	20	A	25	B	30	C