SA2 Bartley Secondary School 2
SA2 Damai Secondary School 31
SA2 Fuchun Secondary School 60
SA2 Seng Kang Secondary School 84
SA2 St. Patrick's School 95
SA2 Yio Chu Kang Secondary School 121

Class	Register Number	Name

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.

Set by: Mdm Tan C K

[Turn over

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?

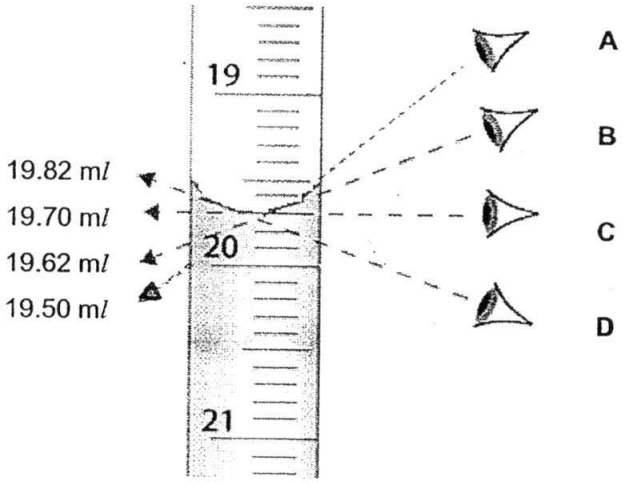
A

B

C

D

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?

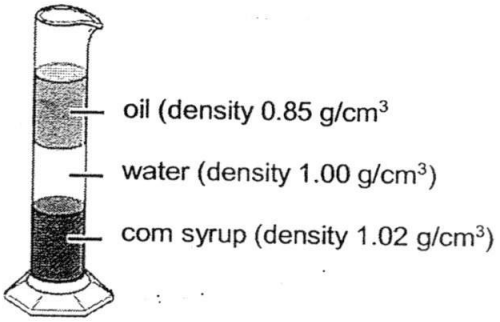
A She brought the test tube closely to her nose to smell the gas produced.

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.

5 A measuring cylinder as shown below contains three different liquids of different densities.



The densities of another four different liquids, **A, B, C** and **D** are listed in the table below.

liquid	**A**	**B**	**C**	**D**
density (g/cm³)	1.10	1.90	1.30	0.88

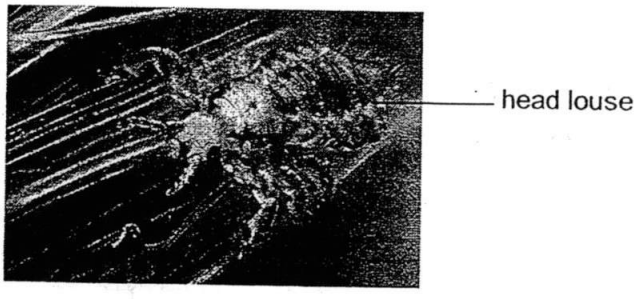
All four liquids are poured into the measuring cylinder above.

Which liquid will float on water?

6 Which classification correctly categorises the organisms in terms of their reproduction method?

	giving birth to young	lay eggs
A	bat	turtles
B	horses	bat
C	rabbit	goat
D	snake	grasshopper

7 The figure below shows a head louse on human hair. Head lice usually feed on human blood and causes infection of the head and scalp.



What kind of relationship exists between the head lice and the human?

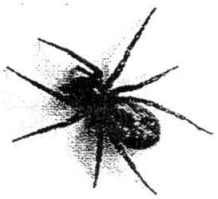
A commensalism

B mutualism

C parasitism

D predator-prey

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?

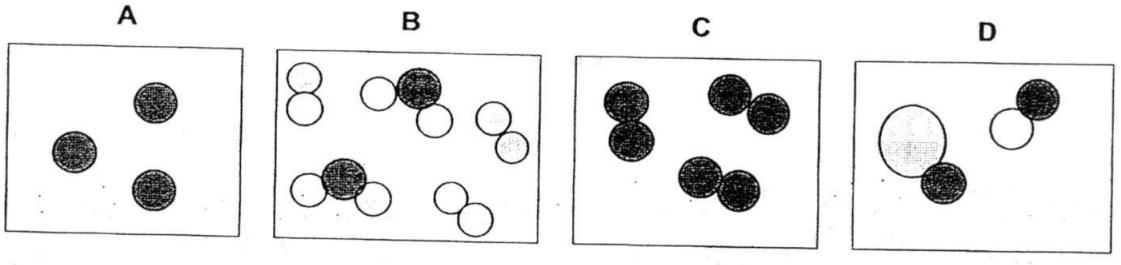
A An alloy consists of only metals.

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?

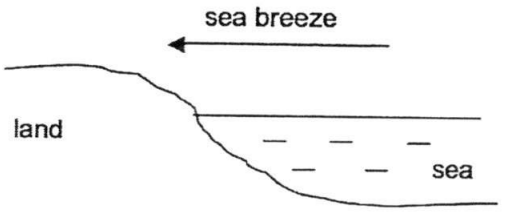
A electrical conductivity

B hardness

C melting point

D strength

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



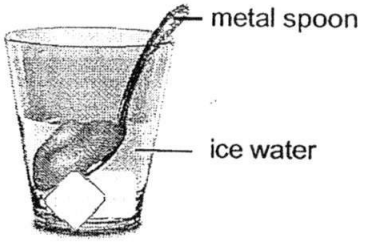
A During the day, hot air above the sea moves towards the land as it is cooler there.

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?

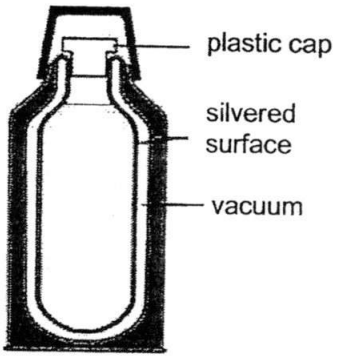
A Fur is a poor conductor of heat.

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

23 Which instrument is used to measure force?

A beam balance
B electronic balance
C measuring balance
D spring balance

24 Two magnets are placed near to each other as shown below.

Which row below correctly shows the type and action of the force in the observation?

	type of force	action of force
A	chemical	pulling
B	gravitational	pushing
C	magnetic	pulling
D	magnetic	pushing

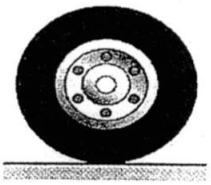
25 Which two factors can affect pressure?

A energy and area
B force and area
C force and distance
D work done and distance

26 The same amount of downward force is applied to four objects resting on a horizontal surface.

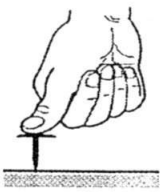
Which object exerts the greatest pressure on the surface?

A



car wheel

B



drawing pin

C

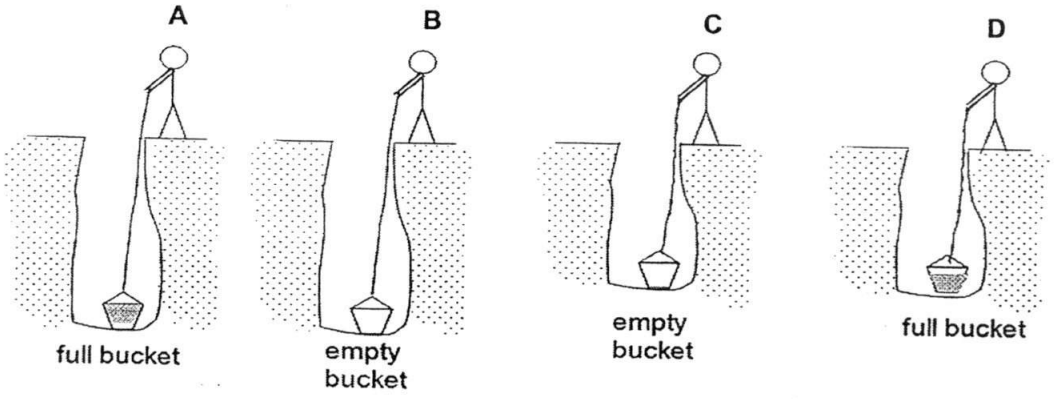
table fork

D

stiletto heel

27 Four men each have to lift a bucket from the bottom of a well.

Which man does the most work?

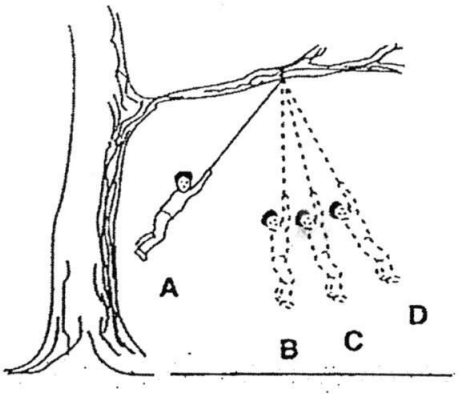


28 Which source of energy is non-renewable?

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.

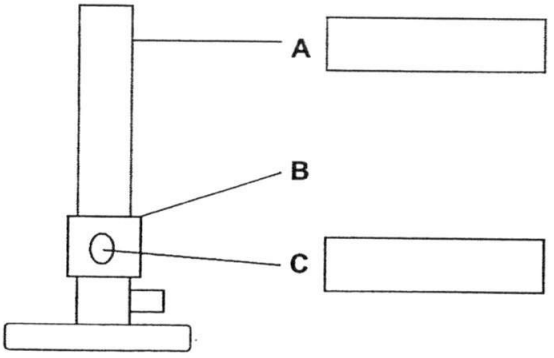
B Energy can neither be created nor destroyed.

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.

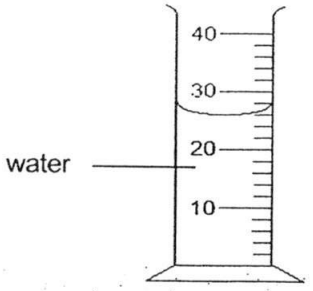


Fig. 2.1

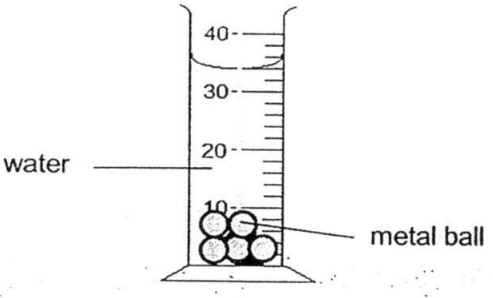


Fig. 2.2

(i) What is the volume of water in the measuring cylinder shown in Fig. 2.1?

_____ [1]

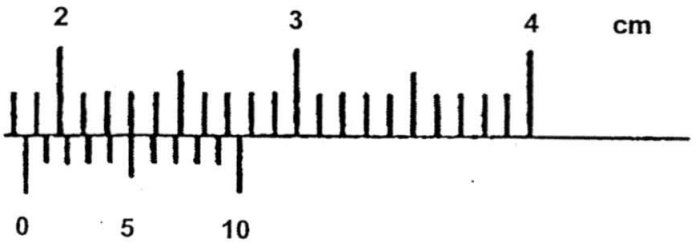
(ii) What is the volume of one metal ball? Show your working clearly.

volume of one metal ball = ... cm^3 [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/cm^3 [1]

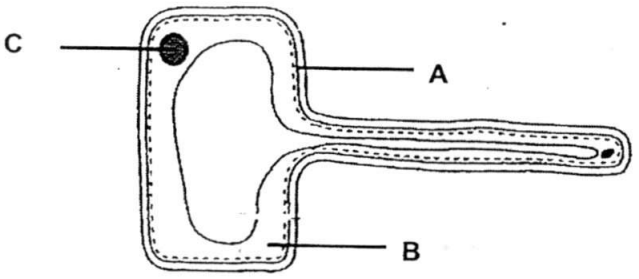
(b) A pair of Vernier calipers is used to measure the diameter of a metal cylinder. The reading on the Vernier calipers is shown below.



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.

$NaHSO_4$

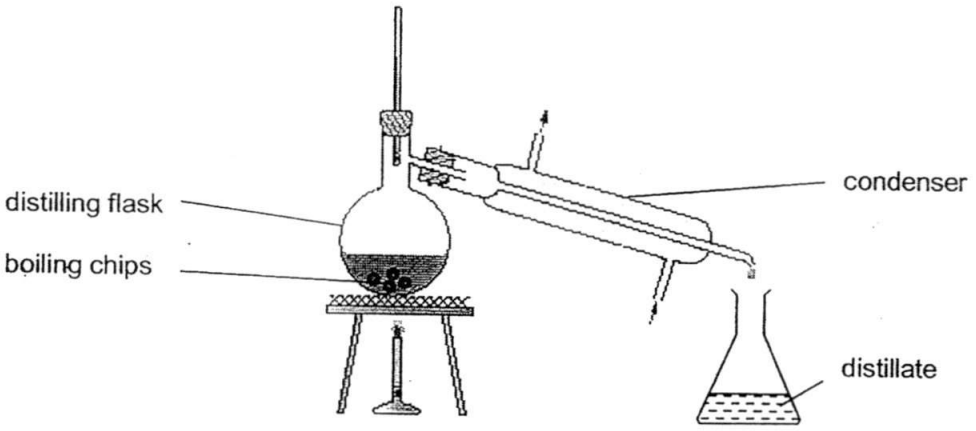
(i) Name the elements in the compound.

_____ [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.

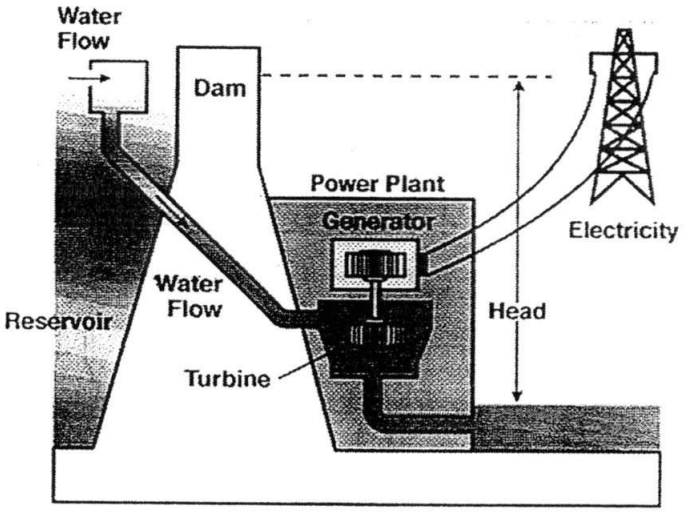
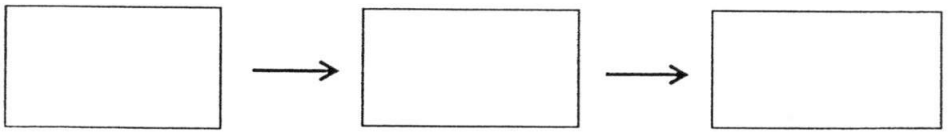


Fig. 8.1

(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.



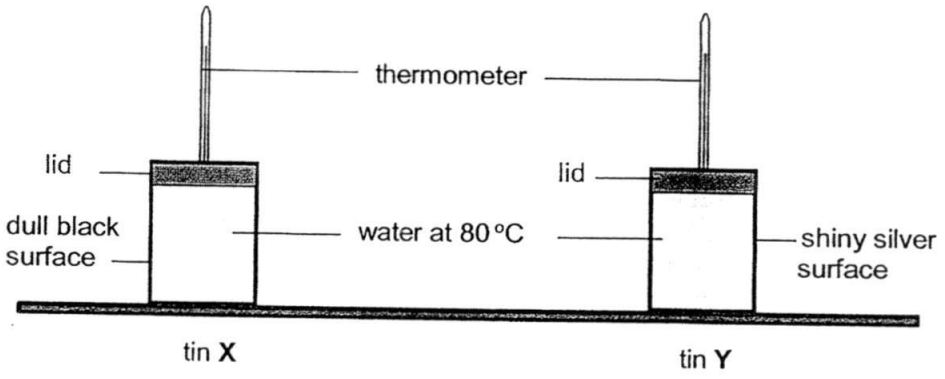
water in the dam → water flows down the dam to turbine → energy from generator

[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]

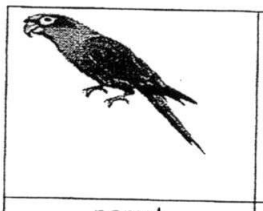
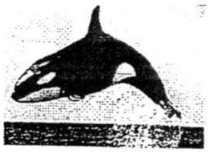
(ii) The total contact area between the tyres and the ground is 25 cm^2.

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

pressure exerted on the ground =.....N/cm^2 [2]

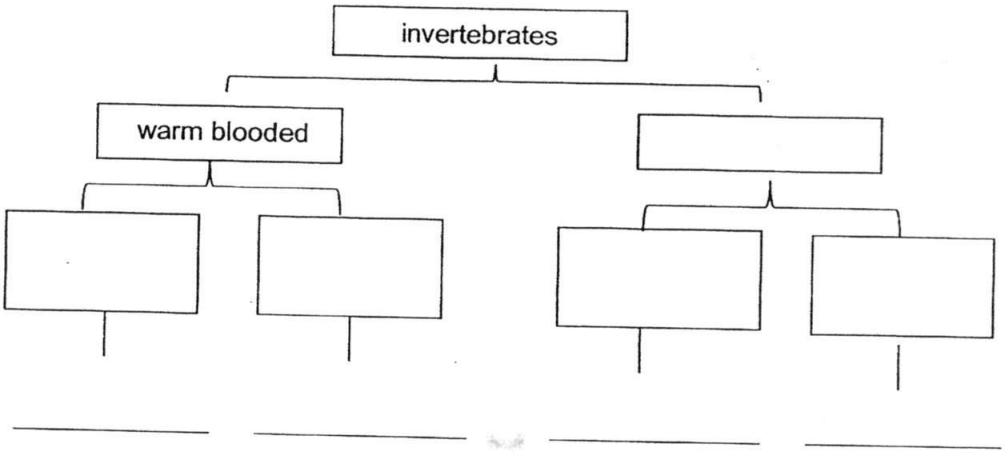
Section C (30 marks)
Answer **all** the questions in the spaces provided.

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

			
parrot	crocodile	frog	whale

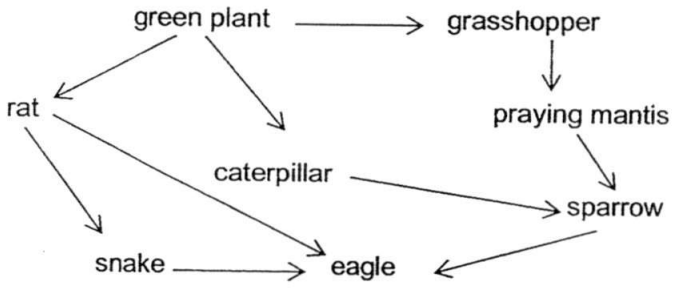
Use the features or characteristics shown in the table below to help you complete the dichotomous key and identify the animals.

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?

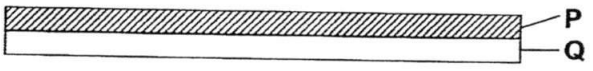
_____ [1]

(v) In a particular year, all the sparrows were killed by a disease.

Describe what will happen to the eagle population.

_____ [1]

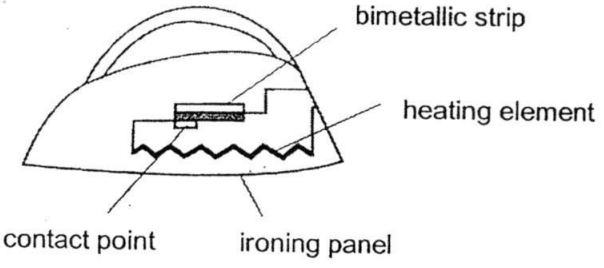
C2 **(a)** The diagram below shows a bimetallic strip which is made up of metals **P** and **Q**. Metal **P** expands more than **Q** when heated.



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?

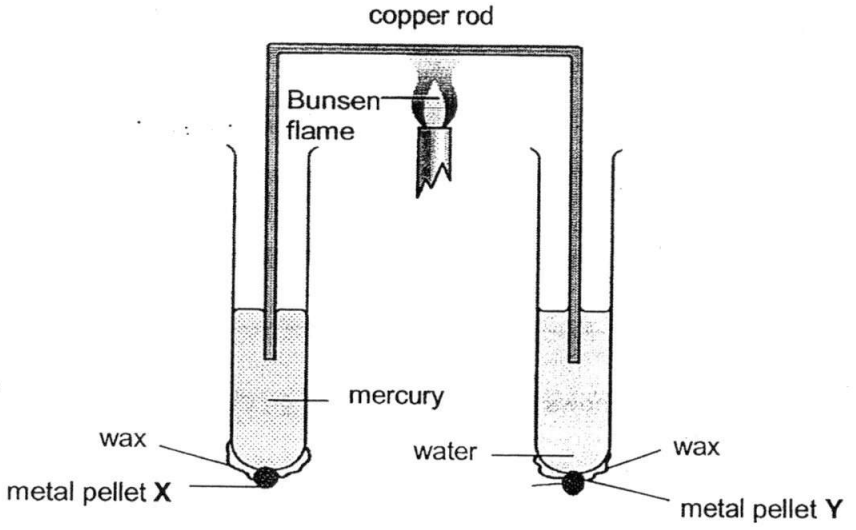
_____ [1]

(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?

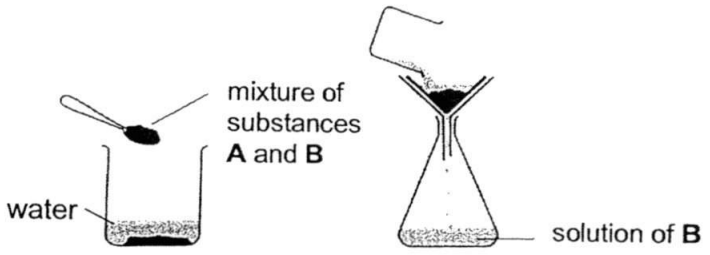
_____ [1]

(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?

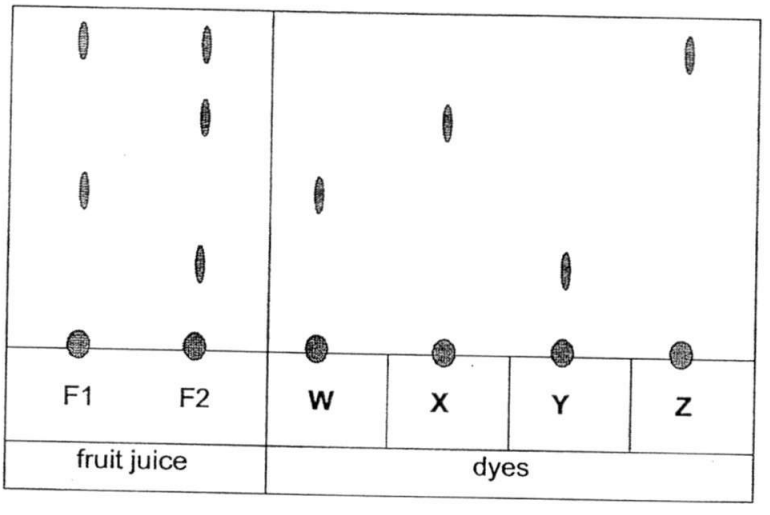
_____ [1]

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

_____ [2]

_____

(c) A chromatography was carried out on two types of fruit juices F1 and F2 and four known coloured dyes, **W, X, Y** and **Z**. The results are shown in the chromatogram below. Dye **W** is found in a list of illegal dyes.



(i) Which dye(s) is/are found in F2?

_____ [1]

(ii) Which dye is the most soluble in the solvent? Explain your answer.

_____

_____ [2]

(iii) Are both fruit juices safe for consumption? Give your reason.

_____

_____ [1]

End of Paper

BLANK PAGE

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 Sulphur 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	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
†90-103 Actinoid series	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 = relative atomic mass; X = atomic symbol; b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

Bartley Secondary School
Sec 1NA End of Year Exam (2016)
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 / (any 1) Responsible for reproduction		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

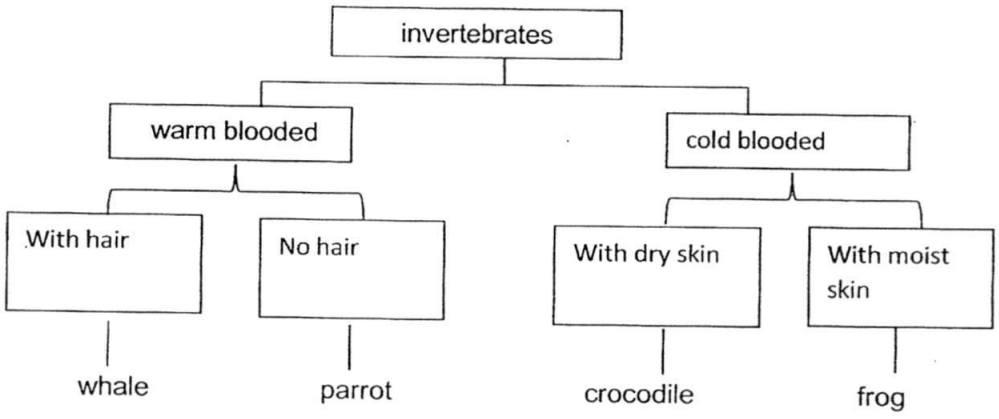
B7	(a)	(i)	magnetic force	1
		(ii)	gravitational force	1
	(b)	(i)	change the shape / change the size of sponge. (any one)	1
		(ii)	Change the direction of the soccer ball. Change the speed of the soccer ball. (any one) Stop the soccer ball from rolling.	1

B8	(a)	(i)	Renewable source of energy	1
		(ii)	gravitational potential energy → kinetic energy → electrical energy [1 m for 1st conversion 1 m for 2nd conversion]	1 1
		(iii)	disadvantage • 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 radiates heat away (lose heat by radiation) faster than that of the shiny silvery surface.	1

		(iii)	radiation	1
B9	(a)	(i)	Work done = force x distance moved = 200 x 8 = 1600 Nm	1
		(ii)	The trolley moves in the same direction as the force 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)	Heat from the Bunsen flame is transferred through the copper rod to the mercury and water. Since mercury is better conductor of heat than water, thus the wax on the test tube with mercury will melt faster than the wax on the test tube filled with water. This causes the pellet X to fall first.	1 1
		(iii)	Conduction	1
C3	(a)	(i)	Alex is correct	1
		(ii)	• 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

Bartley Secondary School
Sec 1NA End of Year Exam (2016)
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**

2

Name : _____( ) Class : _____

DAMAI SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2016

Secondary One Normal Academic

LOWER SECONDARY SCIENCE

Tuesday 11 October 2016 8.15 am – 10.05 am 1 hour 50 minutes

INSTRUCTIONS TO CANDIDATES

1. Write your full name, register number and class in the spaces provided on the cover of this question paper and on the answer booklet.

2. This paper consists of four sections.
   a. Section A – Multiple choice questions
      Answer **ALL** questions. Shade all answers on the answer sheet provided.

   b. Section B, C and D – Structured questions
      Answer **ALL** questions. Write all answers in the answer booklet provided.

3. Hand in the answer sheet, question paper and answer booklet separately at the end of the examination.

INFORMATION FOR CANDIDATES

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

Mistakes in spelling may be penalised in any part of the paper.

Electronic calculators may be used for this paper.

Periodic table is provided.

This question paper consists of 10 printed pages including this page.

[Turn over

Section A (30 marks)

Answer all questions. Shade all answers on the answer sheet provided.

A1 Which of the following correctly shows the prefixes from the smallest value to the largest?

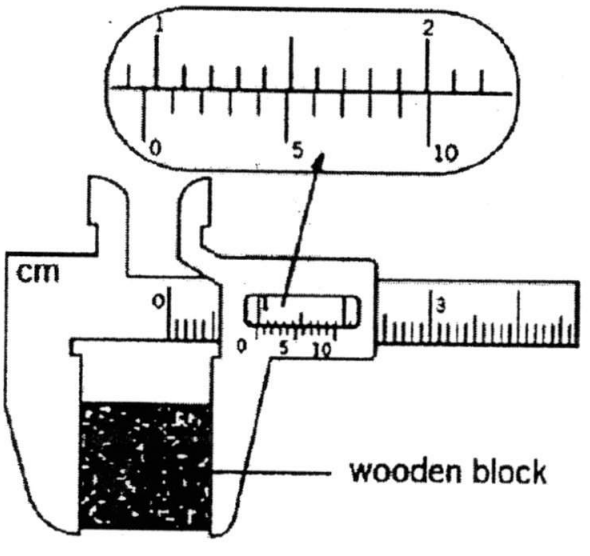
A mega, kilo, milli, nano

B kilo, mega, nano, milli

C milli, kilo, mega, nano

D nano, milli, kilo, mega

A2 The diagram below shows a wooden block being measured with a vernier calipers.

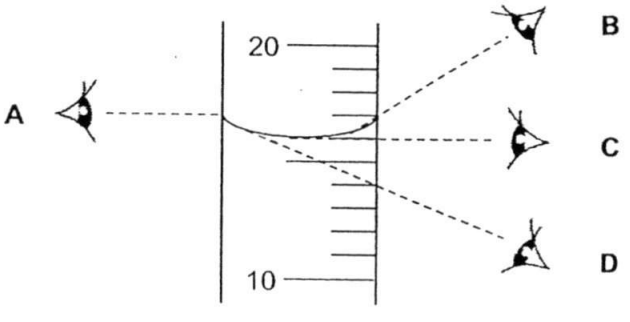


What is the reading of the vernier calipers?

A 0.88 cm **B** 0.98 cm

C 1.80 cm **D** 1.88 cm

A3 In the diagram below, where should the eye be placed so that the reading can be taken accurately?

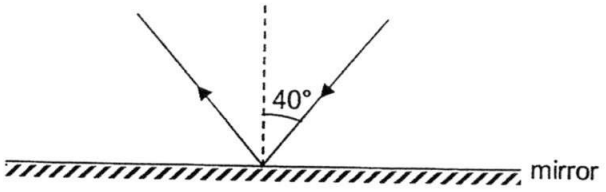


A4 Which of the following is the hardest material?

A graphite **B** steel

C glass **D** diamond

A5 The diagram below shows a ray of light reflected in a plane mirror.



Which of the following shows the correct values for the angle of reflection?

A 40° **B** 50°

C 80° **D** 100°

A6 Amy noticed a mirror at the corner of a shop and she is able to see many other customers in shop, but they looked smaller.

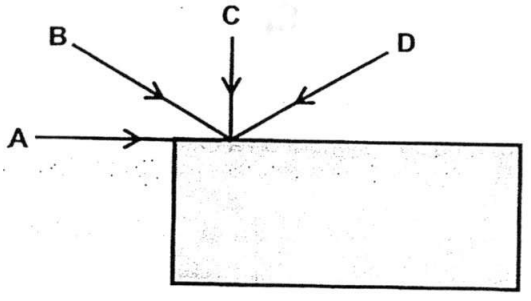
What type of mirror is being described here?

A concave mirror **B** convex mirror

C plane mirror **D** rough mirror

A7 The diagram below shows four light rays hitting the surface of a glass block in different directions.

Which of the following light rays changes speed but will **not** refract?



A8 Which of the following two colours form white light when combined?

A red and yellow **B** cyan and green

C cyan and magenta **D** green and magenta

[Turn over

A9 Which of the following best explains why a red object appears red when a mixture of red and blue light is shone on it?

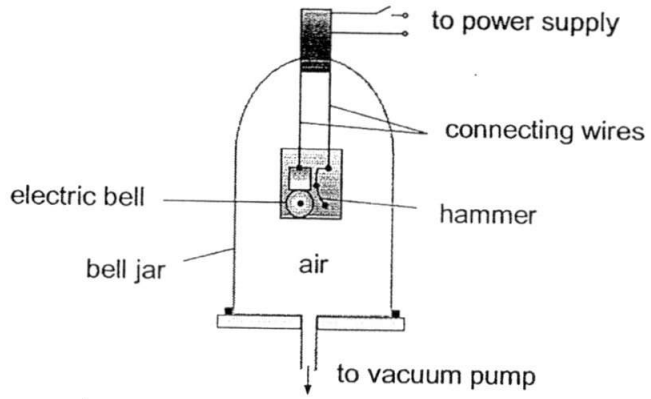
A Both lights are absorbed by the object and no light is reflected to the eyes.

B No light is absorbed by the object and both lights are reflected to the eyes.

C The blue light is absorbed by the object and red light is reflected to the eyes.

D The red light is absorbed by the object and blue light is reflected to the eyes.

A10 The diagram below shows an electric bell placed in a bell jar that is attached to a vacuum pump.



The vacuum pump is then switched on and air is slowly removed from the bell jar.

Which of the following statements is **incorrect**?

A The sound from the electric bell gets softer and softer.

B The sound from the electric bell can only travel through the air in the bell jar.

C The sound from the electric bell is produced by the vibrations of the electric bell.

D The hammer in the electric bell will continue to move even when the air in the bell jar is removed totally.

A11 The diagram shows a hazard symbol on a chemical bottle.

What will be the harmful effect if the person does not handle the substance carefully?

A The substance can cause an explosion because it can be burnt easily.

B The substance can irritate the person's skin, eyes and respiratory system.

C The substance can corrode other substances that it comes into contact with.

D The substance can emit radiation and destroy the person's body cells and tissues.

A12 The parts of the Bunsen burner and their respective functions are listed below.

Which of the following is **incorrect**?

	part	function
A	air-hole	to control the amount of air entering the burner
B	barrel	to raise the flame to a suitable height for heating
C	base	to support the entire burner and make it more stable
D	collar	to open or close the air-holes to change the type of flame

A13 Which of the following is **not** a pair of metallic and non-metallic elements?

A *Al* and Ne **B** Ca and Cl

C Mg and C **D** Li and Fe

A14 Which of the following lists consists of only compounds?

A sand, steam, water **B** air, diamond, iron

C ice, table salt, bronze **D** crude oil, helium, seawater

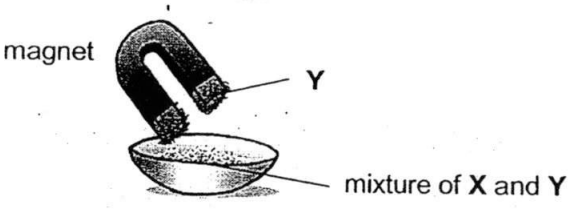
A15 Lead nitrate is a colourless crystalline solid that is toxic and must be handled with care.

How many oxygen atoms are there in one unit of lead nitrate, $Pb(NO_3)_2$?

A 1 **B** 2

C 3 **D** 6

A16 The diagram below shows the observation when a magnet is placed near a mixture of **X** and **Y**.



Which of the following gives the possible identities of **X** and **Y**?

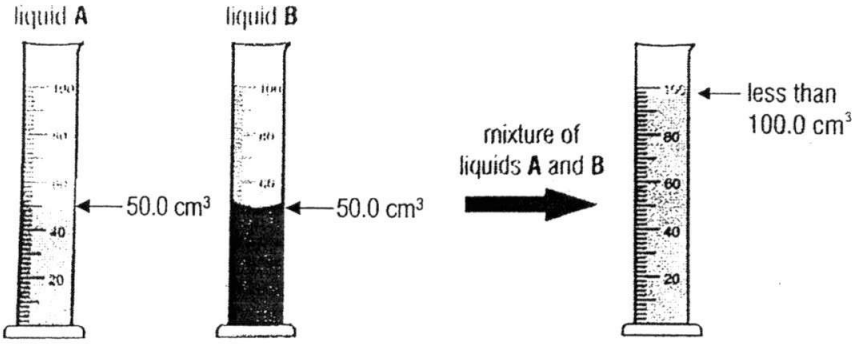
	X	Y
A	aluminium	nickel
B	cobalt	carbon
C	iron	steel
D	sulfur	copper

[Turn over

A17 Which of the following methods is used to obtain desalinated water in Singapore?

A distillation
B reverse osmosis
C filtration
D evaporation to dryness

A18 In an experiment, as shown in the diagram below, a student form a mixture by mixing 50.0 cm^3 of liquid **A** with 50.0 cm^3 of liquid **B**. She found that the total volume of the mixture is less than 100.0 cm^3



Assuming that there is no spillage or loss in any liquid while mixing, which of the following best explains the objective of this experiment?

A To show the random motion of particles in liquids.
B To show the random arrangement of particles in liquids.
C To show the presence of space between particles in liquids.
D To show the presence of attractive force of particles in liquids.

A19 Which of the following best explains why an object expands when it is heated?

A The particles become faster.
B The particles become bigger.
C The particles become denser.
D The particles become further apart.

A20 Which of the following changes occur when a solid at 50°C becomes a liquid at 120°C?

	attractive force between particles	separation of particles	energy of particles
A	decreases	decreases	increases
B	decreases	increases	increases
C	increases	decreases	decreases
D	increases	increases	decreases

A21 Which of the following organelles listed below form the protoplasm?

I nucleus

II chloroplast

III cytoplasm

IV cell membrane

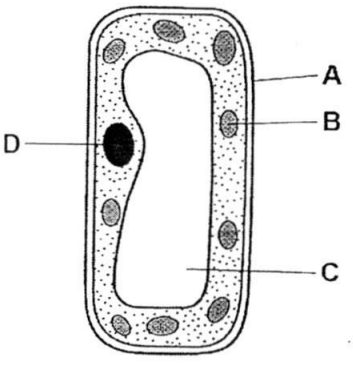
A I and III only

B I, II and III only

C I, III and IV only

D I, II, III and IV

The diagram below shows a cell from a leaf. Refer to it and answer questions **A22** and **A23**.



A22 Which of the labelled structures produces oxygen?

A23 Which of the labelled structures contains genetic material?

A24 The information below shows a sequence of how a multicellular organism is formed.

Cell → P → Organ → Q → Multicellular Organism

Which of the following gives the possible examples of **P** and **Q**?

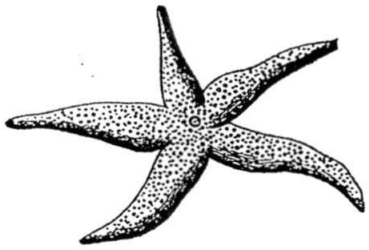
	P	Q
A	heart	blood vessels
B	neural tissue	nervous system
C	mouth	large intestine
D	muscle tissue	stomach

A25 The Scientific Classification System is a method which scientists use to categorise living things. Living things are first grouped into kingdoms, then into phyla.

Some characteristics of the animal phyla as shown below.

phyla	Characteristics
porifera	animals with lots of pores on their bodies, e.g. sponges
annelida	animals with lots of segments on their bodies, e.g. worms
arthropda	animals with segmented bodies and possess exoskeleton, e.g. crab
cnidaria	animals with tentacles and stinging cells with a radial symmetry, e.g. jellyfish
mollusca	animals with soft body, with many having radula, shell and muscular foot, e.g. clam
echinodermata	animals with water vascular system, usually having five lines of symmetry, e.g. sea urchin

In which phyla does the following animal most likely belong to?



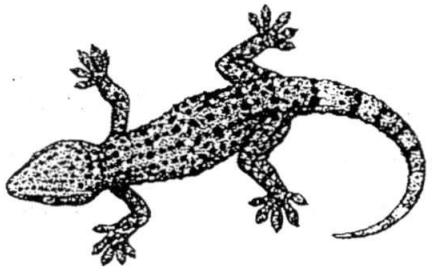
A porifera

B cnidaria

C mollusca

D echinodermata

A26 The diagram below shows two classes of animals.



Which of the following statements is correct?

A They both are cold-blooded and have moist skin.

B They both are warm-blooded and have moist skin.

C They both are cold-blooded and breathe through lungs.

D They both are warm-blooded and breathe through lungs.

A27 Which of the following shows how we can preserve the biodiversity on earth?

A Reduce harvesting of fishes in the ocean.

B Clear rainforests to build houses for humans.

C Hunt endangered species to sell for greater profits.

D Release unwanted pets into the wild to avoid killing them.

A28 Which of the following statements about animals' adaptations are **incorrect**?

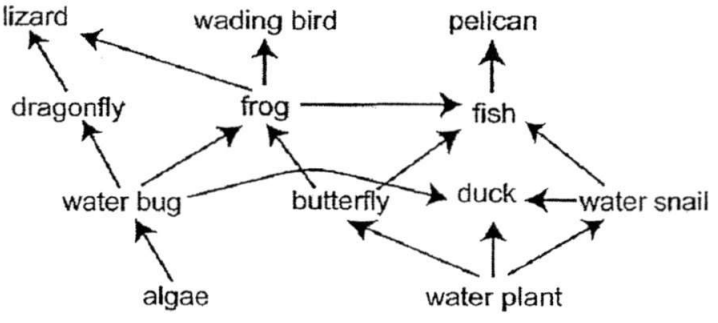
A The cactus has needle-like leaves to store water in the desert.

B The bat has a keen sense of hearing to navigate itself in the dark.

C The polar bear has thick fur to reduce heat loss to the cold artic surroundings.

D The red mangrove has stilt roots to prop itself above the water level to absorb air through the pores in its bark.

The diagram below shows a food web in a wetlands ecosystem. Refer to it and answer questions **A29** and **A30**.



A29 Which of the following organisms is a tertiary consumer?

A duck **B** frog

C lizard **D** water bug

A30 Which of the following organisms is both a primary and a secondary consumer?

A duck **B** frog

C lizard **D** water bug

~ End of Section A ~

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	– Ra radium 88	– 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.).

Name : _____ ( ) Class : _____

Parent's Signature

DAMAI SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2016

Secondary One Normal Academic

LOWER SECONDARY SCIENCE

ANSWER BOOKLET

For Teacher's Use only:

Topics	Section A	Section B, C, D	Marks
Physics	A1-10	B1 – B10	
Chemistry	A11-20	C1 – C10	
Biology	A21-30	D1 – D10	
		TOTAL	90

This answer booklet consists of 11 printed pages including this page.

[Turn over

Section B (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

B1 Complete Fig. B1.1 to show the properties of glass considered when making laboratory apparatus.

	Transparency	Strength	Heat conductivity	Electrical conductivity	Melting point
Glass	Opaque		Poor	Poor	

Fig. B1.1

[2]

B2 Fig. B2.1 shows a steel cube of volume 4.0 cm^3 lowered into a measuring cylinder partially filled with water. The density of water and steel are 1.0 g/cm^3 and 8.0 g/cm^3 respectively.

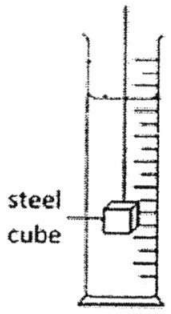


Fig. B2.1

(a) Find the mass of the water taken up by the steel cube.

Mass = ... [2]

(b) The steel cube is cut into 10 smaller pieces and then placed into the water in the measuring cylinder. Will the pieces of steel float or sink? Explain your answer.

.....

.....

..... [2]

B3 Fig. B3.1 shows a double-headed arrow **XY** placed in front of a plane mirror.

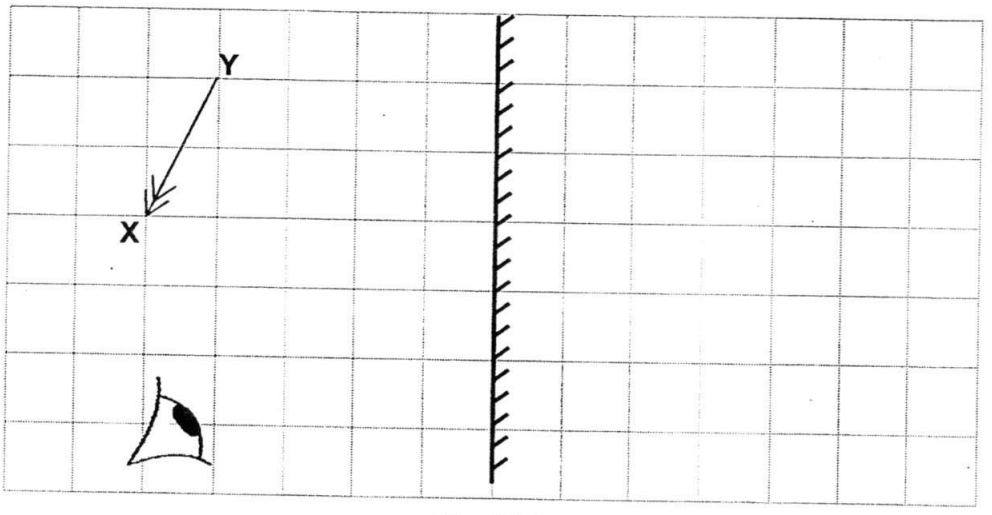


Fig. B3.1

On Fig. B3.1, draw

(a) the image of the arrow, as seen by the eye. [1]

(b) the path of two rays of light leaving point **Y** and then reflecting at the mirror before entering the eye. [2]

B4 Fig. B4.1 shows a light ray passing from material **P** to material **Q**.

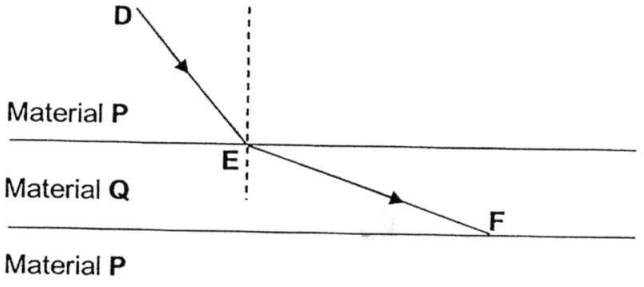


Fig. B4.1

(a) Explain why the light ray **EF** behaves in the manner shown in Fig. B4.1.

.....

.....

..... [2]

(b) On Fig. B4.1,

(i) draw the angle of refraction and label it as '*r*'. [1]

(ii) draw how the light ray behaves when it goes into material **P** again. [1]

[Turn over

B5 Fig. B5.1 shows the loudness for various sources of noises.

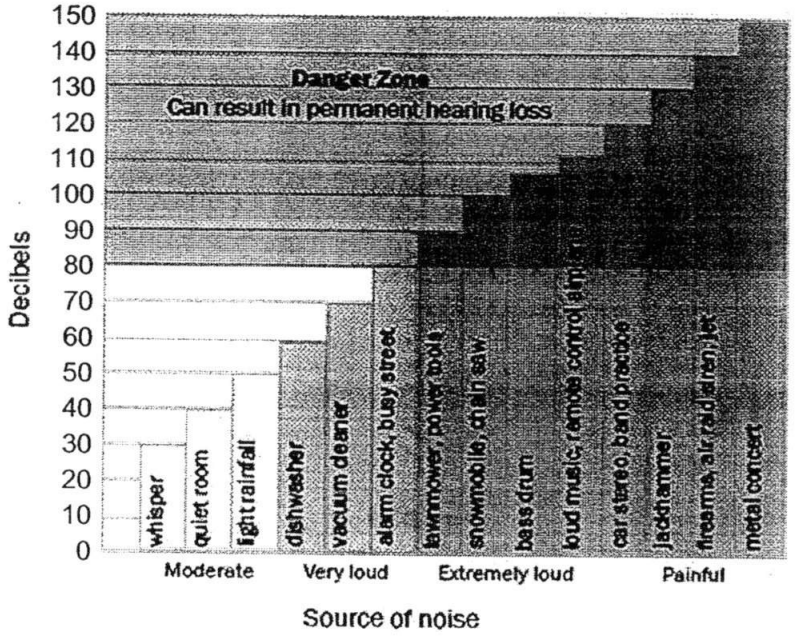


Fig. B5.1

It is recommended that single hearing protection (earplugs OR earmuffs) be used for any sound over 85 dB and double hearing protection (earplugs AND earmuffs) for any level over 105 dB.

(a) From Fig. B5.1, which source of noise can produce the loudest sound without causing any permanent damage to hearing?

.....[1]

(b) If a person uses a lawnmower to cut the grass in his backyard, what sort of ear protection would be recommended for him? Using information from Fig. B5.1, explain your answer.

.....

.....

.....[2]

B6 Fig. B6.1 shows a large diameter steel pipe 900 m long. Student **A** strikes one end of the pipe with a hammer and Student **B** listens for the sound reaching him.

Fig. B6.1

Student **B** hears two sounds: one coming through the air and the other through the pipe.

(a) Explain why Student **B** will hear the sound coming through the pipe first.

.....

..... [1]

(b) What is the speed of the sound in air if Student **B** heard it 3.0 s after the hammer struck the pipe?

Speed = ...[2]

(c) Suggest a way to increase the accuracy of the experimental result found in **(b)**.

.....

..... [1]

~ End of Section B ~

Section C (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

C1 Ahmad and Aiman were given two unknown elements: **X** and **Y**. **X** is a silvery solid while **Y** is a yellowish solid at room temperature. From the appearance, Ahmad concluded that **X** is a metal while **Y** is a non-metal. However, Aiman disagreed that the conclusion should only be based on the appearance and conducted a series of experiments himself.

(a) **(i)** Aiman connected **X** to an electrical circuit with a light bulb. If **X** is a metal, what will he see?

.....

..... [1]

(ii) Aiman dropped **X** onto the hard floor. If **X** is a metal, what will he hear?

.....

..... [1]

(b) State one difference between the physical properties of **X** and **Y**, other than the one mentioned in **(a)** and the question above.

.....

.....[1]

(c) Fig. C1.1 shows the arrangement of three different types of particles. They are represented by ◯, ◍ and ⊛.

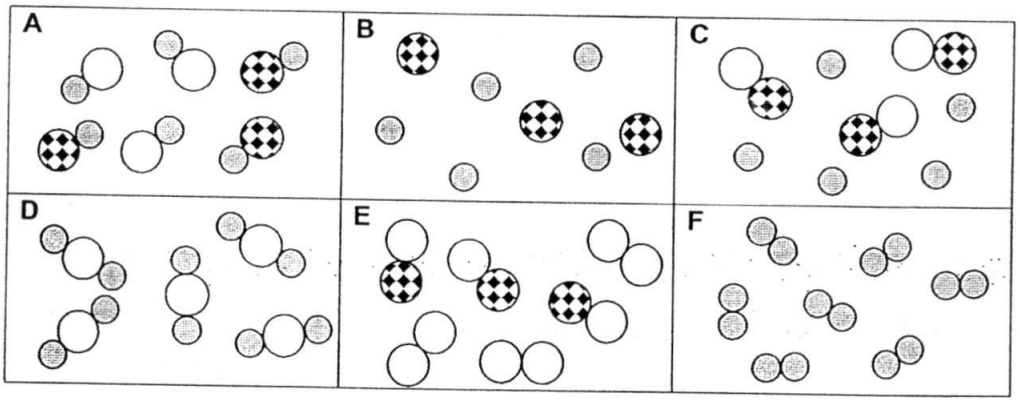


Fig. C1.1

From Fig. C1.1, which diagram best represents

(i) a mixture of **X** and **Y**, ...

(ii) a compound of **X** and **Y** when **X** reacts with **Y**? .....

[2]

C2 Fig. C2.1 shows an experimental setup to investigate how the rate of dissolving of a sugar cube in water is affected by a certain factor.

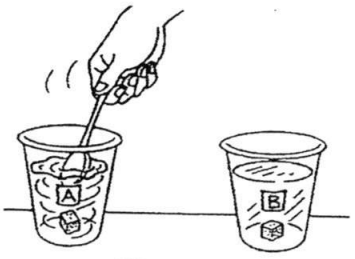


Fig. C2.1

(a) State the factor that is being investigated in the experiment.

.....[1]

(b) In which cup will the sugar dissolve faster?

.....[1]

(c) State one variable to be kept constant so that the experiment is fair.

.....[1]

(d) Suggest **another** way to dissolve the sugar faster.

.....[1]

C3 The apparatus in Fig. C3.1 shows how a mixture of ethanol and water can be separated using simple distillation.

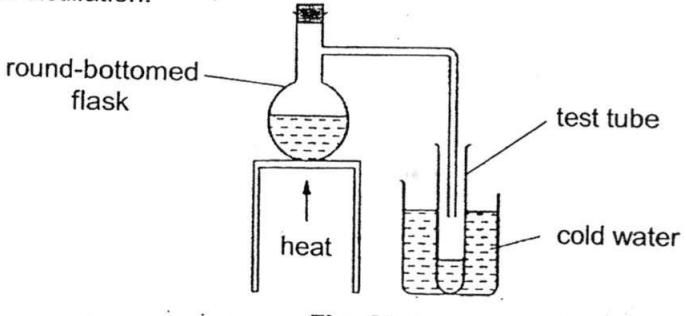


Fig. C3.1

(a) Name the two physical processes that are required for this method of separation to take place.

.....[2]

(b) What is the liquid collected in the test tube?

.....[1]

(c) On Fig. C3.1, use 'X' to indicate the position of the bulb of a thermometer in the round-bottomed flask to show the identity of the liquid in the test tube. [1]

C4 The apparatus in Fig. C4.1 was used to find out the number of different dyes present in an ink mixture.

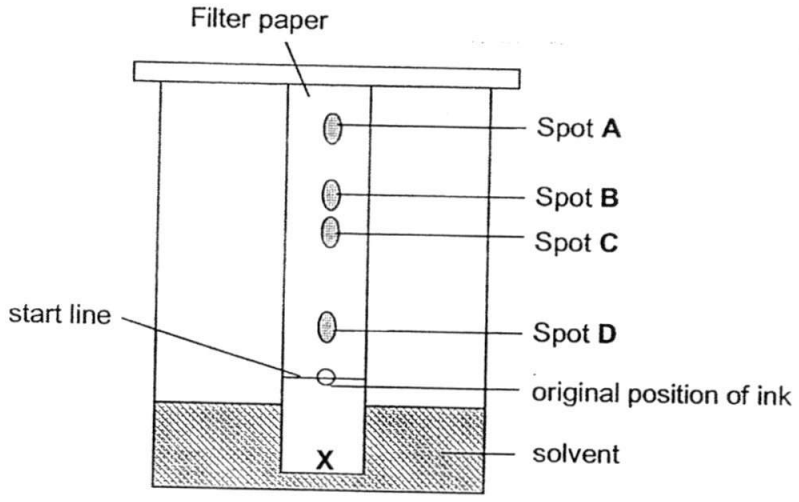


Fig. C4.1

(a) What is this method of separation called?

.....[1]

(b) How many different dyes did the ink mixture contain?

.....[1]

(c) Which dye was the most soluble in the solvent?

.....[1]

(d) Describe what would be observed if the ink mixture had been placed at **X** on the filter paper instead.

.....

.....[1]

C5 Substance **P** has a very high density, a fixed shape and a fixed volume.

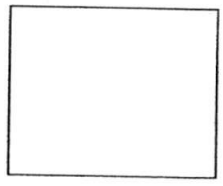


Fig. C5.1

(a) On Fig. C5.1, draw how the particles look like in substance **P**. [1]

(b) Describe the arrangement and the motion of the particles in substance **P**.

.....

.....[2]

~ End of Section C ~

Section D (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

D1 Fig. D1.1 shows the anatomy of an amoeba.

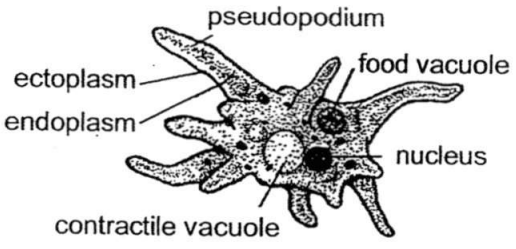


Fig. D1.1

(a) From D1.1, state one similarity between the amoeba and a plant cell.

.....

..... [1]

(b) Amoeba is a unicellular organism that can take any shape that it likes. Explain why a plant cell is **not** able to do so.

.....

..... [1]

D2 Fig. D2.1 shows the structure of typical human cheek cells seen through a microscope.

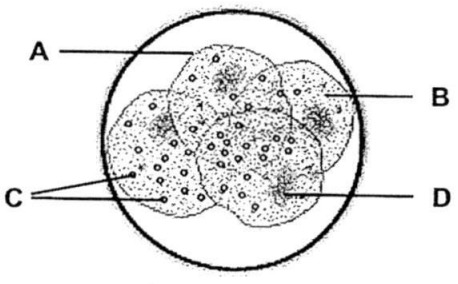


Fig. D2.1

(a) Name the structures labelled **A** and **B**.

(i) **A** .....

(ii) **B** .....

[2]

(b) State the functions of structures labelled **C** and **D**.

(i) **C:** .....

(ii) **D:** .....

[2]

[Turn over

D3 **(a)** Explain what is meant by '*division of labour*' in a multicellular organism.

.....

..... [1]

(b) State briefly the benefits of division of labour among cells, tissues, organs and systems in a multicellular organism.

.....

..... [1]

D4 **(a)** Explain why it is necessary to classify living things.

.....

..... [1]

(b) Complete Fig. D4.1 to show how animals can be classified.

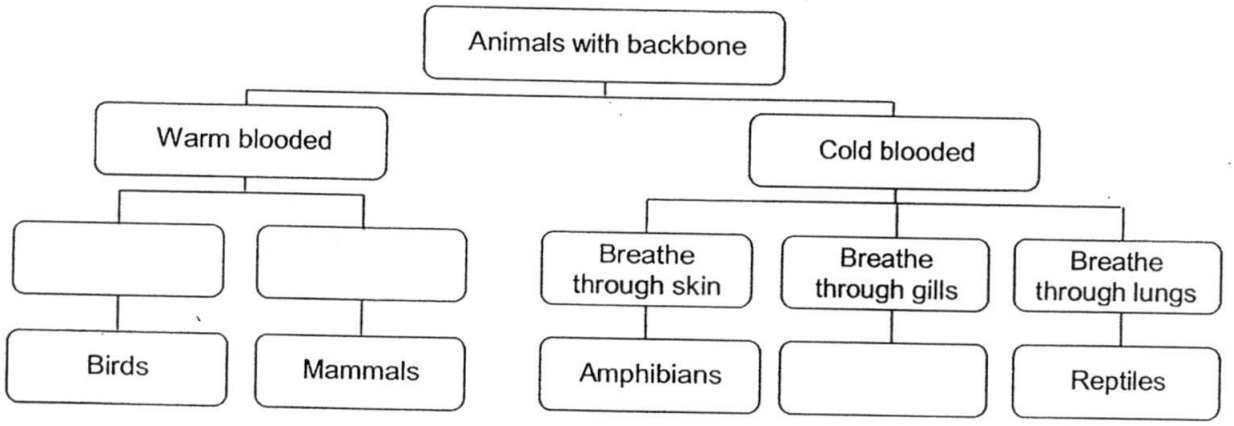


Fig. D4.1 [3]

(c) Explain why the classification shown in Fig. D4.1 is **not** a dichotomous key.

.....

..... [1]

D5 Fig. D5.1 shows some organisms found in a particular habitat.

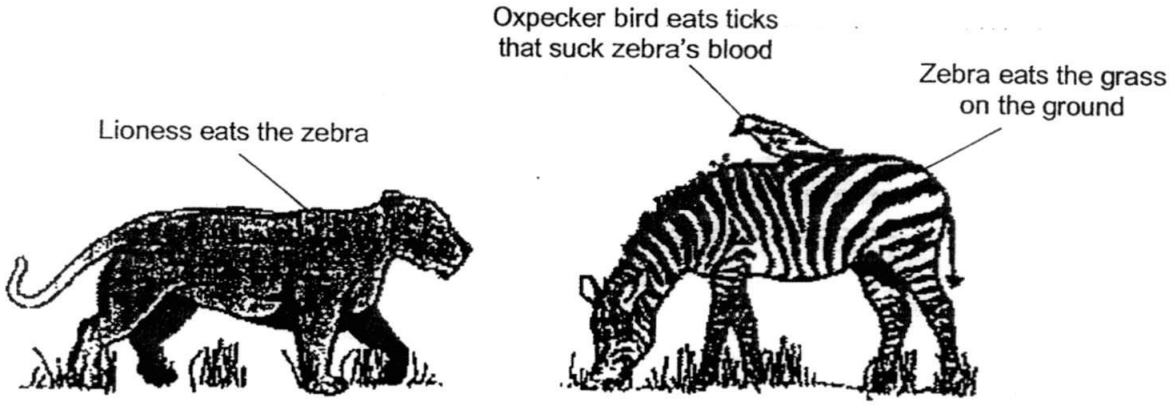


Fig. D5.1

(a) Based on the organisms shown and described in Fig. D5.1, draw a four-level food chain in the space provided below.

[1]

(b) State the type of relationship between the following organisms:

(i) zebra and tick .....

(ii) zebra and oxpecker bird .....

[2]

(c) Which organism shown in Fig. D5.1 has the largest population? Explain your answer.

.....

.....[2]

(d) How is the population of the grass affected when the most of the lioness suddenly die due to a disease? Explain your answer.

.....

.....

.....[2]

~ End of Section D ~

~ END OF PAPER ~

Name of Setter: Mr Tan Wei Zhi

ANSWER SCHEME

Section A

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

Section B (20 marks)

B1 Complete Fig. B1.1 to show the properties of glass considered when making laboratory apparatus.

	Transparency	**Strength**	**Heat conductivity**	**Electrical conductivity**	**Melting point**
Glass	Opaque	**High [1]**	Poor	Poor	**High [1]**

Fig. B1.1

[2]

B2 Fig. B2.1 shows a steel cube of volume 4.0 cm^3 lowered into a measuring cylinder partially filled with water. The density of water and steel are 1.0 g/cm^3 and 8.0 g/cm^3 respectively.

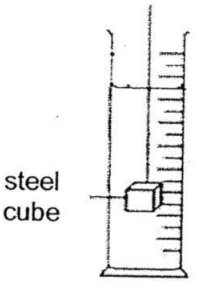


Fig. B2.1

(a) Find the mass of the water taken up by the steel cube.

Mass of water = Density x Volume = 1.0 g/cm^3 x 4.0 cm^3 [1] = 4.0 g [1]

(b) Describe what will be observed if the steel cube is cut into 10 smaller pieces and then placed into the water in the measuring cylinder. Explain your answer.

The steel will still sink [1]. The density remains the same [1].

B3 Fig. B3.1 shows a double-headed arrow **XY** placed in front of a plane mirror.

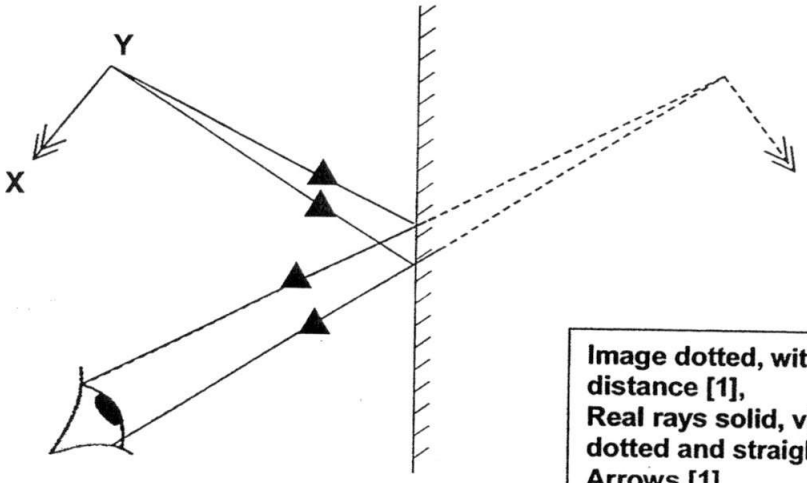


Fig. B3.1

Image dotted, with correct distance [1],
Real rays solid, virtual rays dotted and straight [1]
Arrows [1]

On Fig. B3.1, draw

(a) the image of the arrow, as seen by the eye. [1]

(b) the path of two rays of light leaving point **Y** and then reflecting at the mirror before entering the eye. [2]

B4 Fig. B4.1 shows a light ray passing from material **P** to material **Q**.

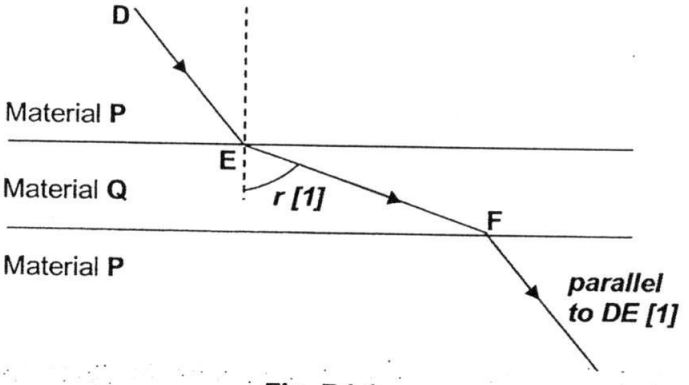


Fig. B4.1

(a) Explain why the light ray **EF** behaves in the manner shown in Fig. B4.1.

The light EF is travelling from optically denser to optically less dense medium [1], and it travels faster [1].

(b) On Fig. B4.1,

(i) draw the angle of refraction and label it as '***r***'. [1]

(ii) draw how the light ray behaves when it goes into material **P** again. [1]

B5 Fig. B5.1 shows the loudness for various sources of noises.

It is recommended that single hearing protection (earplugs OR earmuffs) be used for any sound over 85 dB and double hearing protection (earplugs AND earmuffs) for any level over 105 dB.

(a) From Fig. B5.1, which source of noise can produce the loudest sound without causing any permanent damage to hearing?

Alarm clock / busy street [1]

(b) If a person uses a lawnmower to cut the grass in his backyard, what sort of ear protection would be recommended for him? Explain your answer.

Single hearing protection / Earplugs / Earmuffs [1].

The volume of lawnmower is between 85 dB and 105 dB [1].

B6 Fig. B6.1 shows a large diameter steel pipe 900 m long. Student **A** strikes one end of the pipe with a hammer and Student **B** listens for the sound reaching him.

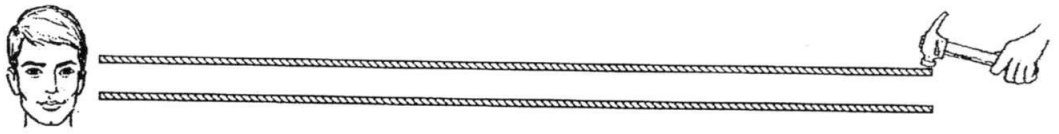


Fig. B6.1

Student **B** hears two sounds: one coming through the air and the other through the pipe.

(a) Explain why Student **B** will hear the sound coming through the pipe first.

Sounds travel <u>faster in solids than in gases</u> [1]. *do not accept travel faster in pipe than in air

(b) What is the speed of the sound if he heard it 3.0 s after the hammer struck the pipe?

Speed = Distance / Time = 900 m / 3.0 s [1] = 300 m/s [1]

(c) Suggest a way to increase the accuracy of the experimental result found in **(b)**.

Repeat the experiment and take the average [1]

Section C (20 marks)

C1 Ahmad and Aiman were given two unknown elements: **X** and **Y**. **X** is a silvery solid while **Y** is a yellowish solid at room temperature. From the appearance, Ahmad concluded that **X** is a metal while **Y** is a non-metal. However, Aiman disagreed that the conclusion should only be based on the appearance.

(a) **(i)** Aiman connected **X** to an electrical circuit with a light bulb. If **X** is a metal, what will he see?

The light bulb will light up [1].

(ii) Aiman dropped **X** onto the hard floor. If **X** is a metal, what will he hear?

A ringing sound [1].

(b) State one difference between the physical properties of **X** and **Y**, other than the one mentioned in **(a)** and the question above.

General properties	Metals	Non-metals
Ability to withstand stress	Malleable, Ductile	Brittle, Non-ductile
Density	High	Low
Melting & Boiling points	High	Low
Conductor of heat	Good	Poor

***must be different from part a** **[1]**

(c) Fig. C1.1 shows the arrangement of three different types of particles. They are represented by ◯, ◎ and ⊛.

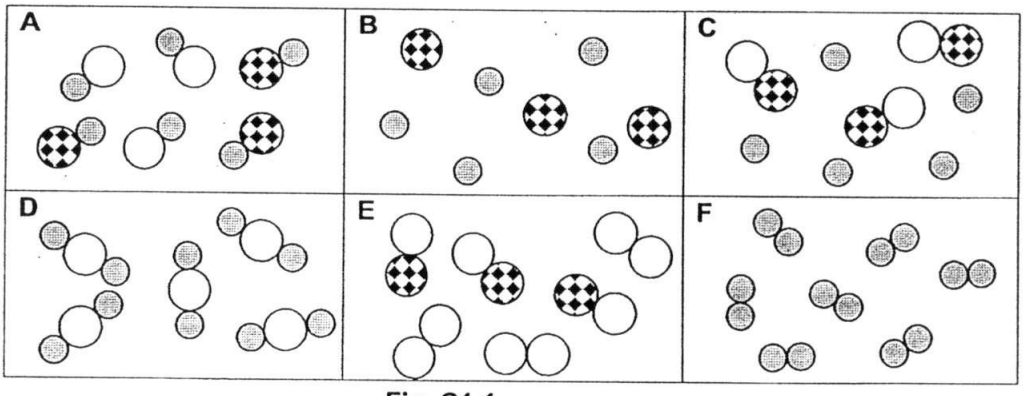


Fig. C1.1

From Fig. C1.1, which diagram best represents

(i) a mixture of **X** and **Y**, **B [1]**

(ii) a compound of **X** and **Y** when **X** reacts with **Y**? **D [1]**

C2 Fig. C2.1 shows an experimental setup to investigate how the rate of dissolving of a sugar cube in water is affected by the rate of stirring.

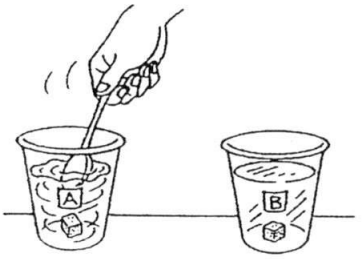


Fig. C2.1

(a) State the factor that is being investigated in the experiment.

The rate of stirring [1]

(b) In which cup will the sugar dissolve faster?

A [1]

(c) State one variable to be kept constant so that the experiment is fair.

Same volume of water / Same mass of sugar cube / Same temperature of water [1]

(d) Suggest **another** way to dissolve the sugar faster.

Crush the sugar cube into fine sugar / Heat the water [1].

C3 The apparatus in Fig. C3.1 shows how a mixture of ethanol and water can be separated.

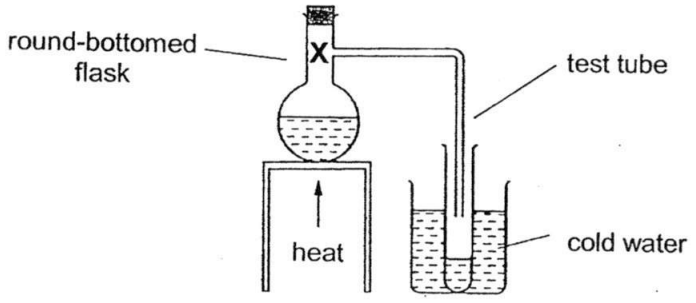


Fig. C3.1

(a) Name the two physical processes required for this method of separation to work.

Boiling [1], condensation [1]

(b) What is the liquid collected in the test tube?

Ethanol [1].

(c) On Fig. C3.1, use 'X' to indicate the position of the bulb of a thermometer in the round-bottomed flask to show the identity of the liquid in the test tube. [1]

C4 The apparatus in Fig. C4.1 was used to find out the number of different dyes present in an ink mixture.

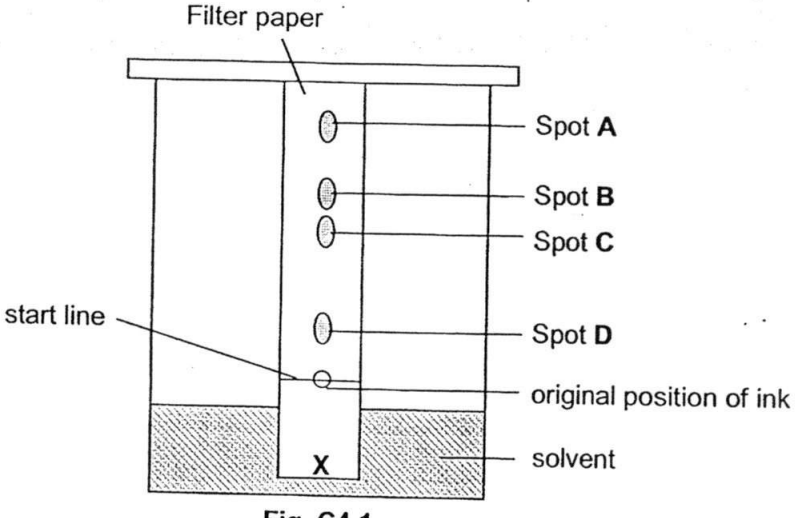


Fig. C4.1

(a) What is this method of separation called?

Paper chromatography [1].

(b) How many different dyes did the ink mixture contain?

4 [1]

(c) Which dye was the most soluble in the solvent?

Dye A [1]

(d) Describe what would be observed if the ink mixture had been placed at **X** on the filter paper instead.

No spots will be on the filter paper [1] / The solvent becomes the colour of the ink mixture [1].

C5 Substance **P** has a very high density, a fixed shape and a fixed volume.

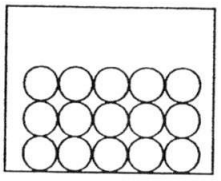


Fig. C5.1

(a) On Fig. C5.1, draw how the particles look like in substance **P**. [1]

(b) Describe the arrangement and the motion of the particles in substance **P**.

The particles are very closely packed in orderly manner [1].

The particles vibrate about their fixed positions [1].

Section D (20 marks)

D1 Fig. D1.1 shows the anatomy of an amoeba.

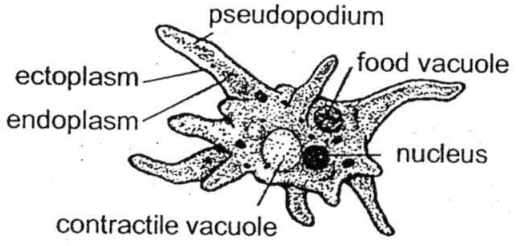


Fig. D1.1

(a) From D1.1, state one similarity between the amoeba and a plant cell.

They both have nucleus / vacuole [1].

(b) Amoeba is a unicellular organism that can take any shape that it likes. Explain why a plant cell is **not** able to do so.

A plant cell has a cell wall [1].

D2 Fig. D2.1 shows the structure of typical human cheek cells seen through a microscope.

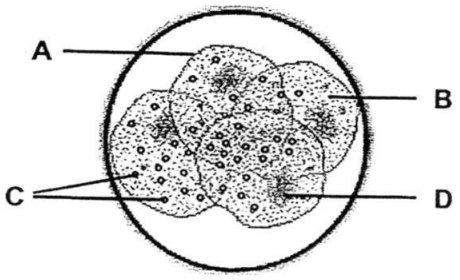


Fig. D2.1

(a) Name the structures labelled **A** and **B**.

(i) **A** **cell membrane [1]**

(ii) **B** **cytoplasm [1]**

(b) State the functions of structures labelled **C** and **D**.

(i) **C:** **Store water and nutrients [1]**

(ii) **D:** **Controls cell activities / contains chromosomes [1]**

D3 **(a)** Explain why is meant by '*division of labour*' in a multicellular organism.

It is the <u>breakdown of workload into smaller and specialised tasks</u> to be done by the cells, tissues, organs, and systems [1].

(b) State briefly the benefits of division of labour among cells, tissues, organs and systems in a multicellular organism.

It allows tasks to be performed quickly and <u>efficiently</u> [1].

D4 **(a)** Explain why it is necessary to classify living things.

To allow easier identification of living things / To identify relationship between living organisms / To allow systematic way of studying living things [1]

(b) Complete Fig. D4.1 to show how animals can be classified.

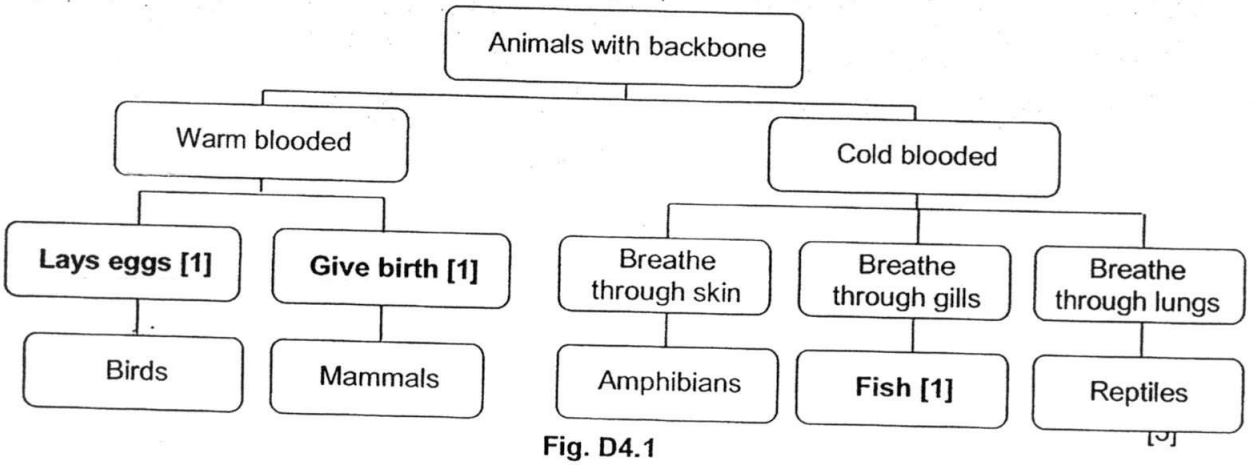


Fig. D4.1

[5]

(c) Explain why the classification shown in Fig. D4.1 is **not** a dichotomous key.

The animals are <u>not divided into two</u> at every level [1]

D5 Fig. D5.1 shows some organisms found in a particular habitat.

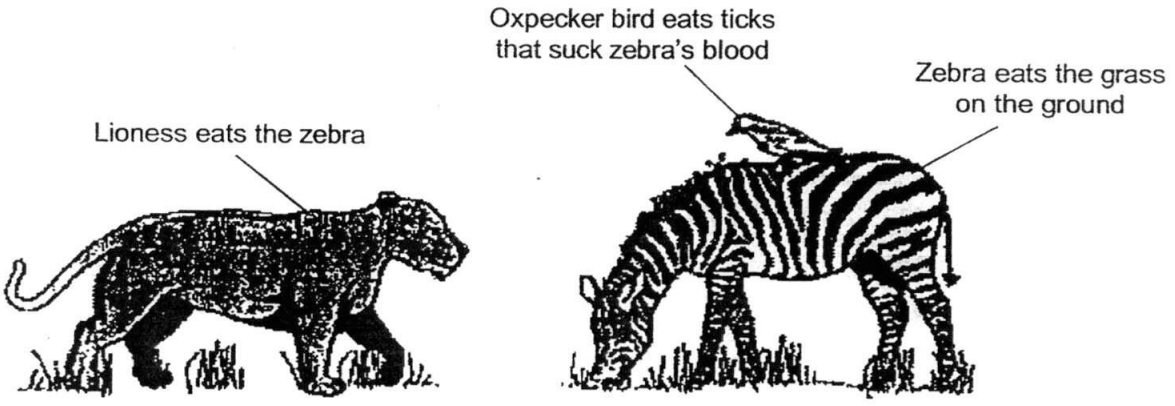


Fig. D4.1

(a) Based on the organisms shown and described in Fig. D9.1, draw a four-level food chain in the space provided below.

grass ==> zebra ==> tick ==> oxpecker bird [1]

(b) State the type of relationship between the following organisms:

(i) zebra and tick **parasitism [1]**

(ii) zebra and oxpecker bird **mutualism [1]**

(c) Which organism shown in Fig. D9.1 has the largest population? Explain your answer.

Grass [1]. It is provide enough energy for all organisms in the food chain [1]

(d) How is the population of the grass affected when the most of the lioness suddenly die due to a disease? Explain your answer.

Grass will decrease [1]. Lesser lioness means lesser predators to eat zebra, thus more zebras will eat up the grass [1].

Fuchun Secondary School
Secondary 1 Normal Academic EOY 2016

Section A [30 marks]
Answer **all** questions in this section.
Shade your answers in the Multiple Choice Answer Sheet provided.

1 A reagent bottle has the following sign on it.

What safety **precaution** should Yassin take when using this chemical?

A He should not touch the bottle.
B He should wear gloves when handling the bottle of chemical.
C He should not heat the liquid directly over a flame.
D He should store it near a flame.

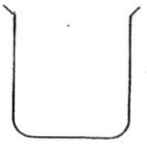
2 Which flame should we use to heat a substance strongly?

A luminous flame **B** non-luminous flame
C orange flame **D** sooty flame

3 Xin Ru did the following steps when she was conducting an experiment in a laboratory. Which of the steps is **incorrect?**

A She put on safety googles when she wanted to heat an unknown chemical.
B She poured back some unused chemicals back into its original bottle.
C She wore gloves before she handled chemicals on her table.
D She washed her hands thoroughly after she had conducted the experiment.

4 The diagram below shows the cross-sectional diagram for a laboratory apparatus.



What does the symbol represent?

A beaker **B** filter funnel
C measuring cylinder **D** test tube

5 A teacher carried out her first lesson in a class. The teacher asked her students the following questions about the study of Science.

I. Science is the study of the natural world.
II. Science is the study of the physical world.
III. Science is the study of the supernatural world.

Which statements represent the study of science?

A I and II only
B I and III only
C II and III only
D all of the above

6 Which of the following shows an example of the abuse of Science?

A The invention of new materials to make cloths.
B The creation of new programming codes.
C The making of pure samples of harmful drugs for consumption.
D The discovery of clean energy.

For question **7** and ***8***, refer to the table below.

The table below shows the data that Samuel collected for an experiment on falling objects.

mass of falling object (kg)	**height from which object was released (m)**	**time taken to reach ground (s)**

7 Which of the following statement(s) below could be the hypothesis that he tested?

I. The greater the mass of an object, the longer the time it takes to fall to the ground.
II. The lower the density of an object, the longer the time it takes to fall to the ground.
III. The greater the mass of a falling object, the greater the distance it falls.

A I only
B II and III only
C I and III only
D all of the above

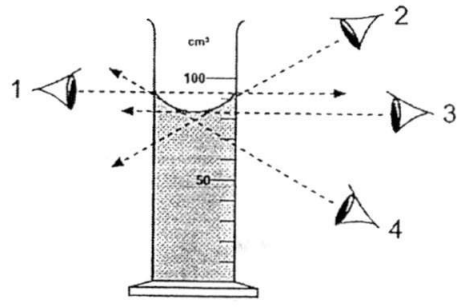
8 To improve the experiment, Samuel's teacher told him that he should ask himself more questions before carrying out the experiment.
Which of the following questions should Samuel have asked?

A Should the release height be measured in centimetres (cm) instead of metres (m)?
B How does the shape of the object affect the time taken to reach ground?
C Should the mass of the object be measured using an electronic balance or beam balance?
D Should the mass of the object be measured again after it reaches the ground?

9 What is the **smallest** length that can be measured by a pair of vernier calipers and a metre ruler respectively?

	Vernier calipers	**metre ruler**
A	0.1 mm	0.01cm
B	0.01cm	0.1cm
C	0.1cm	0.1cm
D	0.01cm	1.0cm

10 The diagram below shows a measuring cylinder containing water.
From which position will the **most** accurate reading of the volume of the water be made?



A position **1** B position **2**
C position **3** D position **4**

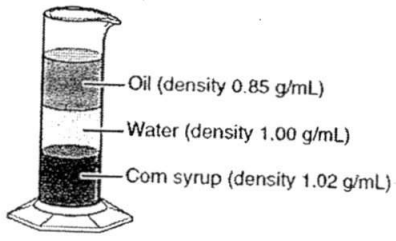
11 Terence wants to find out if his classmates with longer legs can run faster than those with shorter legs.
What measurement should he make to carry out his investigation?

A The weight of his classmates and their running speed.
B The height of his classmates and their running speed.
C The gender of his classmates and their running speed.
D The length of his classmates' legs and their running speed.

12 Students measured and recorded the density of four different liquids in the table below.

liquid	density (g/mL)
1	1.07
2	0.95
3	1.15
4	0.40

If the four liquids are poured into the measuring cylinder below, which liquid sample will **most** likely float on **oil**?



A liquid **1**
B liquid **2**
C liquid **3**
D liquid **4**

13 Which term is used to describe the amount of matter in an object?

A volume
B density
C weight
D mass

14 What is the SI unit for speed?

A m/s
B cm/s
C m/min
D km/hr

15 Electric wires are made from copper.
Which of the following is a physical property of copper?

A It can be easily pulled without breaking.
B It is a liquid at room temperature.
C It is a poor conductor of electricity.
D It reacts readily with oxygen.

16 Cooking utensils are always fitted with plastic handles.
Which property of plastics allows them for its use?

A Plastics are good conductors of heat.
B Plastics are not strong.
C Plastics are poor conductors of heat.
D Plastics have a high density.

17 Which property of a substance indicates if it is a liquid or solid at room temperature?

A melting point **B** hardness
C flexibility **D** solubility

18 Which of the following is **not** a physical change?

A Plastic is heated and moulded to desired shapes.
B Glass allows light to pass through.
C Wood is placed on the surface of the water.
D A dead tree decomposed and released carbon dioxide.

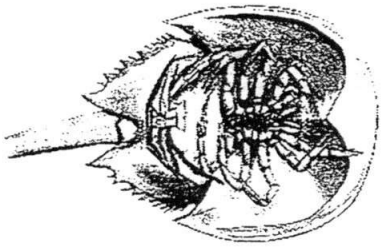
19 What does biodiversity refer to?

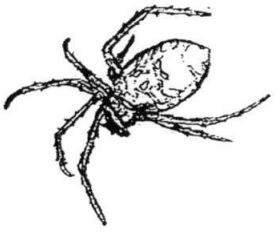
A the existence of different kinds of human races on earth
B the existence of different kinds of animals and plants on earth
C the existence of different kinds of animals on earth
D the existence of different kinds of plants on earth

20 Which of the following animals is **least** affected by the destruction of tropical rainforests?

A Pangolin **B** Orang Utan
C Paradise snake **D** Giant Panda

21 What do horseshoe crabs and spiders have in common?





A They are cold blooded.
B They live on land.
C They have four pairs of legs.
D They are venomous.

22 Which of the following groups consists of animals that have soft bodies and are protected by a shell?

A snails , clams, crab
B tortoise, clams, whales
C clown fish, octopus, centipedes
D spider, snake, jelly fish

23 Which of the following are found in the Periodic Table?

A elements **B** compounds
C mixtures **D** all of the above

24 How are elements classified?

A metals or non-metals
B mixtures and solutions
C solutions and suspensions
D chemical formulae and symbols

25 Which of the following rows is **correct**?

A	solvent	made up of solute and solution
B	solution	made up of solute and solvent
C	solution	made up of solute and solute
D	solute	made up of solvent and solution

26 Which of the following actions will **not** speed up the rate of dissolving of a sugar cube in a beaker of water?

A Lower the temperature of water by adding ice.
B Stir continuously.
C Increase temperature of the water by heating.
D Crush the sugar cubes into small pieces and swirl the beaker.

27 Which of the following groups is arranged from basic to complex order of organisation in a multicellular organism?

A cell → tissue → organ → system
B tissue → cell → system → organ
C system → organ → tissue → cell
D organ →system → cell → tissue

28 An amoeba has its nucleus removed. For 30 minutes, it continued to move and feed, but did not reproduce. A normal amoeba reproduced twice for the same period of time.
What conclusion can be drawn about the role of the nucleus in the amoeba?

A The nucleus is necessary for cell growth.
B The nucleus is necessary for reproduction.
C The nucleus is the only place that contains DNA.
D The nucleus regulates the activity of the cell.

29 What is the function of chlorophyll?

A absorbs light energy **B** absorbs carbon dioxide
C absorbs heat energy **D** absorbs oxygen

30 Which of the following has a large central vacuole?

A onion
B cheek
C brain
D blood

End of Section A

Section B [40 marks]
Answer **all** questions.
Write your answers in the spaces provided.

1 Use the Periodic Table to help you answer the following questions about magnesium.

(a) Write the chemical symbol of magnesium.

..... [1]

(b) Which Group is magnesium in?

.....[1]

(c) List the **two** physical properties of magnesium.

.....

..... [2]

(d) Explain your answer in part **(c)**.

.....[1]

2 Fig.1 shows the dichotomous key of organisms in Kingdom Plantae. Use Fig.1 to answer the questions.

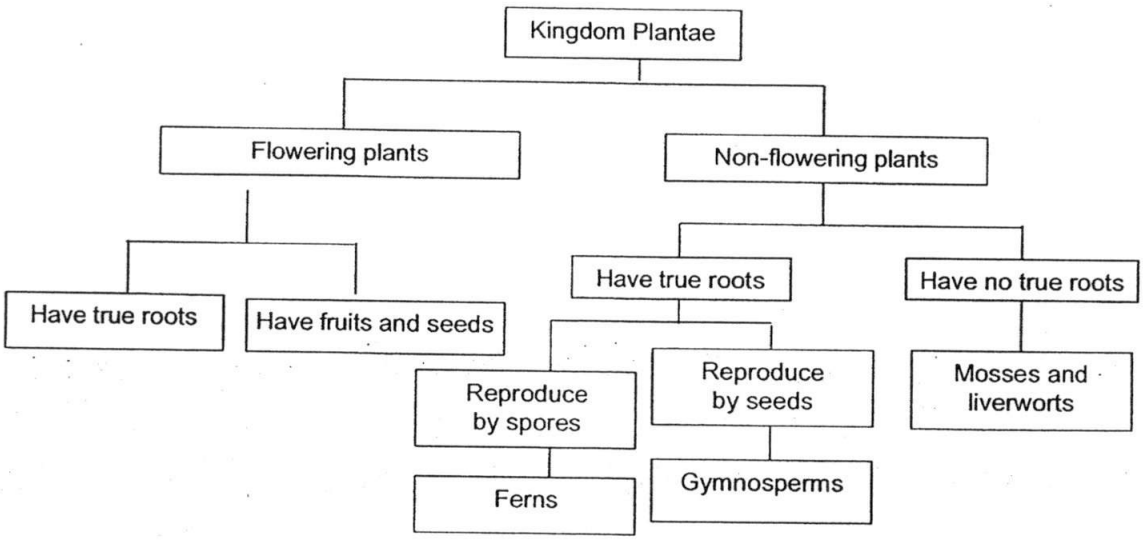


Fig. 1

(a) Identify a similarity between flowering plants and gymnosperms.

.....[1]

(b) For each of the following groups of plants, describe their characteristics.

(i) mosses and liverworts

.....

..... [1]

(ii) ferns

.....

.....[2]

3 **(a)** Choose the **correct** material for the following objects. Fill in the blanks in the Fig. 2 with the options given below.

Cotton; Glass; Plastic; Metal

Object	Material
bottle	.....
jewellery	.....
clothing	.....
vase	.....

[2]

Fig. 2

(b) State **two** physical properties of plastic in **3(a)**.

.....

..... [2]

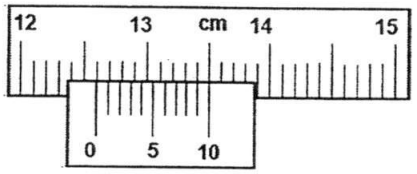
(c) Suggest a reason why the study of physical properties of materials is important to us.

.....

..... [1]

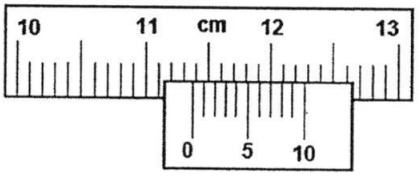
4 **(a)** Give the correct reading for each of the following.

(i)



..... cm [1]

(ii)



..... cm [1]

(b) Complete the Fig 3. by filling in the blanks with the appropriate quantity measured and the appropriate SI unit for the quantity.

Apparatus	Quantity measured	SI unit
Electronic balance	.....	.....
Digital stopwatch	.....	.....
Measuring tape	.....	.....

Fig. 3

[6]

(c) The distance between Reshme's house to her school is approximately 22 km. Calculate the journey time in minutes for Reshme to travel from the school to her house if the average speed of the school bus is 11 km/hour. Show your workings.

.....minutes [2]

5 An irregular shaped object is lowered into a meausring cylinder containing water. Fig 4.1 shows the reading before the solid is lowered into the water. Fig 4.2 shows the reading when the solid is in the water.

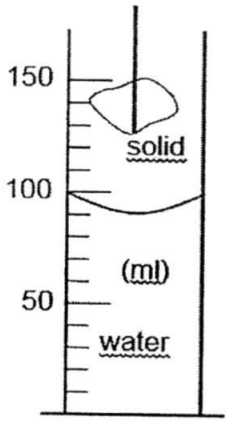


Fig 4.1

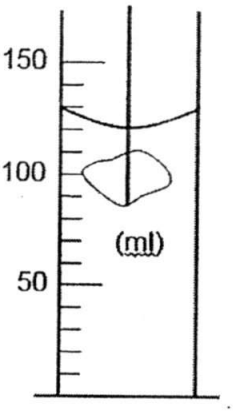


Fig 4.2

(a) State the volume of the water before and after the solid is lowered into the water.

volume of water before the solid is lowered (Fig 4.1) = ... ml

volume of water after the solid is lowered (Fig 4.2) = ... ml

[2]

(b) The mass of the solid is 50 g. Calculate the density of the solid. Leave your answer in 3 significant figures. Show your workings clearly.

.....g/cm^3 [3]

6 Fig 5. shows parts of a Bunsen burner.

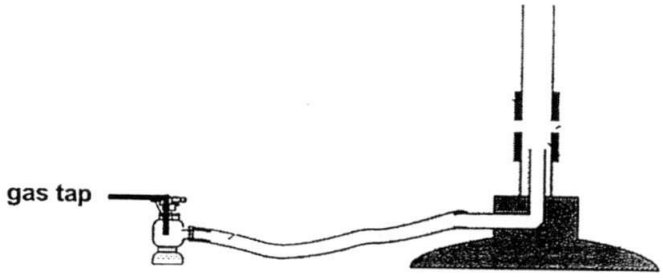


Fig. 5

(a) Use the words below to label the parts. Draw a straight line when labeling on Fig 5. An example has been done for you.

gas tap	air-hole	base
collar	barrel	

[4]

(b) Read the following situation carefully.

After the Science practical lesson in the Science laboratory, the students were dismissed for their recess. Some of the students went directly to the canteen, bought their food and immediately consumed them.

(i) Identify the unsafe behaviour exhibited by the students.

.....

.....[1]

(ii) What precaution should the students have taken?

.....

..... [1]

7 Fig. 6 shows a plant cell model.

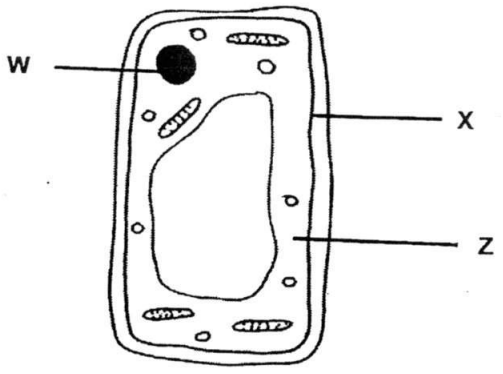


Fig. 6

(a) Label the cell parts.

X : .....

W: .....

Z: .....

[3]

(b) How is the plant cell different from an animal cell?

.....

.....[2]

End of Section B

Section C [30 marks]
Answer all **three** questions in this section.

8 After a learning journey to Lee Kong Chian Natural History Museum, a student constructed a dichotomous key on his learning as shown in Fig. 7

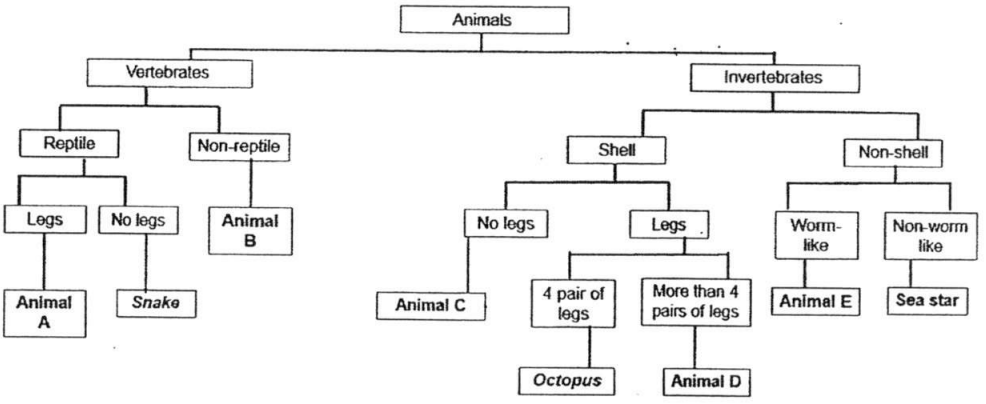


Fig. 7

(a) Suggest an example for animal **A** to **E** by using the dichotomous key. Two examples of animals are given in the dichotomous key.

animal **A**: .....

animal **B**: .....

animal **C**: .....

animal **D**: .....

animal **E**: ..... [5]

(b) Describe the characteristics of the *snake*.

.....

.....

.....[2]

(c) The *octopus* is closely related to the *nautilus*, as shown in Fig. 8.

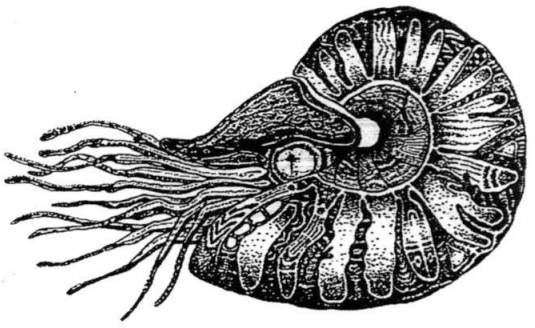


Fig. 8

(i) With reference to the dichotomous key (Fig.7) **only**, identify the special feature that the octopus has, but not the nautilus.

.....

.....[1]

(ii) Suggest how the feature identifed in **c(i)** helps the octopus survive in the ocean.

.....

.....[2]

9 John added two spoonfuls of salt to 50 cm^3 of water in beaker **A,** and two spoonfuls of chalk powder to 50 cm^3 of water in beaker **B**. After stirring, he left the mixures in beakers **A** and **B** to stand for 10 minutes each.

(a) Draw his experimental set up below.

[3]

(b) Identify the different variables for this experiment by using one of the words provided below for each blank.

salt , chalk, amount of water, salt mixture, chalk mixture, spoonful, spoon, stirring, beaker

independent variable : .....

dependendent variable : .....

constant : ..... [3]

(c) Identify the solute and solvent in the chalk mixture.

solute :.....

solvent:..... [2]

(d) Describe what John will observe in beakers **A** and **B** after 10 minutes.

.....

.....[2]

10 The melting and boiling points of three substances are given in Fig.9.

substance	melting point/ °C
N	-70
O	-20
P	100

Fig. 9

(a) At room temperature (28°C), which substance(s) will be in the liquid state?

.....[2]

(b) Explain your answer in part **(a)**.

.....

.....[1]

(c) Huge pieces of glacial ice may break off from a glacier and fall into the ocean to form ice bergs, as shown in Fig.10 below.

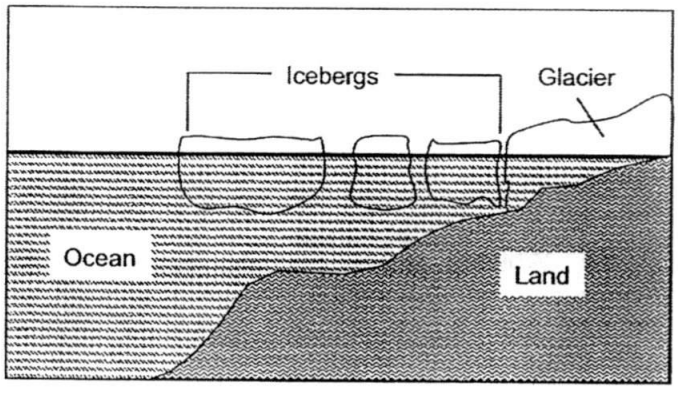


Fig. 10

(i) What evidence in Fig 10 indicates that icebergs have a lower density than water?

.....

.....[1]

(ii) A sample of ice berg and ocean water has a mass of 500 kg. Explain why the ice berg has a larger volume compared to ocean water of the same mass.

.....

.....[2]

(iii) Predict **one** environmental change that would **most** likely occur if all the glaciers on Earth melted.

.....

.....[1]

(d) In an experiment, three bags made of different materials, cotton, paper and plastic, were tested. Weights were added to them separately until the bags tore. The results are tabulated below in Fig 11.

	bag made of		
weight added for bag to tear (kg)	**cotton**	**paper**	**plastic**
	1.2	0.02	0.06

Fig. 11

(i) Which physical property was being tested in the experiment?

.....[1]

(ii) State **two** conclusions you can draw from the result of the experiment.

.....

.....[2]

End of paper

The Periodic Table of the Elements

Group I	Group II												Group III	Group IV	Group V	Group VI	Group VII	Group 0
																		4 He helium 2
						1 H hydrogen 1												
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	– Ra radium 88	– 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: $\begin{matrix} a \\ X \\ b \end{matrix}$ 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.).

Sec 1 NA EOY 2016 Mark Scheme

Section A

Q1	Q2	Q3	Q4
C	B	B	A
Q5	Q6	Q7	Q8
A	C	A	B
Q9	Q10	Q11	Q12
B	C	D	D
Q13	Q14	Q15	Q16
D	A	A	C
Q17	Q18	Q19	Q20
A	D	B	D
~~Q21~~	Q22	Q23	Q24
~~C~~	A	A	A
Q25	Q26	Q27	Q28
B	A	A	B
Q29	Q30	-	-
A	A	-	-

1a) Mg [1]

1b) Group II (**Reject** ' 2 ') [1]

1c) [2]
- It is a **metal**.
- It is **shiny.**
- It is a **solid** at room temperature/ **high melting point**
- It is a **good conductor** of heat/ good conductor of electricity.

(Do not accept strong, magnetic, high/ low density)

(2 marks for any of the above two points)

1(d)
- **Left hand side** of the periodic table are all **metals** [1]

OR

- It is a **metal.** (**Reject** repetitive answer; for example 1c) metal. 1d)metal

2a)
- Have true roots / have roots/ reproduce by seed/ have seeds [1]

2b)

i)
- Have **no** true roots (**Reject** non-flowering plants) [1]

ii)
- Have true roots
- Reproduce by spores [2]

3a)

- Plastic
- Metal
- Cotton
- Glass

[2]

1 Mark for 2 correct answer.

b)

- Translucent/ transparent
- High melting point
- Poor conductor of heat
- Resist to scratches
- Low density/ it is light
- The plastic does not break easily.
- The plastic is strong.
- Plastic is a poor conductor of electricity.

[2]

- **(Reject** durable)

(Accept any 2 points)

c)

- We can make something that does not **spoil**

[1]

OR

- The material suit the **uses** of the products.

(Candidates who attempt to use examples to support their claim can get 1m)

4ai)

- 12.5 cm + 0.10cm = 12.60cm OR 12.59 cm

[1]

4aii)

- 11.3 cm + 0.07cm11.37cm

[1]

b)

[6]

Apparatus	Quantity measured	SI unit
Electronic balance	**Mass**	**kg**
Digital stopwatch	**Time**	**s**
Measuring tape	**Length**	**m**

c)
- 22 / 11 = 2 hours
- 2 hours = 120 min

[2]

5a)
- Before : 90 ml
- After : 120ml

[2]

b)
- 120ml – 90 ml = 30 ml
- 50/ 30 = 1.67 g/ml

[3]

- If students shown the 30ml without working on the difference, award 1m
- Correct working on density= mass/ volume but wrong answer : 1m
- Do not penalise answers with wrong values from 5a. (e.c.f)
- Accept answer that is not 3 significant.

6a)
- Correct labels

[4]

6bi)
- Students **did not wash their hands** after the lab practical.

[1]

6bii)
- Students **must wash their hand** after the lab

[1]

7b)
- It has cell wall.
- It has a large vacuole at the centre.

[2]

- The plant cell has chloroplasts / chlorophyll.

No mark for wrong spelling
2 marks for 2 different features

7a)
- X: cell membrane
- W: nucleus
- Z: cytoplasm

[3]

No mark for wrong spelling

8a)
- Animal A: Sea turtle (Reptiles with legs)
- Animal B: Birds (mammals or amphibians)
- Animal C: Snails (Invertebrate + shell)
- Animal D: Prawns (crab, horseshoe crab)
- Animal E: caterpillar/ centipedes (**reject** worm)

[5]

8b)
- Snake has a **backbone** / a vertebrate and
- it **has no legs**.

[2]

. (Reject Reptiles)

8ci)

- Octopus has **eights tentacles/legs** / legs while **nautilus has more tentacles/legs**. [1]

OR

- Octopus **does not have outer shell** / shell is inside octopus

8cii) (Students must explain how the characteristic helps in the movement of the animal [1], and how that help it survive in the habitat [1]. [2]

- Eight tentacles help the Octopus walk on the ocean floor
- Hence, easier to hide from **predators/** ambush on its **preys**

OR

- Without a heavy shell on its body, **octopus** can swim very fast.
- This allow it to escape from its predator easily/ ~~easily camouflage~~/ hide in small crevices.

9a)

1m for correct cross-section diagram of beaker [3]
1m for same amount of water in the two beakers
1m for differentiation between salt water and chalk water (shaded or non-shaded) OR clear label on "salt water" or 'chalk water'

Reject spoon drawings.
(1 mark is deducted from pen drawing)

(b)

- Independent variable : salt / chalk [1m for any point] [3]
- Dependent variable: chalk mixture / salt mixture [1m for any point]
- Constant: spoonful of salt and chalk / amount of water in each beaker/ stirring [1m for any point]

(c)

- Solute: chalk [2]
- Solvent: Water

(d)

- Clear water in beaker A [2]
- Chalk settles at the bottom of beaker B/ Water in beaker B s cloudy.

10a)

- Substance N and O [2]

10b)

- Substance N **melt / change from solid to liquid** at -70 °C / -20 °C) [1]

(ci)

- Ice bergs **float** on the water. [1]

(cii)

- The density of a substance is the ratio [1] of its mass to volume. [1] [2]

OR

- The ice has **low** [1] + **density** [1].

(ciii)	• Sea level rise/ flooding (**Reject** global warming)	[1]
di)	• Strength	[1]
dii)	• Cotton is the strongest material. • Paper is the least strong material.	[2]

Name _____ Class _____ Reg. No _____

SENG KANG SECONDARY
BREAKTHROUGH

END OF YEAR EXAMINATION 2016
SECONDARY 1 NORMAL ACADEMIC
SCIENCE BIOLOGY
12 OCTOBER 2016
55 MINUTES

40

Set by: **Mrs Quek Soo Kim**
Vetted by: **Mrs Kim Ong**
Approved by: **Ms Wee Yee Yun**

Parent's signature : _____

This document consists of 9 printed pages.

Instruction to candidates:

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

There are **nineteen** questions in this paper. Answer **all** questions.

For **Section A**, there are four answers **A**, **B**, **C** and **D**. Choose the one you consider correct and record your choice in soft pencil on the separate Answer Sheet.

For **Sections B** and **C**, all answers should be written in the spaces provided on the question paper.

Any rough working should be done in this question paper.
The use of an approved scientific calculator is expected, where appropriate.

Section A [15 marks]

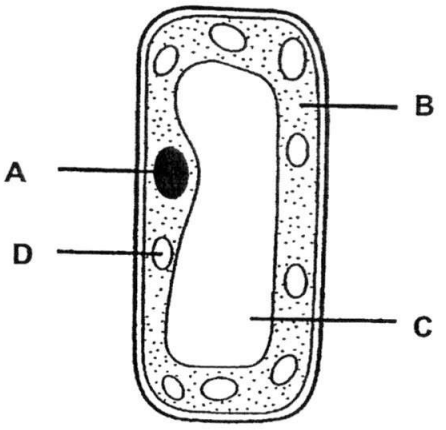
Answer **all** the questions in the OTAS provided.

1 Which part of the plant cell is partially permeable?

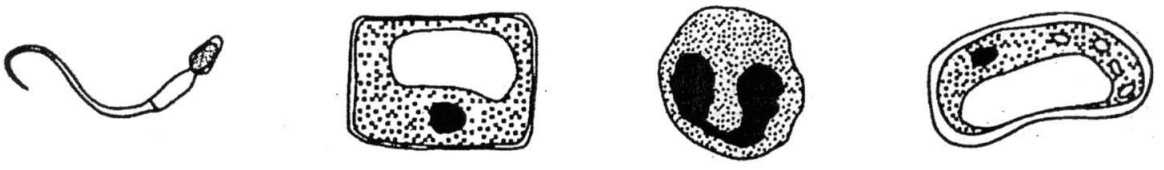
A cell wall
B cell membrane
C nucleus
D chloroplast

2 The diagram shows a cell from the leaf of a green plant.

In which part would chromosomes be found?



3 The diagram below shows four different cells as seen through a microscope.



1 2 3 4

Which two cells are plant cells?

A 1 and 2
B 1 and 3
C 2 and 4
D 3 and 4

4 Which row in the table below lists the structures 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

5 A dichotomous key classifies organisms by dividing a group into _____.

A any number of groups each time
B four smaller groups each time
C three smaller groups each time
D two smaller groups each time

[Turn over

6 Which of the following statements is correct?

A Biodiversity is the existence of different human races on earth.
B Biodiversity is the existence of different kinds of animals on earth.
C Biodiversity is the existence of different kinds of plants on earth.
D Biodiversity is the existence of different kinds of animals and plants on earth.

7 Which statement would you **not** use when classifying an animal with a backbone?

A It lives on land.
B It is warm- blooded.
C It produces its own food.
D Its body is covered with feathers.

8 Which of the following depicts the correct order for the passage of food through the alimentary canal?

A mouth → colon → stomach → small intestine → oesophagus
B mouth → oesophagus → small intestine → stomach → colon
C mouth → oesophagus → stomach → small intestine → colon
D mouth → stomach → oesophagus → small intestine → colon

9 Digestive enzymes are special types of proteins which _____.

A speed up the process of digestion
B relax the muscles in the alimentary canal
C dissolve the nutrients in the food
D combine small molecules into big molecules

10 A food is known to contain reducing sugar and protein.
When this food is tested for reducing sugar and protein, what colours would a student observe?

	reducing sugar test	protein test
A	blue	blue
B	blue	violet
C	brick red	blue
D	brick red	violet

[Turn over

11 The following substances can be found in the bloodstream of the small intestine except _____.

A amino acids
B glucose
C fatty acids
D starch

12 Saliva contains an enzyme that digests _____.

A fats
B protein
C sugars
D starch

13 Which enzyme will digest peanut oil in the alimentary canal and what are the products formed?

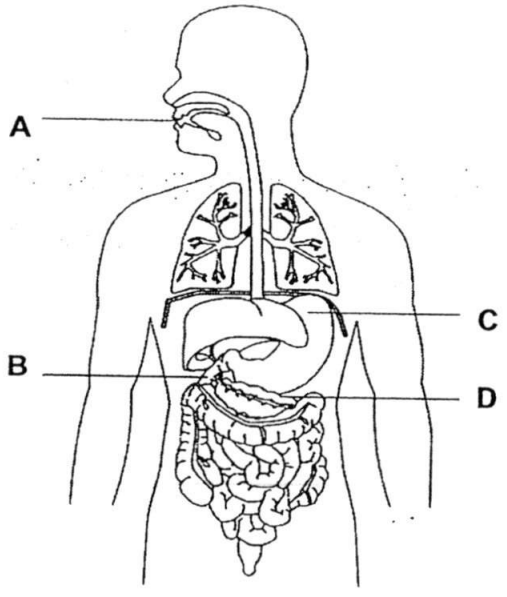
	enzyme	products
A	lipase	amino acids
B	lipase	fatty acids and glycerol
C	protease	amino acids
D	protease	fatty acids and glycerol

14 What is the function of the gall bladder?

A absorption of fat
B digestion of fat
C production of bile
D storage of bile

15 The human digestive system is shown below.

Where does the digestion of starch begin?



Section B [15 marks]

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

16 Fig. 16.1 shows three human cheek cells.

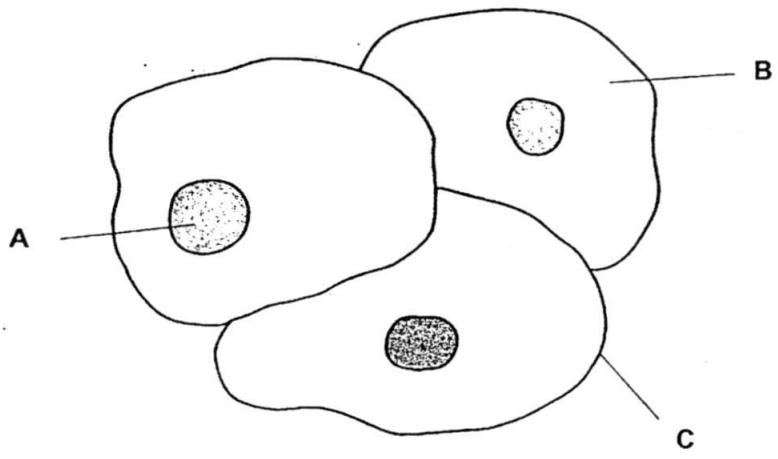


Fig. 16.1

(a) Name the structures labelled **A**, **B** and **C** in Fig.16.1.

A - ..... **C** - .....

B - ..... [3]

(b) State two features that show these are animal cell.

1. .....

2. ..... [2]

(c) State the function of **C**.

..... [1]

[Turn over

17 Fig. 17.1 shows four fruits commonly found in Singapore. Mango and tomato are edible fruits.

Fig. 17.1

Fig.17.2 is the dichotomous key that shows how the four fruits can be classified.

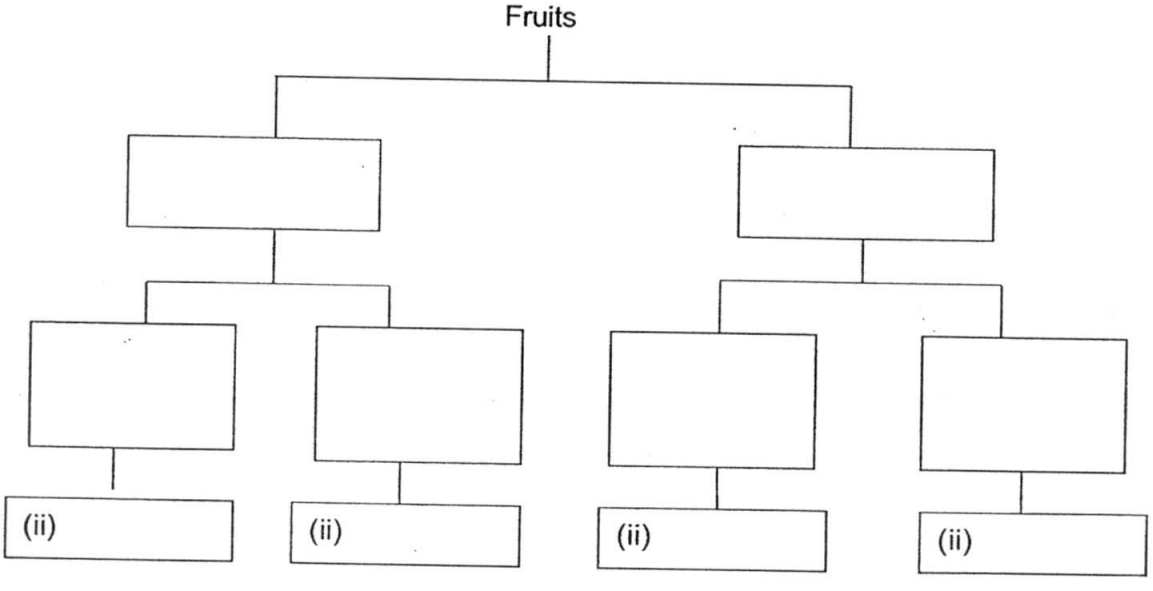


Fig. 17.2

[3]

(i) Fill in the boxes in Fig. 17.2 with the help of the following keys :

-edible or inedible
-one seed or many seeds
-has fibrous husk or has wing-like structure

(ii) Hence, identify the fruits by filling in the boxes in Fig. 17.2. [2]

[Turn over

18 Fig. 18.1 shows a comic strip on the digestion of food.

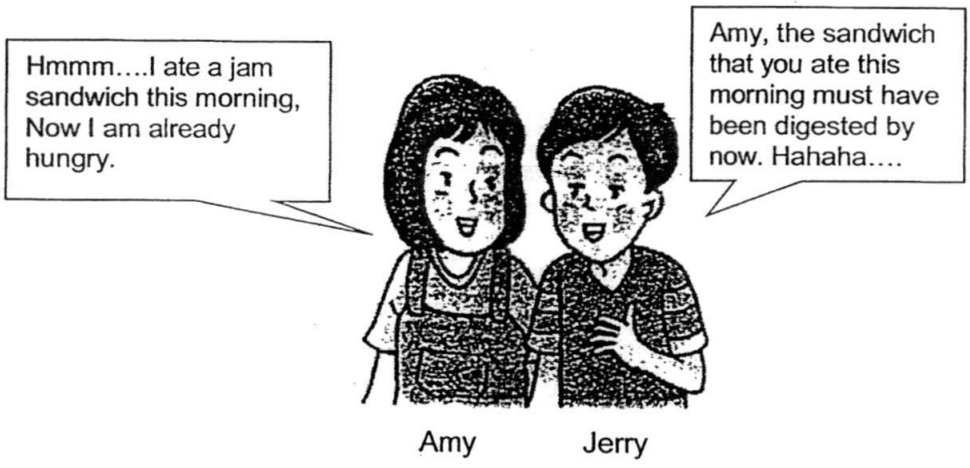


Fig. 18.1

(a) What does Jerry mean by 'sandwich ..... must have been digested'?

.....

..... [1]

(b) In an experiment, saliva is mixed with a small piece of bread.
Another small piece of bread was mixed with water as the control set-up.
After 30 minutes, a few drops of iodine were added to both set ups to test for the presence of starch.
Change in colour of iodine was observed.

(i) What is the colour of iodine for the set-up using saliva?

..... [1]

(ii) Explain your answer to **(a)(i)**.

.....

..... [2]

[Turn over

Section C [10 marks]

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

19 Fig.19.1 shows part of a digestive system.

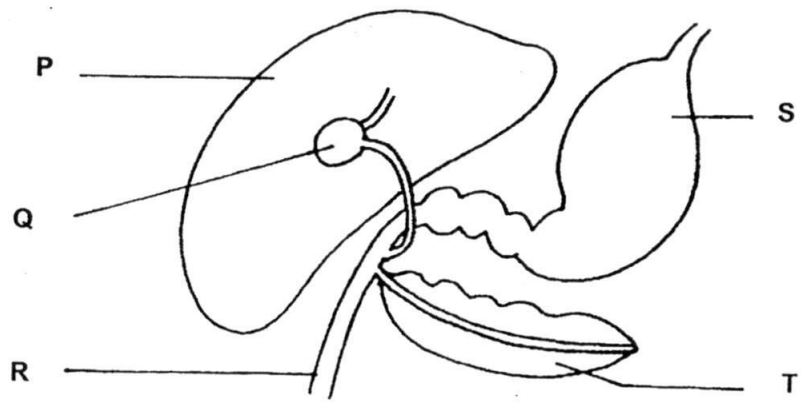


Fig. 19.1

(a) Name the structures labelled **P** to **T**.

P - ..... **S** - .....

Q - ..... **T** - .....

R - ..... [3]

(b) **(i)** Name the nutrient digested in **S**.

..... [1]

(ii) **S** produces hydrochloric acid.
What is the function of hydrochloric acid?

..... [1]

(c) **(i)** Name an enzyme produced by structure **T**.

..... [1]

(ii) Hence, write a word equation to show the action of this enzyme you have named in part **(c)(i)**.

..... [1]

[Turn over

(d) Fig 19.2 shows the appearance of droplet of fat in the human alimentary canal.

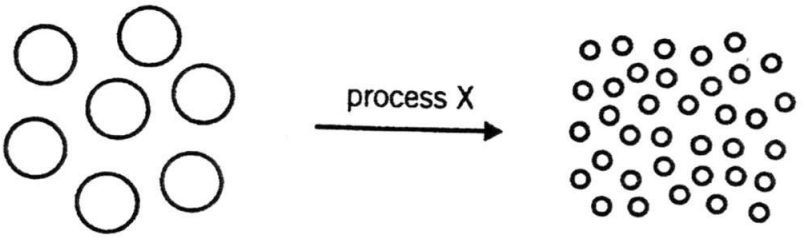


Fig. 19.2

(i) Process X is known as emulsification.
Name the substance that carries out emulsification.

..... [1]

(ii) Using Fig. 19.2, explain how this substance helps in the digestion of fat.

.....

.....

..... [2]

END OF PAPER

1 NA BIO EOY 2016 ANSWER SCHEME

SECTION A: Multiple Choice Questions (15 marks)

Enter answers in the table below.

1	B	**2**	A	**3**	C	**4**	B	**5**	D
6	D	**7**	C	**8**	C	**9**	A	**10**	D
11	D	**12**	D	**13**	B	**14**	D	**15**	A

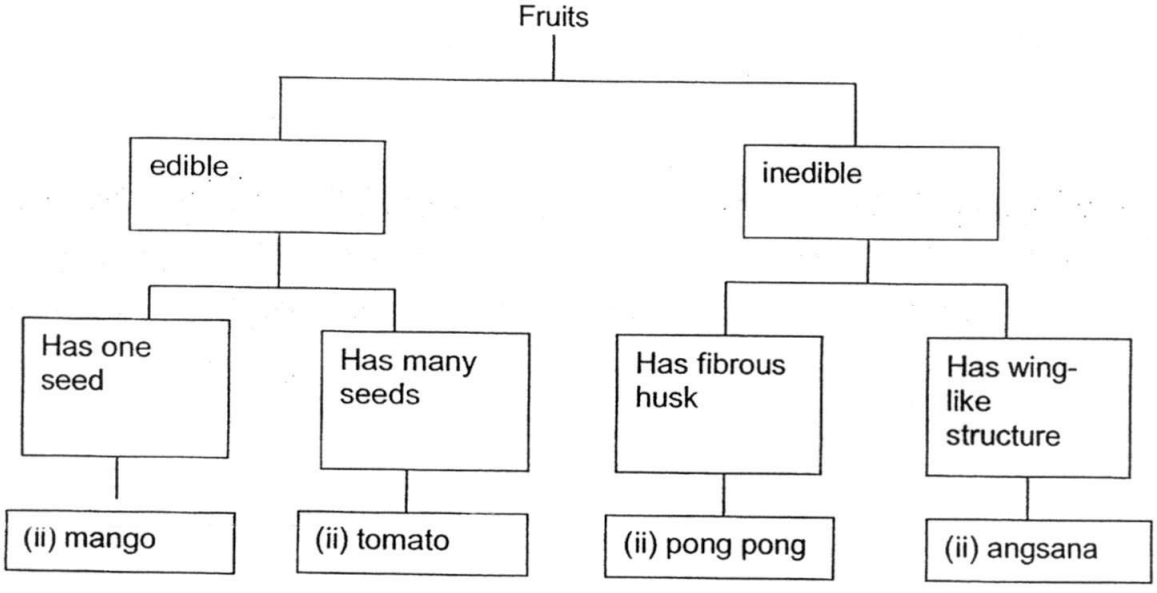
SECTION B: Short Answer Questions (15 marks)

16 **(a)** A - nucleus
B - cytoplasm
C - cell membrane

(b) Any 2 answers
Cell wall is absent [1]
Chloroplasts are absent. [1]
There is no large central vacuole [1]

(c) C controls the movement of substance in and out of the cell. [1]

17 **(a)** i) 2 correct-1m
4 correct-2m
6 correct-3m



ii) 2 correct- 1m
4 correct- 2m

18 **(a)** The sandwich has been broken down into small soluble molecules [1]

(b) **(i)** Yellow brown/ The iodine solution remains brown. [1]

(ii) Enzyme/Amylase [1] in the saliva digest the starch [1] to maltose. Starch is no longer present.

SECTION C: Long Answer Questions (10 marks)

19 **(a)** P- Liver

S- stomach

Q- gall bladder

T- pancreas

R- small intestine/duodenum

2 correct- 1m
4 correct- 2m
5 correct- 3m

(b) **(i)** Protein [1]

(ii) Hydrochloric acid kills microorganisms/bacteria in the food. [1]

(c) **(i)** Amylase/Protease/Lipase [1]

(ii)

$$\text{Starch} \xrightarrow{\text{amylase}} \text{Maltose}$$

$$\text{Protein} \xrightarrow{\text{protease}} \text{amino acid}$$

$$\text{fats} \xrightarrow{\text{lipase}} \text{fatty acid and glycerol}$$

Any one- 1m (all parts must be correct)

(d) **(i)** bile [1]

(ii) Bile converts large fats substance into small oil droplets. [1]
This increase the surface area to volume ratio [1] so that lipase can digest the fats easily.

5

NAME	CLASS	INDEX NO.

Parent's/Guardian's Signature: _____ Date: _____

ST. PATRICK'S SCHOOL
END-OF-YEAR EXAMINATIONS 2016

SUBJECT : GENERAL SCIENCE

LEVEL : SECONDARY 1 NORMAL (A)

DATE : 10 OCTOBER 2016

DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

1. Write your name, class and index number on the **Question Papers** and the **Optical Answer Sheet** in the spaces provided. **It is also required that you SHADE your index number on the Optical Answer Sheet.**
2. This paper consists of **Three (3) Sections: Section A, Section B** and **Section C.**
3. Answer **ALL** questions in **Section A** on the **Optical Answer Sheet** provided.
4. Answer **ALL** questions in **Section B** in the spaces provided.
5. Answer **THREE FULL** questions in **Section C** in the spaces provided.
6. Calculators may be used where necessary. **Where numerical answers are not exact, give answers to Three (3) significant figures.**
7. **DO NOT DETACH** any sections from this paper.
8. Submit the **Optical Answer Sheet** and **this paper SEPARATELY.**

For Examiner's Use Only

Section	A (30 m)	B (40 m)	C (30 m)	Ttl (100 m)	Grade	Target Grade
Score						

This question paper consists of 22 printed pages.
A copy of the Periodic Table is provided on page 22.

SECTION A : [30 marks]

*Each question is provided with **four** possible answers (**A**, **B**, **C** and **D**). Select the most appropriate answer and **shade** your choice on the **Optical Answer Sheet** provided.*

1 The following statements show the various skills practiced by a scientist when carrying out an experiment.

I Records down his observations.
II Draws conclusions from his observations.
III Changes results to prove his hypothesis.
IV Researches thoroughly on his experiment.

What are some procedures that a good scientist should follow?

A I and IV only
B II and III only
C I, II and IV
D All of the above

2 Which one of the following statements describes the harmful effect of technology?

A The introduction of new vaccines and medicines to treat and prevent diseases.
B The invention of high speed Maglev train to transport people between cities.
C The use of machines on farms to grow vast quantities of food within a short period of time.
D The constant need to keep up with technology such as computers and hand phones has resulted in large amount of electronic junk.

3 The following show steps carried out when lighting a Bunsen Burner.

I strike the lighter
II open the air-hole
III close the air-hole
IV turn on the gas tap

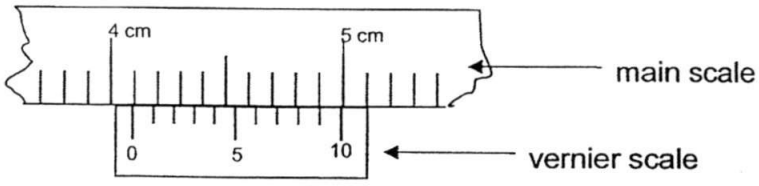
Which one of the following shows the correct steps in lighting a Bunsen burner safely?

A I → II → III → IV
B II → I → IV → III
C III → IV → I →II
D IV → III → I → II

4 Which one of the following physical quantities is correctly matched to its S.I. unit?

	Base quantity	S.I. unit
A	Length	kilometre
B	Mass	gram
C	Temperature	kelvin
D	Time	minutes

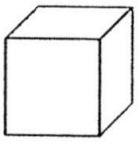
5 The diagram below shows a reading on a vernier caliper.



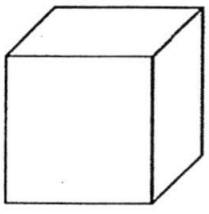
Which one of the following shows the correct reading?

A 4.09 cm
B 4.19 cm
C 4.10 cm
D 4.90 cm

6 The diagram below shows two metal cubes of different sizes. Both of the cubes are made from pure silver.



Cube **A** weighs 3 kg



Cube **B** weighs 5 kg

Which one of the following statements is true about the densities of metal cube **A** and **B**?

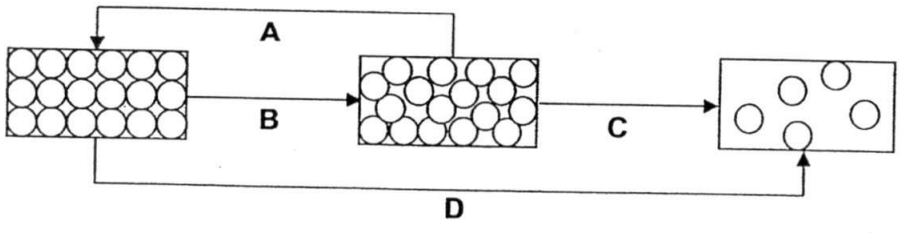
A Cube **A** and cube **B** have the same density.
B Cube **A** has a higher density than cube **B**.
C Cube **B** has a higher density than cube **A**.
D The densities of cube **A** and cube **B** are 3 kg/m^3 and 5 kg/m^3 respectively.

7 Which of these properties would be suitable for the material used in making a wire apart from it being a good conductor of electricity?

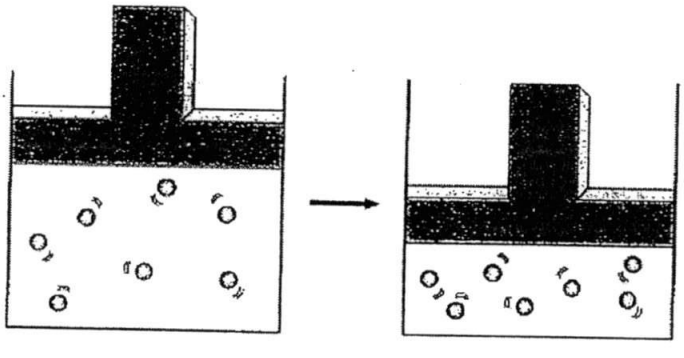
I ductile
II high melting point
III good conductor of heat

A I only
B II and III only
C I and III only
D All of the above

8 Which one of the following processes represent boiling?



9 The following diagram shows an experiment carried out on gases.



The experiment shows that gases can _____.

A be compressed
B vibrate at fixed positions
C occupy any available space
D diffuse faster into the surrounding

10 The following table shows the forces of attraction between particles during a

change in state.

Forces of attraction between particles before change of state:	Forces of attraction between particles after change of state:
very strong forces of attraction	extremely weak forces of attraction

Which one of the following represents the substances?

A Water turning into ice
B Water turning into water vapour
C Ice turning into water
D Ice turning into water vapour

11 Which one of the following sub-atomic particles can be found in the nucleus of an atom?

A Neutrons only
B Neutrons and protons
C Electrons only
D Electrons and neutrons

12 Which one of the following is the smallest particle in an atom?

A Proton
B Electron
C Neutron
D Nucleus

13 Hydrogen peroxide has the chemical formula H_2O_2. Which one of the following statements about hydrogen peroxide is correct?

A It is a mixture that contains the elements helium and oxygen.
B It is a mixture that contains the elements hydrogen and oxygen.
C It is a compound that contains the elements helium and oxygen.
D It is a compound that contains the elements hydrogen and oxygen.

14 Which one of the following groups contains three mixtures?

A Air, petrol, sea water
B Air, sand, helium
C Sugar, bronze, water
D Table salt, sugar, alcohol

15 Which one of the following statements shows a characteristic of a suspension?

A It is homogenous.
B Light is able to pass through completely.
C The proportion by mass for the components is not fixed.
D The properties of the suspension is the same as the constituent components.

16 Which one of the following statement(s) is/are correct about magnetic force?

I It is a non-contact force.
II It is a force of attraction or repulsion.
III Any objects which have masses can exert magnetic force on each other.

A I only
B II only
C I and II only
D II and III only

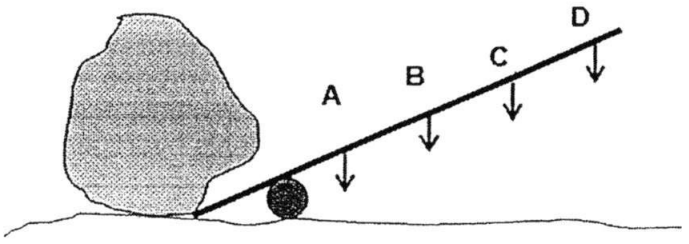
17 The gravitational force on the Moon is about one-sixth that on Earth. What is the mass of an astronaut on the Moon who has a mass of 70 kg on Earth?

A 11.7 kg
B 70 kg
C 117 N
D 700 N

18 Which one of the following shows a positive effect of friction?

A Heat produced by friction wears out tires of vehicles.
B Machines work less efficiently when friction is produced.
C Friction produced between the tires and the road slows down a racer.
D Friction between brakes and wheels slows down a bicycle on a downward slope.

19 The diagram shows a bar used to lift a rock. At which point will the **least** force be required to lift the rock?



20 The table given below shows pairs of energy and its source. Which one of the pairs is **wrongly** matched?

	Energy	Source
A	Geothermal energy	Escaping steam from earth
B	Hydraulic energy	Plants
C	Chemical energy	Rice
D	Solar energy	Sun

21 Which one of the following statements regarding the relationship between energy

and work done is correct?

A Energy is required to do work.
B Work can be done without any energy,
C As long as energy is used, some form of work must be done.
D Total amount of energy used equals to the total amount of work done.

22 Which one of the following is a feature of a dichotomous key?

A It uses similarities to divide a group.
B It can be used to classify plants only.
C It only divides a group based on structure.
D It divides a group into two sub-groups at each stage.

23 Which statement(s) is / are true about bacteria?

I Bacteria can be found in all types of places such as water, soil, food and even in our body.
II Bacteria may be beneficial as certain kinds of bacteria are used in waste treatment plants to break down waste into harmless product.
III Bacteria may be harmful as it can infect our digestive system and leads to diseases such as food poisoning.

A **I** only
B **II** only
C **I** and **III** only
D All of the above

24 Which one of the following does the diagram represent?

A Abiotic environment
B Community
C Ecosystem
D Population

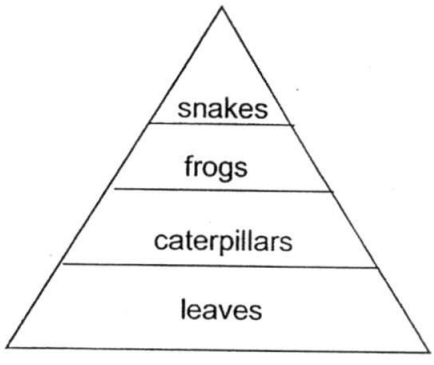
25 The following shows the equation for photosynthesis.

$$P + Q \xrightarrow[\text{sunlight}]{\text{chlorophyll}} R + S$$

Which one of the following options identifies **P**, **Q**, **R** and **S** correctly?

	P	Q	R	S
A	Carbon Dioxide	Glucose	Oxygen	Water
B	Oxygen	Water	Carbon Dioxide	Glucose
C	Carbon Dioxide	Oxygen	Glucose	Water
D	Carbon Dioxide	Water	Oxygen	Glucose

26 Which one of the following statements about the food pyramid shown is correct?



A Frogs feeds on leaves.
B Snakes has the largest population.
C The number of snakes is less than the number of frogs.
D The number of leaves is less than the number of caterpillars.

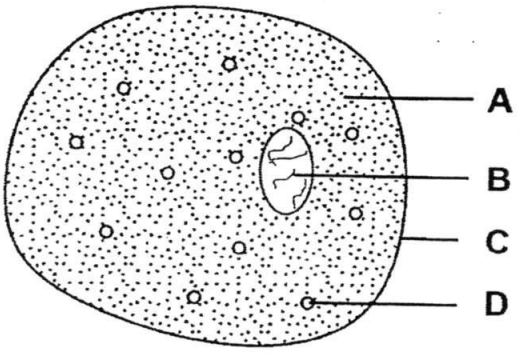
27 Which situation does **not** pose a threat to biodiversity?

A Preventing a hungry snake from attacking its prey.
B Using slash and burn method to clear land for use.
C Spraying insecticide to kill all the ants in the kitchen.
D Throwing a pet tortoise into the reservoir to get rid of it.

28 Which one of the following statements about cells are true?

A Cells are made up of tissues.
B Cells are the basic unit of all matter.
C All cells have a fixed shape and size.
D Cells can be seen with the naked eye.

29 Isaac realised that he has the same type of earlobe as his mother. Which part of the cell determines this characteristic?



30 Why is it important to have division of labour in a multi-cellular organism?

A It reduces the energy required in a multi-cellular organism.
B It reduces the waste products produced in a multi-cellular organism.
C It enables efficient functioning of the processes in a multi-cellular organism.
D It enables the multi-cellular organism to better defend itself against bacteria.

SECTION B : [40 marks]

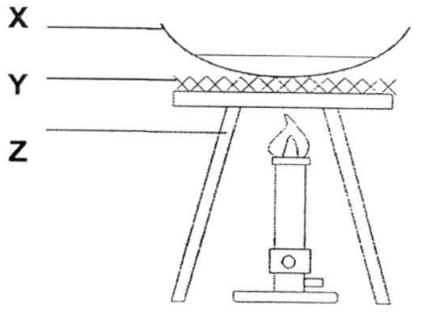
Answer **ALL** *questions in this section. Show your working and write your answers in the space provided.*

1 The diagram below shows an experiment setup to obtain salt from sea water. Name the apparatus labelled **X**, **Y**, and **Z** in the following diagram.

X: ..... **[1]**

Y: ..... **[1]**

Z: ..... **[1]**

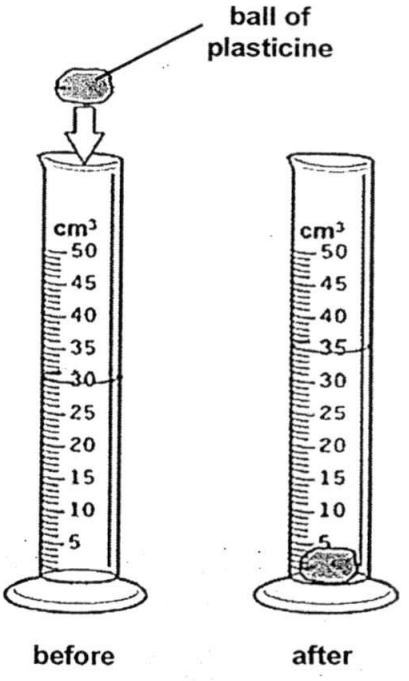


2 The following diagram shows readings before and after a ball of plasticine was placed into the measuring cylinder.

(a) Find the volume of the ball of plasticine. Show your workings clearly.

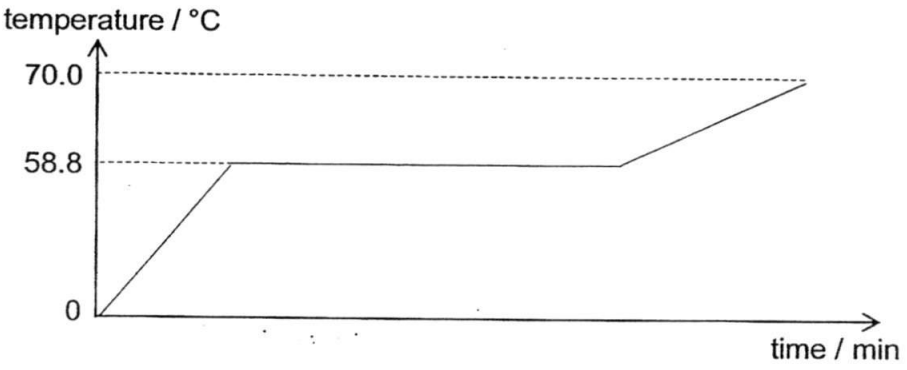
[1]

(b) Given that the density of the plasticine is 1.8 g/cm^3, find the mass of the ball of plasticine. Show your workings clearly.



[2]

3 The following heating curve is obtained when liquid bromine is heated from 0 °C to 70 °C.



(a) **(i)** Name the change of state that took place at 58.8 °C.

.....

[1]

(ii) Even though heat is supplied during the change of state in **(a)(i)**, why does the temperature remain constant?

.....

.....

[2]

(b) Describe the arrangement and movement of the bromine molecules at 70 °C.

Arrangement:

.....

.....

[1]

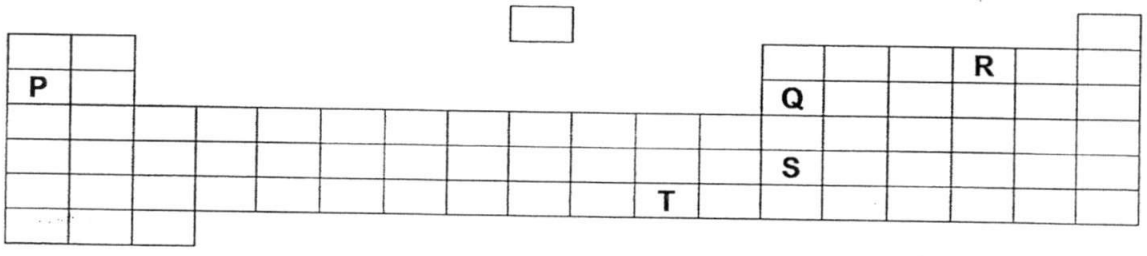
Movement:

.....

.....

[1]

4 The diagram shows a simplified structure of the Periodic Table of elements **P**, **Q**, **R**, **S** and **T**.



(a) **(i)** State the elements (**P**, **Q**, **R**, **S** and **T**) which are in the same **group**.

..... and ..... **[1]**

(ii) State the elements (**P**, **Q**, **R**, **S** and **T**) which are in the same **period**.

..... and ..... **[1]**

(b) Which two element have similar chemical properties? Explain your answer.

.....

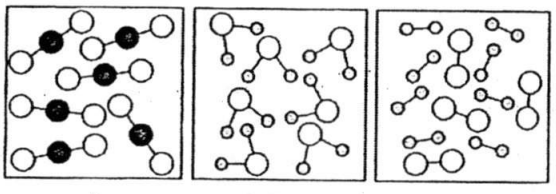
..... **[2]**

(c) Describe **two** differences in physical properties between elements **R** and **T**.

.....

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

5 The following diagrams labelled **A**, **B** and **C** represent the particles in different substances.



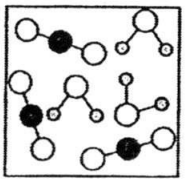
Using the letters **A**, **B and C** answer the following question.

(a) Which of the diagrams above represents compounds? Explain your answer.

.....

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

(b) The following diagram shows substance **D**.



D

Is substance **D** a mixture of elements, compounds or both elements and compounds? Explain your answer.

.....

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

6 When eggs are dropped or hit lightly, they crack. However, when a person weighing 600 N stands on a carton of eggs, the eggs do not crack.

(a) Explain how the eggs are able to withstand the weight without cracking.

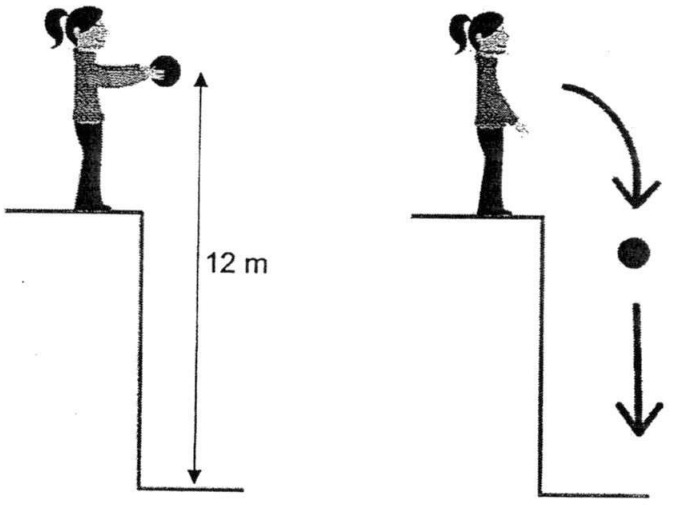
.....

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

(b) Given that the surface area of both feet in contact with the carton of eggs is 0.0252 m^2, calculate the pressure exerted on the carton of eggs by the person with a weight of 600 N.

[2]

7 The following diagram shows a girl dropping a ball from a height of 12 m.



(a) (i) State the principle of conservation of energy.

.....

..... [2]

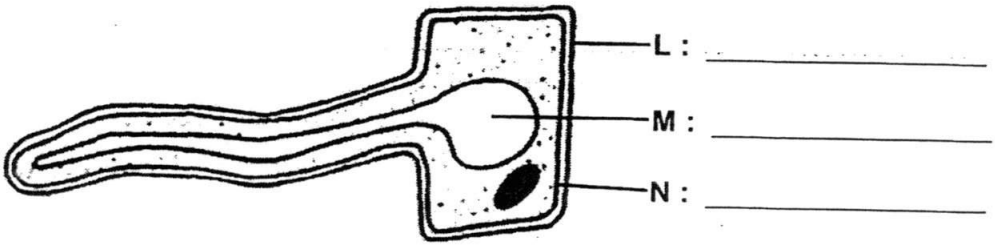
(ii) The amount of gravitational potential energy before the ball is dropped is 240 J. Using the principle of conservation energy, predict the maximum amount of energy converted into kinetic energy right before the ball hits the ground.

..... [1]

(b) The average speed of the ball as it falls was calculated to be 7.75 m/s. Calculate the time taken for the ball to hit the floor in seconds.

[2]

8 The following diagram shows a cell.



(a) Label the parts **L**, **M**, and **N** in the diagram above. **[3]**

(b) Is the cell shown in the diagram a plant cell or an animal cell? Give **two** reasons to explain your answer.

.....

.....

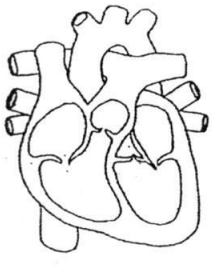
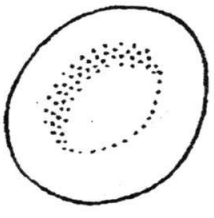
..... **[2]**

9 **(a)** Define 'division of labour'.

.....

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

(b) Identify if the following diagrams is an **organ**, **tissue** or **cell**. *(The options can be used once, more than once or not at all.)*

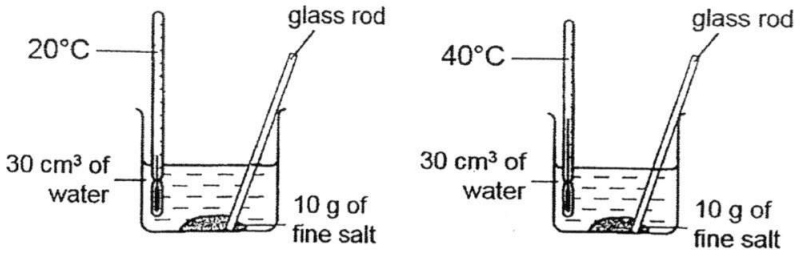
		
(i) _____	**(ii)** _____	**(iii)** _____

[3]

SECTION C: [30 marks]

Each question is worth **10 marks**. *Answer* ***THREE OUT OF FOUR*** *questions in this section. Write your answers on the spaces provided.*

1 (a) An experiment was conducted to investigate a specific factor that affects the rate of dissolving of salt. The set-up for the experiment is shown in the following diagram.



(i) Suggest a suitable hypothesis for the experiment conducted.

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

(ii) Identify the following variables for the experiment.

(A) An independent variable: ..... **[1]**

(B) A dependent variable: ..... **[1]**

(C) Two constant variables: ..... **[1]**

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

(iii) In which beaker (**X** or **Y**) will the 10 g of salt dissolve faster? Explain your answer.

.....

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

(iv) In terms of water particles and salt particles, suggest what happens when salt crystals dissolve in water.

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

(b) State the **two other** factors that affect the rate of dissolving.

Factor 1: .....

Factor 2: ..... **[2]**

2 (a) (i) What is an element?

..... [1]

(ii) Using information from the Periodic Table, complete the following table on two of the elements found in baking soda.

Element	No. of Protons	No. of Neutrons	No. of Electrons
Carbon			
Sodium			

[3]

(b) The elements above can be found in chemical substances used in our everyday lives. For example, baking soda is used when making cakes to allow the flour to rise. It is known as sodium bicarbonate. Water and sodium chloride are also examples of chemical substances made up of elements.

Using the example give, complete the blanks in the following table.

name of substance	formula of substance	number of atoms of each element
Sodium bicarbonate	*$NaHCO_3$*	*1 sodium, 1 hydrogen, 1 carbon, 3 oxygen*
	CO_2	
Sodium chloride		*1 sodium, 1 chlorine*

[3]

(c) Baking soda is a white solid. The appearance of baking soda is different from that of carbon and sodium. Carbon and sodium cannot be obtained by filtration as well.

Give **three** reasons why baking soda is a compound and not a mixture.

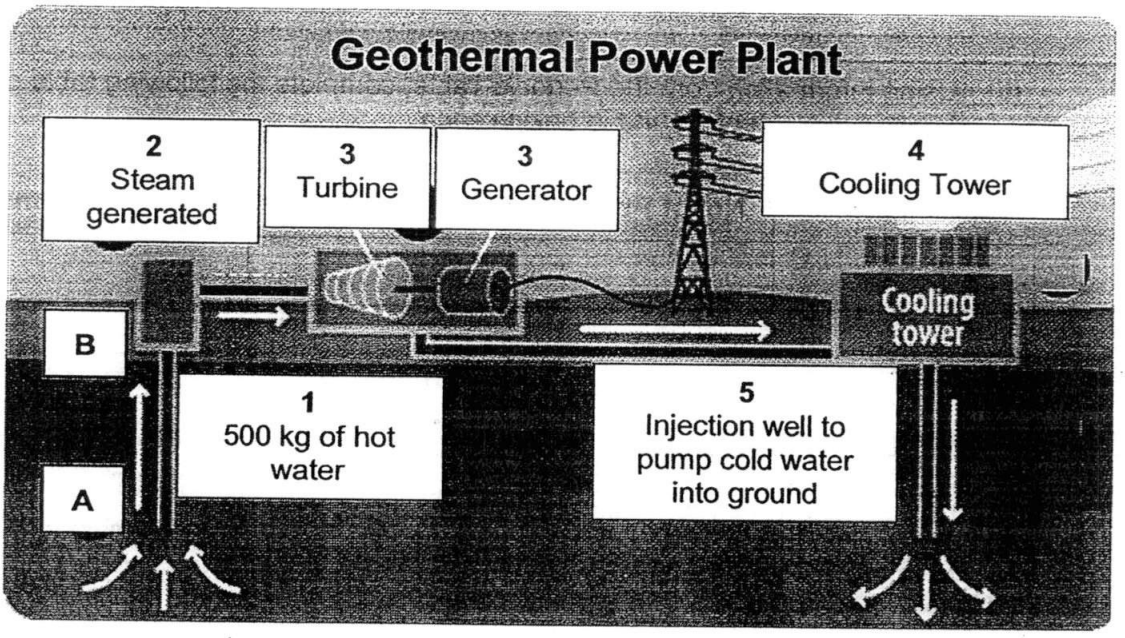
Reason 1: .....

Reason 2: .....

Reason 3: ..... [3]

3 Electricity is generated in a geothermal power station by using the heat from the

ground. This electrical energy will be transferred to houses and used to power various housing appliances.



(a) State the energy conversion from the formation of steam to powering household appliances.

..... energy

from the ground heats up to form steam.

⇩

..... energy

of steam turns the turbines.

⇩

..... energy

of turbines turns the generator

⇩

..... energy is converted to

..... energy by the generator. **[5]**

(b) Hot water rising from below the ground boils into steam to turn the turbine. 500 kg of water flows from **A** to **B**.

(i) the weight of the water. (*The gravitational field strength, g, is 10 N/kg.*)

(ii) the work done to move the water. **[1]**

[2]

(c) Explain why it is not possible to have geothermal power station in Singapore.

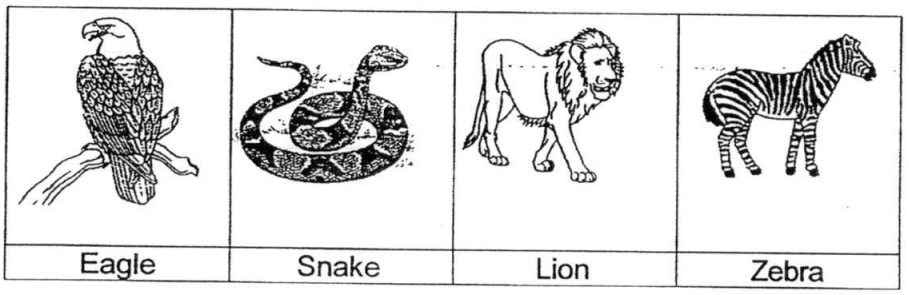
.....

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

(d) State one way you can conserve energy in your home.

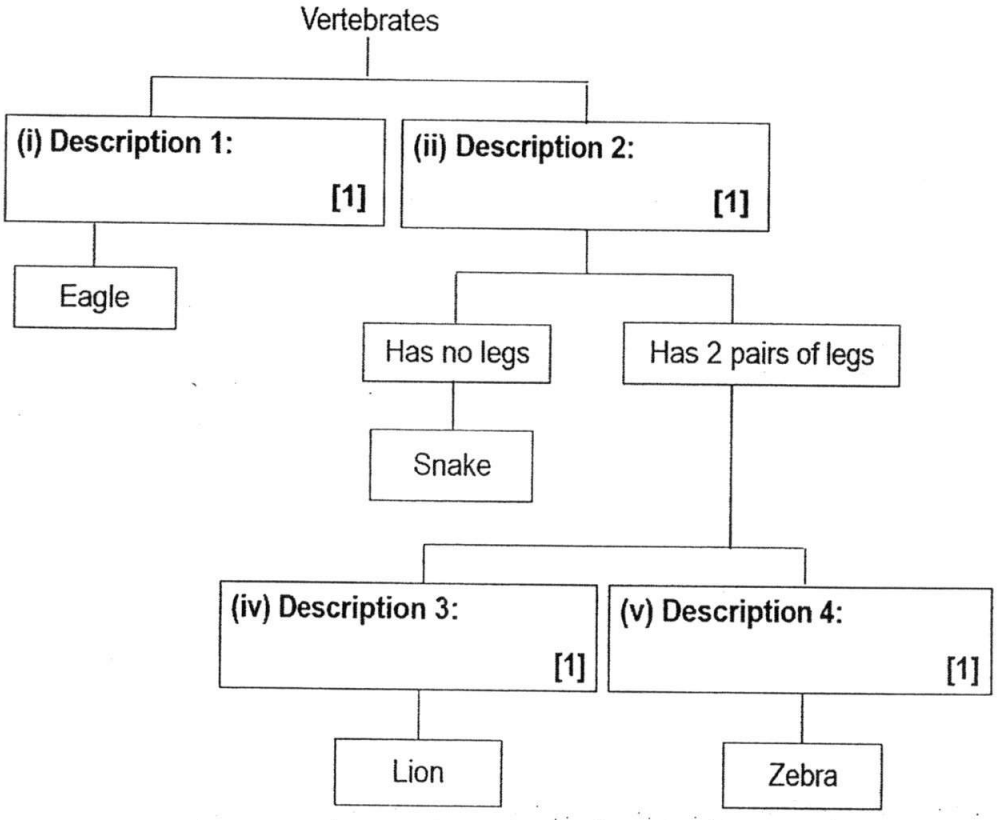
..... **[1]**

4 (a) The following animals can be found in the savannah.



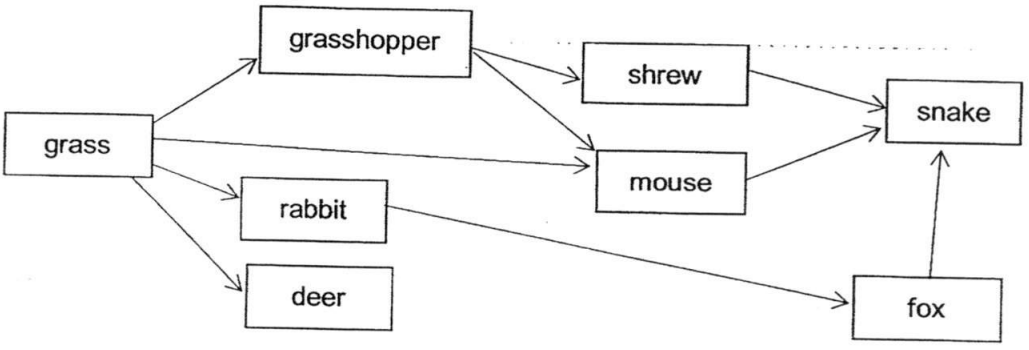
Eagle	Snake	Lion	Zebra

Complete the dichotomous key below by filling in the empty boxes with descriptions.



[4]

(b) The following diagram below shows a food web.



(i) Which organism is both a primary and secondary consumer?

.....

[1]

(ii) If the amount of energy found in grass was 5000 kJ, calculate the amount of energy passed on to the fox in the food web above.

[2]

(iii) State the **two** ways in which energy is returned to the environment.

.....

.....

[2]

(c) Fleas hide in the fur of rabbits and feed on their blood. State the type of relationship between rabbits and fleas.

.....

[1]

END OF PAPER

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	– Ra radium 88	– 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

ST. PATRICK'S SCHOOL
END – OF - YEAR EXAMINATION 2016

SUBJECT :	GENERAL SCIENCE	DATE :	
LEVEL :	Secondary 1 Normal Academic	DURATION :	2 Hours

SECTION A

1	2	3	4	5	6	7	8	9	10
C	D	C	C	A	A	D	C	A	D

11	12	13	14	15	16	17	18	19	20
B	B	D	A	C	C	B	D	D	B

21	22	23	24	25	26	27	28	29	30
A	D	D	B	D	C	C	B	B	C

SECTION B

1	(a)		**X**: Evaporating dish [1] **Y**: Wire gauze [1] **Z:** Tripod stand [1]	[3]
2	(i)		**35 – 30 = 5 cm^3/ml (-1/2 for wrong/no units)**	[1]
	(ii)		Density = mass/ volume 1.8 = mass/ 5 **[1]** Mass = 1.8 x 5 = **9 g [1] (-1/2 for wrong/no units)**	[2]
3	(a)	(i)	Boiling.	[1]
		(ii)	Temperature remains constant as the molecules are **gaining energy [1]** to **overcome strong forces of attraction [1]** between each other.	[2]
	(b)	(i)	At 70°C, bromine molecules are **very disorderly arranged/spread out**.	[1]
		(ii)	At 70°C, bromine molecules move **randomly**[1/2] **at high speeds**[1/2].	[1]
5	(a)		**A and B.**[1] There are two different elements seen in the diagram. [1]	[2]
	(b)		**D.** [1] It shows **two different polyatomic compounds**. [1]	[2]
4			(i) Q, S (ii) P, Q	[1] [1]
			Q and S. [1] Elements in the **same group have the same chemical properties**. [1]	[2]
			Any two points for 1 mark. If only one point, award ½ marks. T: Has high melting point/ is a good conductor of heat or electricity/ is a solid. [1] R: Has low melting point/ is a poor conductor of heat or electricity/ is a gas. [1]	[2]

5	(a)	**A and B.**[1] There are two different elements that are **chemically combined together** [1] seen in the diagram.	[2]
	(b)	**A mixture of compounds.** [1] It shows **two different polyatomic compounds**. [1]	[2]
6	(a)	The **pressure exerted is reduced** **[1]** as his **weight is distributed among the carton of eggs.[1]**	[2]
	(b)	Pressure = force/ area Pressure = 600 / 0.0252 **[1]** = **23800 N/m^2 or Pa [1] (-1/2 for wrong/no units/not to 3sf)**	[2]
7	(a)	Energy cannot be **destroyed[1/2]** or **created[1/2]**. It can only be **converted[1]** to other forms of energy.	[2]
	(b)	**240 J [1]**	[1]
	(c)	Speed = distance/ time Time = distance / speed [1] = 12/7.75 = **1.55s [1]**	[2]
8	(a)	L: cell wall [1] M: vacuole [1] N: cell membrane [1]	[3]
	(b)	It is a **plant cell**[1]. This is because it has a **cell wall**[1/2] and **large central vacuole**[1/2].	[2]
9	(a)	The **breakdown[1]** of work into smaller and more specific tasks to **increase efficiency**[1].	[2]
	(b)	(i) organ (ii) organ (iii) cell	[3]

SECTION C

1	(ai)	The higher the temperature the faster the rate of dissolving.	[1]
	(aii)	(i) temperature of water (ii) time taken to dissolve completely/ rate of dissolving (iii) type of salt/ mass of salt/ volume of water	[3]
	(iii)	Beaker Y. [1] The higher the temperature, the more soluble the salt particles are.[1]	[2]
	(iv)	The salt particles get in between the particles of the water molecules.	[1]
	(b)	- Temperature - Size of solute particles - Rate of stirring	[3]

2	(a)	(i)	An element is a substance which cannot be broken down into two or more simpler substances by chemical methods.	[1]
		(ii)	Carbon: 6 [1/2] , 6[1/2], 6[1/2]	[3]

			Sodium: 11[1/2], 12[1/2], 11[1/2]	
	(b)	**(i)**	<table><tr><th>name of substance</th><th>formula of substance</th><th>number of atoms of each element</th></tr><tr><td>Sodium bicarbonate</td><td>$NaHCO_3$</td><td>1 sodium, 1 hydrogen, 1 carbon, 3 oxygen</td></tr><tr><td><u>Carbon dioxide[1]</u></td><td>CO_2</td><td><u>1 carbon, 2 oxygen [1]</u></td></tr><tr><td>Sodium chloride</td><td><u>NaCl [1]</u></td><td>1 sodium, 1 chlorine</td></tr></table>	**[3]**
	(c)		1. Properties of the compound is different from that of their constituent elements 2. It cannot be separated by physical means **3.** It is made up of four different elements	**[3]**

3	**(a)**	**(i)**	Heat	**[5]**
		(ii)	Heat/Kinetic	
		(iii)	Kinetic	
		(iv)	Kinetic , electrical	
	(b)	**(i)**	Weight of water = 500 kg × 10 N/kg **= 5000 N [1]** (-1/2 for wrong/no units)	
		(ii)	Work done =5000 N × 3000 m [1] **= 15 000 000 J [1]** (-1/2 for wrong/no units)	**[2]**
	(c)	Singapore does not have any volcanoes, geysers and hot springs to obtain geothermal energy from.		**[1]**
	(d)	Switch off electrical appliances when not in use.		

4	**(a)**	**(i)**	Has wings	**[4]**
		(ii)	No wings	
		(iii)	Has no stripes/ has a mane/ has claws	
		(iv)	Has stripes/ has no mane/ has no claws	
	(b)	(i)	Mouse	**[2]**
		(ii)	(10% x 5000) x 10% = **<u>50 kJ</u> (-1/2 for wrong/no units)**	
	(biii	Excretory products./Heat from respiration./Faeces/ decomposition		**[2]**

	)			
	(c)	(i)	parasitism	[1]

Name:	Index Number:	Class:

YIO CHU KANG SECONDARY SCHOOL
END OF YEAR EXAMINATION 2016
SECONDARY ONE NORMAL (ACADEMIC)

SCIENCE Syll A

Friday 7 October 2016 1 hour 30 minutes

Additional Material: Optical Answer Sheet (OAS)

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on the cover page.
Write in dark blue or black ink.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

SECTION A: Multiple Choice Questions
This section consists of **thirty** 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 OAS.

SECTION B: Structured Questions
This section consists of structured questions. Answer **all** questions.
Write your answers in the spaces provided.
The number of marks is given in brackets [ ] at the end of each question or part question.

The use of an approved scientific calculator is expected, where appropriate.
A copy of the Periodic Table is printed on page 17.

For Examiner's Use

Section A	/ 30
Section B	/ 50
Total	/ 80

Parent's / Guardian's signature

Name of Setter: Ms Shereen Seah

This document consists of **17** printed pages and **1** blank page.

SECTION A [30]: Multiple Choice Questions
Answer **all** questions in soft pencil on the separate OAS.

1 Most of the chemical reactions in a cell take place in the _____.

A cell membrane
B chromosomes
C cytoplasm
D nucleus

2 Plants contain _____ to trap sunlight to carry out photosynthesis.

A chlorophyll
B guard cells
C haemoglobin
D sap

3 Which of the following has one large vacuole filled with cell sap?

A cheek
B heart
C onion
D stomach

4 Which of the following is **not** classified as an organ?

A brain
B hair
C leaf
D liver

5 The speed of light in vacuum is _____ m/s.

A 300
B 30,000
C 300,000
D 300,000,000

6 Which of the following is an inherited trait of humans?

A ability to draw
B ability to ride a bicycle
C ability to roll tongue
D ability to run very fast

7 Which type of mirror is placed behind a car's headlight?

A concave mirror
B convex mirror
C plane mirror
D square mirror

8 Which of the following has the smallest mass?

A a neutron
B a proton
C an atom
D an electron

9 Which of the following mixtures can be separated by adding water, stirring and filtering?

A copper sulfate and coffee powder
B iron and copper fillings
C orange syrup and salt
D zinc powder and milo powder

10 What causes a swimming pool to appear shallower than its real depth?

A both reflection and refraction of light
B dispersion of white light
C reflection of light
D refraction of light

11 Which of the following is **not** a characteristic of an image formed in a convex mirror?

A the image is brighter that the object
B the image is distorted and smaller than object
C the image is laterally inverted
D the image is upright

12 The hardness of a material is _____.

A its ability to bend without breaking
B its ability to support a heavy load without breaking or tearing
C its ability to withstand scratches
D the quantity of matter packed into a unit volume of the material.

13 What is the solvent in a cup of hot coffee with condensed milk and sugar?

A coffee powder
B condensed milk
C hot water
D sugar

14 Which of the following is **not** a characteristic of the luminous Bunsen burner flame?

A It is less hot than the non-luminous flame.
B It is sooty.
C It is steady.
D It is yellow in colour.

15 Which of the following shows the correct relative charges of the sub-atomic particles of an atom?

	proton	neutron	electron
A	– 1	0	+ 1
B	0	+ 1	– 1
C	+ 1	0	– 1
D	+ 1	– 1	0

16 During the heating of liquid in a test tube, we should _____.

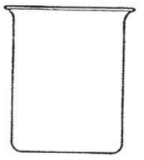
I. ensure that the liquid is not filled up to the brim of the test tube
II. keep the test tube in upright position
III. always use a stopper to cover the mouth of the test tube
IV. always use a test tube holder to hold the test tube

A I and III
B I and IV
C II and III
D III and IV

17 Which of the following apparatus is most suitable for evaporating a solution to dryness?

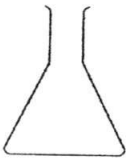
A

B



C

D



18 Which of the following substances is ductile?

A fluorine
B iron
C nitrogen
D sulfur

19 Which of the following will produce diffused reflection?

A concrete wall
B glass window
C polished table top
D still water

20 A molecule of hydrogen peroxide has two hydrogen atoms and two oxygen atoms.

What is its chemical formula?

A 2H2O
B $2H_2O$
C H2O2
D H_2O_2

21 Which of the following shows a compound with **three** elements?

A $CuSO_4$
B H_2O
C MgO
D O_3

22 The following hazard symbol is labelled on a bin.

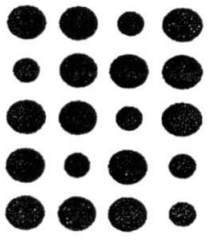
What could be found in the bin?

A blood
B chloroform
C mercury
D uranium

23 Which of the following is a compound?

A air
B iron
C salt solution
D table salt

24 How many types of atoms make up the substance below?



A Fourteen
B Six
C Twenty
D Two

25 A rainbow is formed as a result of the _____ of sunlight by the raindrops.

A absorption
B combination
C dispersion
D reflection

26 An image which cannot be caught on a screen is said to be _____.

A false
B imaginary
C real
D virtual

27 Which of the following statements is true about a compound?

A A compound can be separated by physical means.
B A compound is made up of two or more elements chemically combined together.
C The elements that make up a compound are not combined in a fixed proportion by mass.
D The properties of a compound are the same as the properties of the elements it is made up of.

28 Which of the following groups of elements consists of only metals?

A copper, carbon
B magnesium, silicon
C sodium, zinc
D sulfur, iodine

29 The following statement is written by a student who is carrying out an investigation using the scientific method.

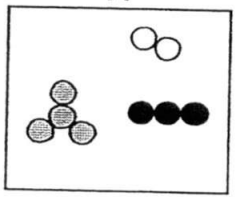
" If a plant receives enough sunlight, then it will grow to be taller than a plant that does not receive enough sunlight."

At which stage of the scientific method is the student at?

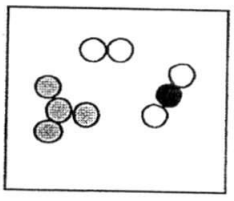
A asking a question
B constructing a hypothesis
C drawing a conclusion
D making an observation

30 Which of the following best represents a mixture of oxygen (O_2), ammonia (NH_3) and carbon dioxide (CO_2) gases?

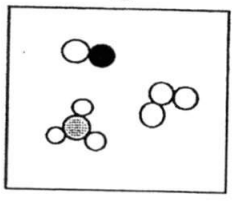
A



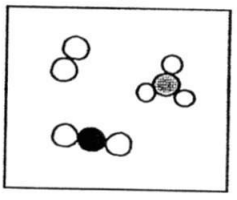
B



C



D



SECTION B [50]: Structured Questions
Answer **all** questions in the spaces provided.

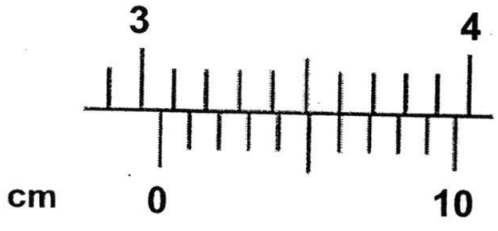
31 **(a)** Convert the following quantities to the specified units.

(i) 500 m = ... km

(ii) 2.4 litres = ... cm^3 [2]

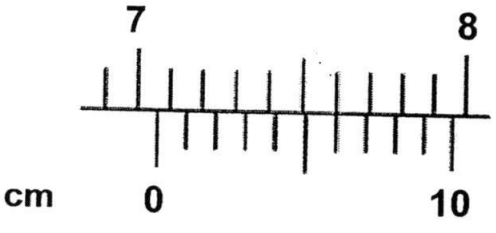
(b) Determine the readings of the measurements made by using Vernier Calipers.

(i)



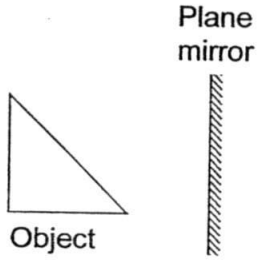
Reading= _____ cm [1]

(ii)



Reading= _____ cm [1]

32 The diagram below shows an object placed in front of a plane mirror.



(a) Draw the mirror image of the object as seen in the plane mirror above. [3]

(b) State **three** characteristics of an image formed by a plane mirror.

.....

.....

..... [3]

(c) If the object is placed 5 cm in front of the mirror, calculate the distance between the object and its image.

[1]

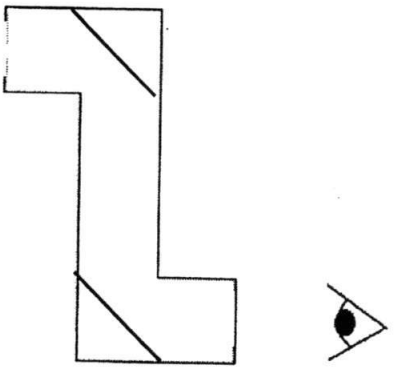
33 **(a)** In each of the boxes below, draw a diagram to represent:

(i) A parallel beam of light.

(ii) A divergent beam of light

[2]

(b) Complete the following diagram by drawing the path of the light ray in the periscope.



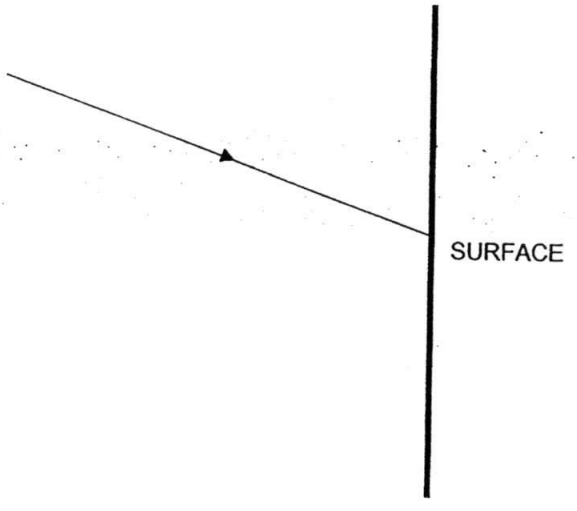
[1]

(c) In the following ray diagram,

(i) draw the normal;

(ii) measure the angle of incidence (*i*);

(iii) draw the reflected ray



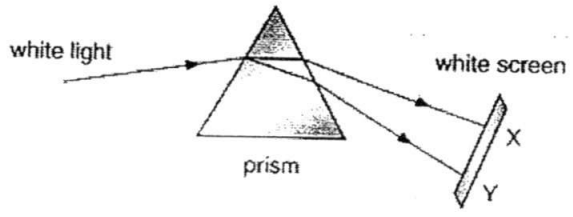
[3]

(iv) State the angle of reflection.

.....

[1]

(d) Name all the colours in the light spectrum, starting from X to Y.



..... [1]

34 **(a)** Fig. 3.1 shows the arrangement of particles in solid ice. In Fig. 3.2, draw the arrangement of particles in melted ice.

Solid ice

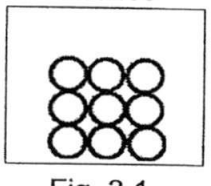


Fig. 3.1

Melted ice

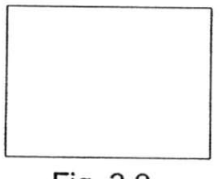


Fig. 3.2

[2]

(b) Solid ice has a fixed shape. Explain why solid ice loses its shape after it has melted.

.....

..... [1]

(c) How does the movement of the particles in solid ice differ from the movement of the particles in melted ice?

.....

..... [2]

35 **(a)** A substance has the chemical formula $Ca(NO_3)_2$. How many atoms are there in this substance?

..... [1]

(b) Using the Periodic Table, state the elements present in $Ca(NO_3)_2$.

..... [1]

(c) The structure of an atom of the above element is shown in the diagram below.

$^{40}_{20}Ca$

What is the nucleon number of this atom?

..... [1]

36 **(a)** Which type of cloning would scientists use to clone human?

..... [1]

(b) Suggest **one** advantage and **one** disadvantage of human cloning.

Advantage: .....

.....

Disadvantage: .....

..... [2]

(c) Plants can also be cloned. Suggest **one** advantage and **one** disadvantage of cloning plants.

Advantage: .....

.....

Disadvantage: .....

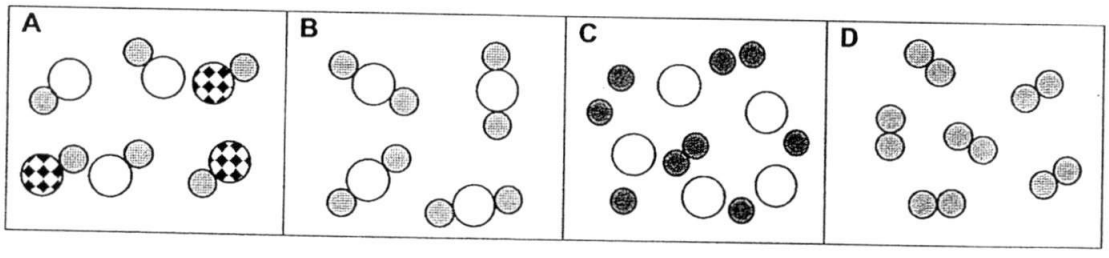
..... [2]

37 Draw a diagram to illustrate a typical animal cell and label the following parts.

cell membrane	chromosomes	cytoplasm	nucleus	vacuoles

[5]

38 The drawings below represent different substances.

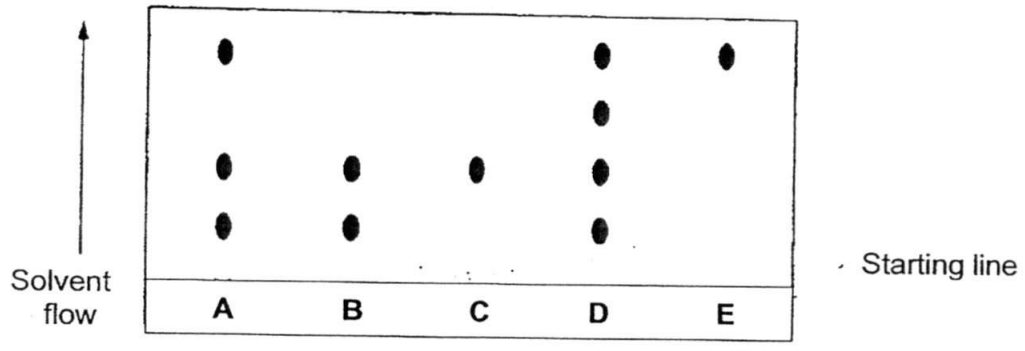


Complete the following table below to show which one of the drawings, **A** to **D**, best represents each of the following substances. Each letter can only be used **once**.

	a compound	an element	a mixture of compound	a mixture of elements
Substance **A** to **D**				

[3]

39 Chromatography is carried out to find out the number of coloured component(s) used in five different samples of inks **A** to **E**. The chromatogram obtained is shown below.



(a) Which ink(s) is/are pure?

.....

[1]

(b) Which two inks when mixed will form ink **A**?

.....

[1]

(c) A pencil is used to draw the starting line. Explain why a pencil is used instead of a pen.

.....

[1]

40 Kelvin has 10 marbles. The mass of each marble is 8 g. He placed the 10 marbles in a measuring cylinder containing some water and the water level rises from 40 cm^3 to 80 cm^3.

(a) Calculate the average volume of 1 marble.

.....

[1]

(b) Calculate the density of 1 marble. Show your working clearly with units.

.....

.....

[1]

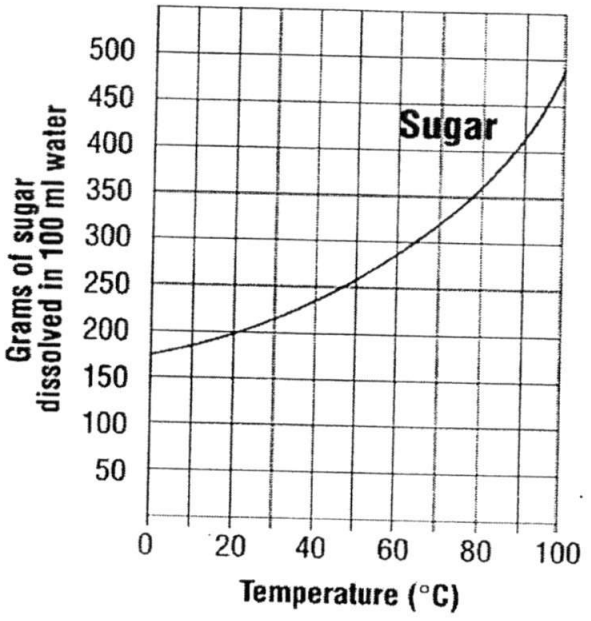
(c) Liquid **Y** has a density of 3 g/cm^3. State whether a marble would sink or float in liquid **Y**.

.....

.....

[1]

41 Timothy is trying to investigate the solubility of rock sugar in water at different temperatures. A plot of the experiment results is shown in the graph below.



(a) Identify **one** variable that has to be kept constant when conducting the experiment.

..... [1]

(b) Suggest **two** things Timothy can do if he wants to increase the rate of sugar dissolving in water.

.....

..... [2]

(c) From the graph, what can Timothy conclude regarding the solubility of sugar in water at different temperatures?

.....

..... [1]

- End of Paper -

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	– Ra radium 88	– Ac actinium 89 †															

*58-71 Lanthanoid series

†90-103 Actinoid series

Group III	Group IV	Group V	Group VI	Group VII	Group 0
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.).

Blank page

	Ans	
13a	Generation of a genetically identical organism	1
b	Reproductive cloning	1
c	Advantages: *[Any 1]* • Humans with special characteristics may be created • Couples unable to conceive can have a child • Can have identical twins Disadvantages: *[Any 1]* • Procedure may not be successful hence wastage of cells • The cloned baby may have some abnormalities • The human being clone may experience trauma during the process of cloning • Cloned baby may not survive long	1 1

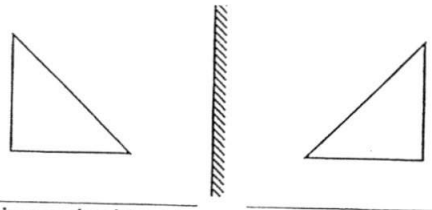
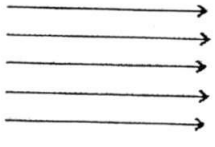
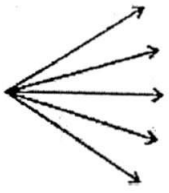
YIO CHU KANG SECONDARY SCHOOL
MARKING SCHEME

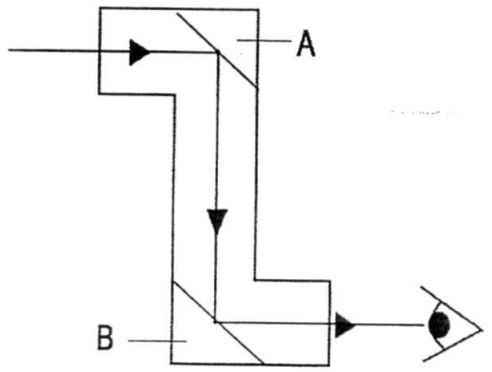
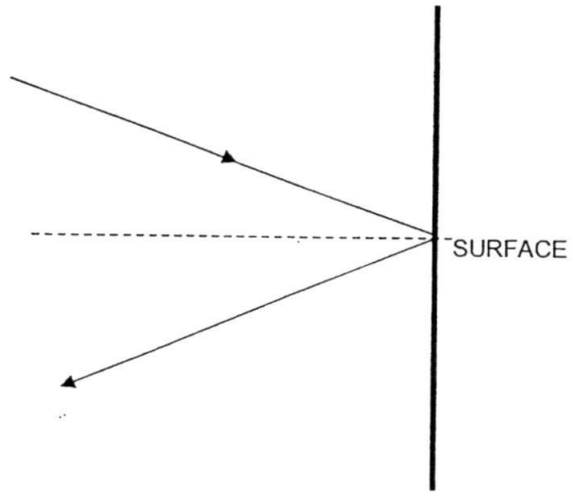
Exam: EOY 2016 Subject: LSS Science Level: 1NA

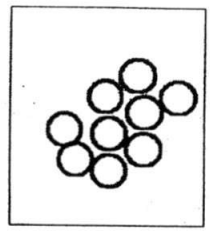
Section A (MCQ)

01.	C	16	B
02.	A	17	C
03.	C	18	B
04.	B	19	A
05.	D	20	D
06.	C	21	A
07.	A	22	A
08.	D	23	D
09.	D	24	D
10.	D	25	C
11.	A	26	D
12.	C	27	B
13.	C	28	C
14.	C	29	B
15.	C	30	D

Section B

31	(a)	(i) 0.5 km	[1]
		(ii) 2400 cm^3	[1]
	(b)	(i) 3.06	[1]
		(ii) 7.06	[1]
32	a		[1] for correct 'flip' of diagram [1] for correct distance from mirror [1] for correct size.
	b	The image is virtual / The image is same size as object. / The image is upright / The image is laterally inverted / The distance the image is from the mirror is the same as that of the object from the mirror.	[3] for any 3 points
	c	5 + 5 = 10 cm	[1]
33	(a)	i)  ii) 	[1] for direction of arrow and parallel lines [1] for arrow and diverging rays

	(b)		[1] for direction of arrow with straight lines of path
	(c)	(i) to (iii)  (iv) 20°	[1] for normal [1] for angle *i* (20°) [1] for reflected ray with arrow (correct angle of 20°)
	(d)	Red, orange, yellow, green, blue, indigo, violet	[1] No mark for wrong arrangement of colours

34	(a)		[1] 9 atoms [1] irregular arrangement of atoms
	(b)	When it becomes liquid, the particles of a melted ice are no longer packed in an orderly arrangement / the particles are not in their fixed positions.	[1]
	(c)	Solid particles vibrate about their fixed positions whereas the particles in melted ice slide past one another.	[1] [1]

35	(a)	9 atoms	[1]
	(b)	Calcium, nitrogen, oxygen	[1]
	(c)	40	[1]
36	(a)	Reproductive cloning	[1]
	(b)	Advantages: *[Any 1]* • Humans with special characteristics may be created	[2]

		• Couples unable to conceive can have a child or identical twins Disadvantages: *[Any 1]* • The cloned baby may have some abnormalities or allergies. • Cloned baby may not survive long/Short lifespan of the cloned baby	
	(c)	Advantages: *[Any 1]* • Longer shelf life • Better quality of crops • Large quantities may be produced in shorter time Disadvantages: *[Any 1]* • May cause diseases • May have side effects like allergies on humans	[2]
37	(a)		[5] for 5 parts No mark awarded for plant cell
38			[3]

Substance	a compound	an element	a mixture of compound	a mixture of elements
A to **D**	B	D	A	C

39	(a)	C and E	[1]
	(b)	B and E	[1]
	(c)	The pencil lead will not dissolve in solvent. / The pencil lead is not soluble./ the pen ink will smudge with other inks.	[1]
40	(a)	Volume of 10 marbles = 80 – 40 cm^3 = 40 cm^3 Volume of 1 marble = 40 / 10 = 4 cm^3	[1]
	(b)	Density = 8 / 4 = 2 g/cm^3	[1]
	(c)	The marble will float.	[1]
41	(a)	The amount of water/ the amount (grams) of rock sugar/ same size of beaker/ size/type of sugar	Any one-[1]
	(b)	He can crush the rock sugar to smaller pieces of sugar. / He can use a stirrer and stir the mixture faster to dissolve the sugar. / He can use a hotter solvent. / He can heat up the solvent.	[1] for one thing, [1] for second thing
	(c)	The higher the temperature, the greater amount of sugar dissolved / The higher the temperature, the more soluble the sugar/ the solubility increases with temperature. Do not accept: "the higher the temperature, the faster the sugar dissolves"	[1]