Geylang Methodist School (Secondary)

End-of-Year Examination 2016

Candidate Name			
Class		Index Number	

LOWER SECONDARY SCIENCE **Sec 1 Express**

Additional materials : Optical Answer Sheet **2 hours**

Setters: Mrs Loh Kim Woon **11 October 2016**
Mr Ho Kah Fai

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
There are **twenty** questions in this section. Answer **all** questions. For each question, there are four possible answers, **A**, **B**, **C** or **D**. Choose the **one** you consider correct and record your choice in soft pencil on the separate answer sheet.

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

Section C
Answer **all** three 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 25.

All numerical answers are to be rounded off to 3 significant figures.

For Examiner's Use	
Section A	20
Section B	50
Section C	30
Total	100

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

[Turn over

Section A

1 Which of the following is **not** a method to preserve biodiversity?

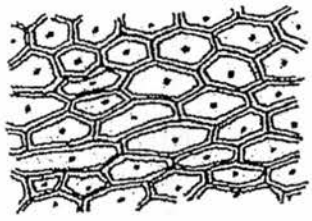
A Rescuing animals from the pet shop and releasing them into the environment.

B Replanting plants in areas of deforestation.

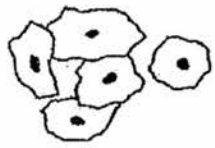
C Enforce laws to stop the hunting of endangered species.

D Encouraging classmates to keep our beaches clean.

2 Onion cells and human cheek cells are examined under a microscope.



onion cells



human cheek cells

How many of the following structures are seen in both cells?

I nucleus
II cell wall
III chloroplast
IV cell membrane

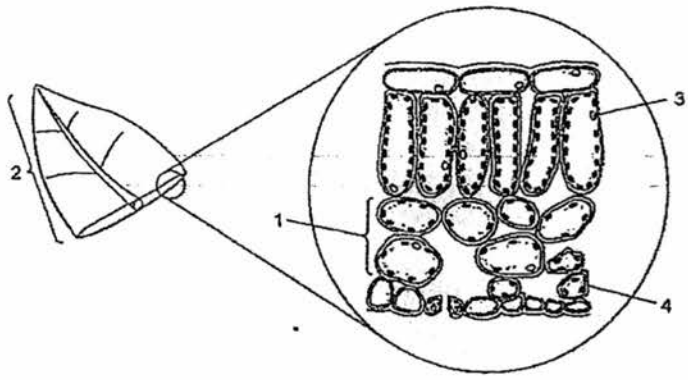
A 1

B 2

C 3

D 4

3 The diagram shows a leaf and an enlarged view of a leaf's cross-section.

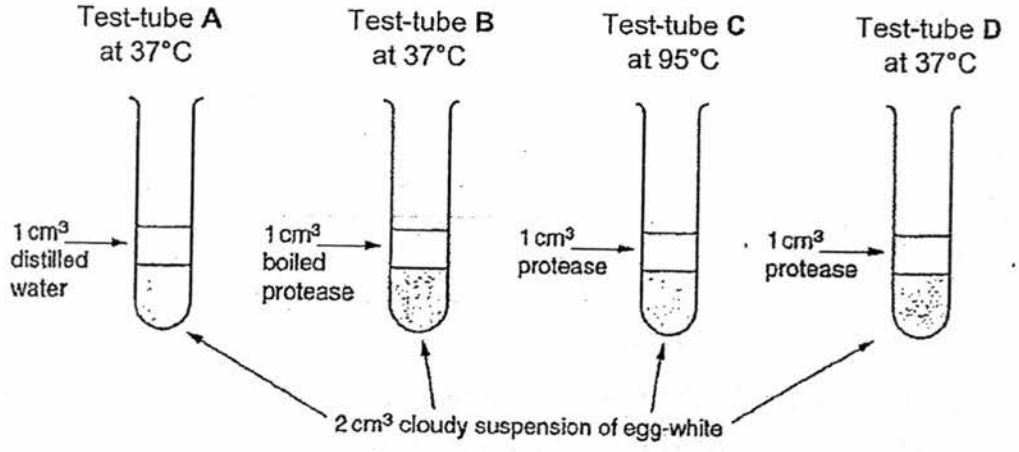


Which of the following labels are correct?

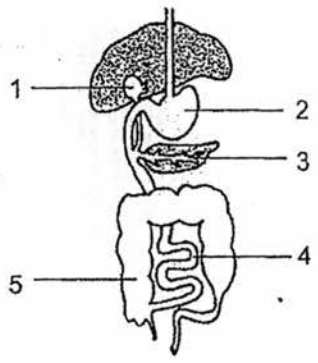
	organelle	cell	tissue	organ
A	1	2	3	4
B	2	3	4	1
C	3	4	1	2
D	3	1	4	2

4 The diagram below shows an experimental set-up with each test-tube containing the same volume of egg-white suspension.

Which test-tube would have the least volume of egg-white remaining after 20 minutes?



5 The diagram below shows a section of the human digestive system.



At which structures do protein digestion start and end?

A 1 and 3

B 2 and 4

C 3 and 5

D 1 and 5

6 Diarrhoea is a condition in which faeces containing abnormally large amounts of water are discharged from the body frequently.

Which part of the alimentary canal is malfunctioning when a person is suffering from diarrhoea?

A stomach

B oesophagus

C small intestine

D large intestine

7 Four properties of suspensions are listed below. Which statement is **not** true?

A Suspensions are homogenous.

B Suspensions does not allow light to pass through them.

C Suspensions leave behind a residue when filtered.

D Suspensions will have insoluble particles floating on top or settling at the bottom when left to stand for some time.

8 John accidentally spilled some paint on the floor. He was told only turpentine can be used to dissolve and remove the paint but not water.

Which of the following statements correctly describes the above phenomenon?

A All solutes can be dissolved in turpentine.

B Different types of solvents affect the solubility of the same solute.

C Different types of solvents can be used to dissolve the same solute.

D Different types of solutes have the same solubility in different solvents.

9 Particles on the surface of a substance are able to escape if they have sufficient energy. The particles remaining have a lower average energy than before and so the substance cools down.

Which of the following best describes the substance?

A boiling

B condensation

C convection

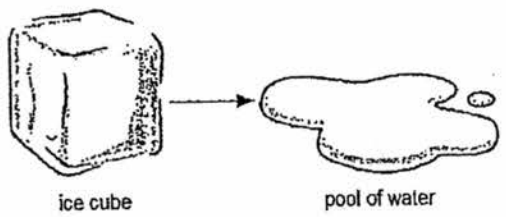
D evaporation

10 The melting points and boiling points of some substances **A** to **D** are given in the table below.

Which of the following is a liquid at room temperature?

	melting point / °C	boiling point / °C
A	824	1430
B	-189	-186
C	-39	357
D	44	280

11 An ice cube melts. What happens to the particles of water in the ice cube?



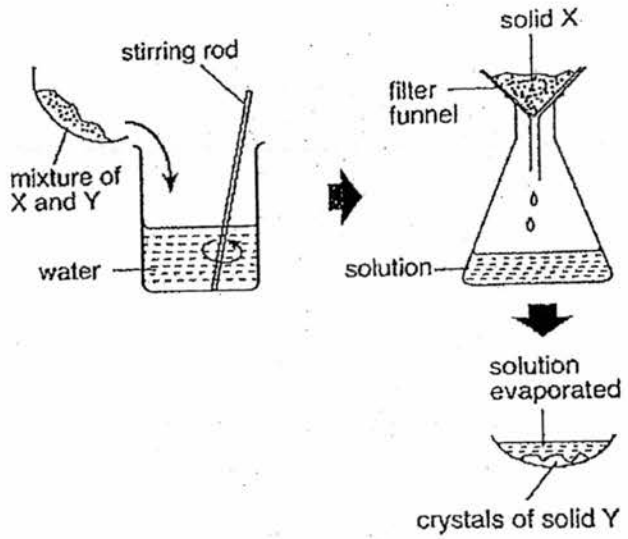
A They condense.

B They dissolve.

C They gain energy.

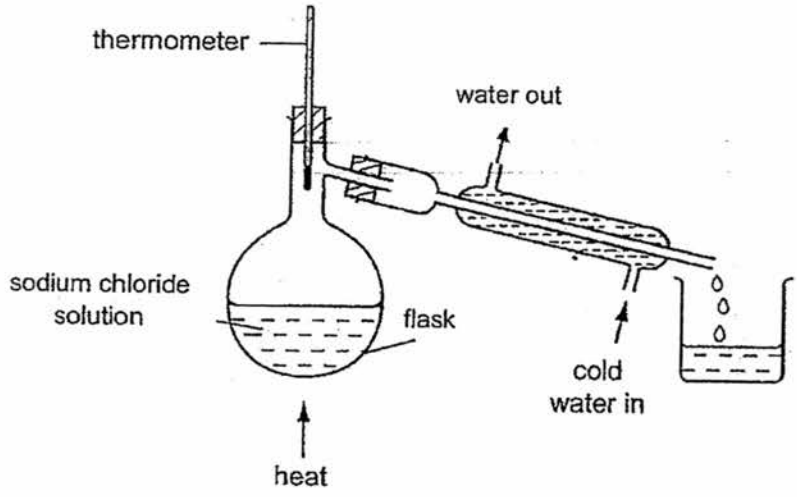
D They lose energy.

12 A mixture of two solids, X and Y, are separated by the procedure shown in the diagrams below. Which substances could be X and Y?



	solid X	solid Y
A	sand	chalk
B	sand	sodium chloride
C	sodium chloride	chalk
D	sodium chloride	sugar

13 A solution of sodium chloride is distilled.



What is the temperature shown by the thermometer and what is left in the flask?

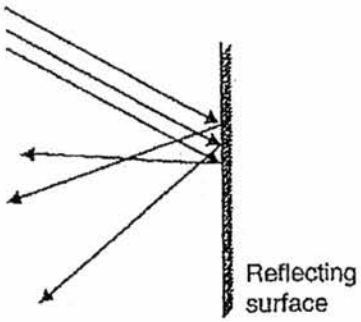
	temperature / °C	final contents of flask
A	97	no residue
B	100	white residue
C	103	no residue
D	106	white residue

14 Which pair of mirrors shows their correct usages?

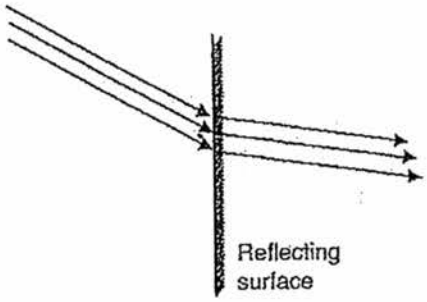
	concave mirror	convex mirror
A	solar cooker	security mirror
B	microscope	rear view mirror of car
C	security mirror	microscope
D	security mirror	solar cooker

15 The diagrams below show four different kinds of reflecting surfaces. In which of the following surfaces will you be able to see a clear image?

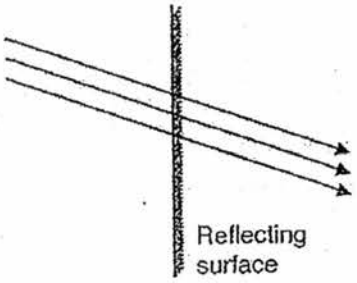
A



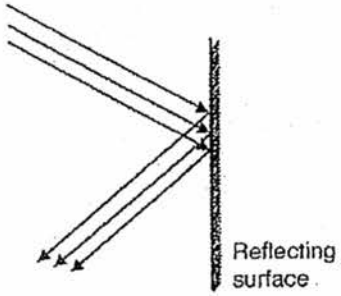
B



C



D



16 A light ray is directed on a plane mirror as shown in Figure 16.1 below.

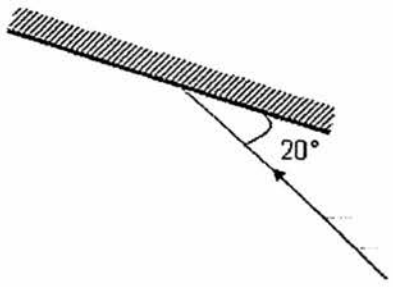


Figure 16.1

What are the angles of incidence and reflection?

	angle of incidence	angle of reflection
A	20°	20°
B	20°	70°
C	70°	70°
D	70°	20°

17 An object has the following physical properties.

- flexible
- soft
- transparent

Which material is the object made of?

A ceramic

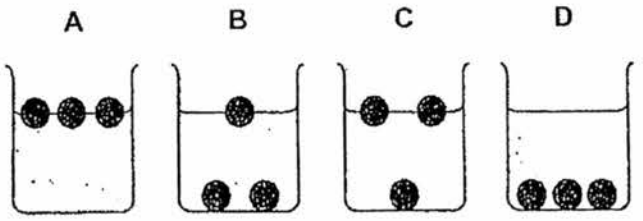
B metal

C glass

D plastic

18 Three balls with densities 0.9 g/cm^3, 1.3 g/cm^3 and 1.6 g/cm^3 are placed into four beakers containing liquids of different densities as shown.

Which beaker contains a liquid with a density of 1.2 g/cm^3?



19 Container S and container T are filled with equal amounts of hot water. After a while, it is observed that the water in container S has a higher temperature than the water in container T.

Which of the following statements are the possible reasons for the observation?

I Container S is made of clay and container T is made of steel.
II Container S has a lid and container T is not covered with a lid.
III Container S has a darker surface than container T.

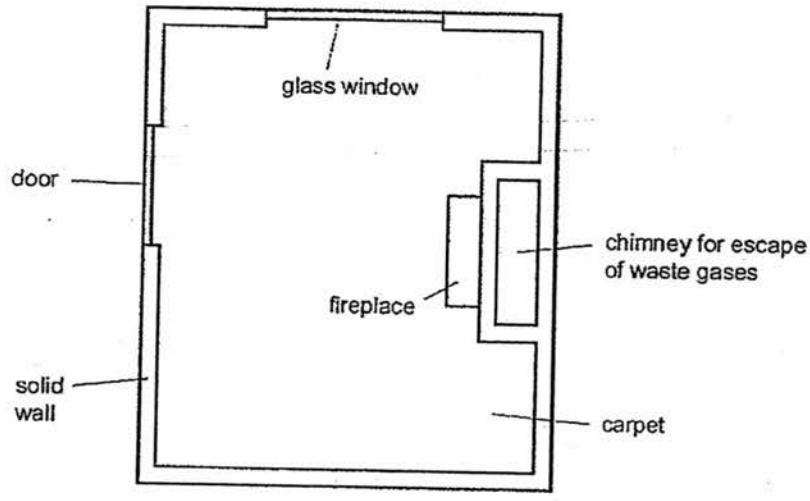
A I and II only

B I and III only

C II and III only

D I, II and III

20 The diagram shows the top view of a living room of a house. The temperature outside the house is 5°C. The living room is heated by a small fire in the fire place.



Where is most heat lost by convection?

A carpet

B glass window

C door

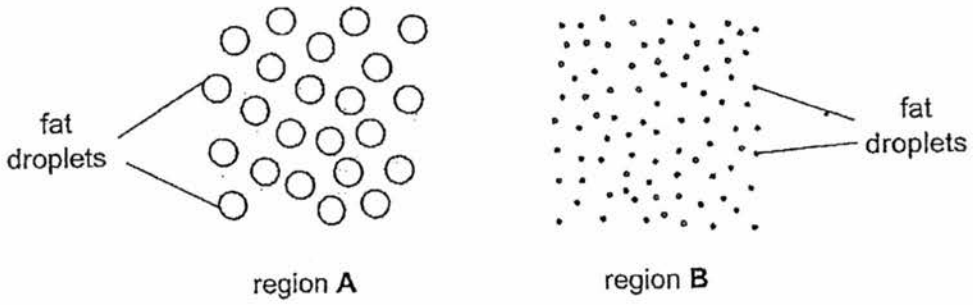
D chimney

End of Section A

Section B

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

21 The figure below shows the change in appearance as fat droplets move from region **A** to region **B** of the human alimentary canal.



(a) Name the substance that changes the appearance of fat droplets.

.....[1]

(b) Name the regions from which the fat droplets were obtained.

A:..... B: .....[2]

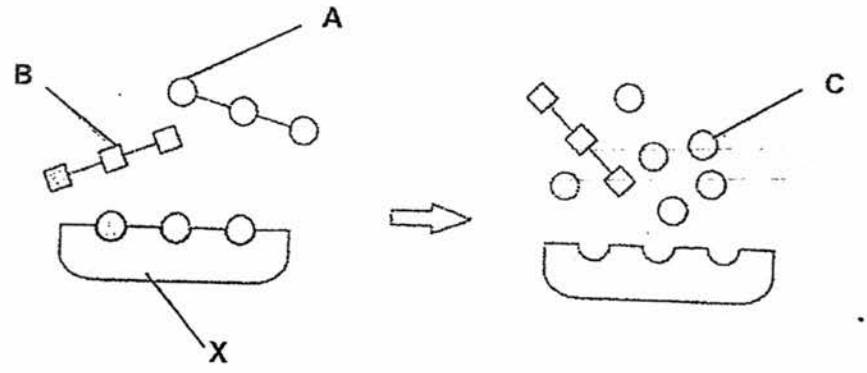
(c) State **two** functions of fats.

.....

.....

.....[2]

22 The diagram shows the action of enzyme **X** on food molecules **A** and **B** in the human alimentary canal.



(a) Explain why enzyme **X** can digest **A** but not **B**.

.....

.....

.....[2]

(b) **A** is a protein molecule.

Name enzyme **X**.

.....[1]

(c) Does the diagram show chemical digestion or physical digestion? Give a reason to support your answer.

.....

.....[2]

23 The short-haired bumblebee, *Bombus subterraneus*, is a species of bee last seen in the United Kingdom in 1988. It experienced a sharp decline in population in the 1980s.

Give two possible reasons for the decrease in bumblebee population.

.....

.....

.....[2]

24 Fig. 24.1 shows a plant cell.

Fig. 24.1

(a) On Fig. 24.1, label the cytoplasm and vacuole clearly. [2]

(b) The plant cell shown in Fig. 24.1 uses a lot of energy to absorb mineral salts from the soil.

Based on this information, suggest a structure which is abundant in the plant cell. Explain your answer.

.....

.....[2]

25 Study the properties of solids **A**, **B**, **C** and **D** given below.

Solid A	**Solid B**
A has a constant composition and decomposes into two elements when heated.	**B** is coloured grey and attracted to a magnet. It cannot be decomposed into simpler substances.
Solid C	**Solid D**
C is speckled black and white. The white particles dissolve in water but the black particles do not.	**D** is black. It is formed by strongly heating copper in oxygen.

Classify each of the solids as either an element or a compound or a mixture.

A .....

B .....

C .....

D ..... [4]

26 **(a)** The table below provides data on three elements, **X**, **Y** and **Z**.

element	state	appearance	thermal conductivity	electrical conductivity	use of element
X	solid	silvery	high	high	aircraft bodies
Y	solid	yellow	low	low	a fungicide
Z	gas	greenish-yellow	low	low	kill bacteria in water

(i) Which of the above elements (**X**, **Y** or **Z**) are non-metals?

.....[1]

(ii) State **two** properties of a metallic element which is different from a non-metallic element.

.....

.....

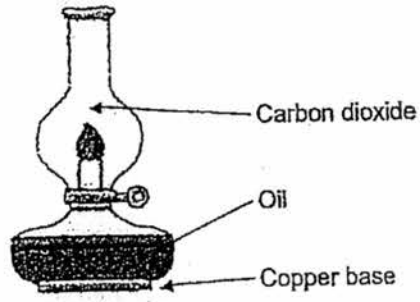
.....[2]

(b) Identify the elements based on the data given in **(a)** and give the chemical symbol for each element.

element	name of element	chemical symbol
X		
Y		
Z		

[3]

27 The diagram shows a burning kerosene lamp.



(a) In the boxes below, sketch simple diagrams to show the particle arrangement at room temperature for the substances.

	carbon dioxide	oil	copper base
arrangement of particles			

[3]

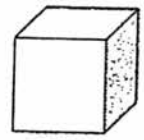
(b) Carbon dioxide and copper are made up of particles.

Complete the table below to describe how the particles in these two substances differ in their arrangement, movement and attraction for one another.

how particles differ	carbon dioxide	copper
arrangement		closely packed in fixed position
movement		
attraction between particles		

[5]

28 The diagram shows a cube made of metal **X**. The volume of the cube is 200 cm^3 and the density of the cube is 10.5 g/cm^3.



(a) Calculate the mass of the cube in kg.

mass = ... kg [2]

(b) The diagram shows a sphere made of metal **Y**. The sphere has a density of 13.8 g/cm^3 and a mass of 2070 g.

A student melts the cube made of metal **X** and sphere made of metal **Y** to form a solid rod.

(i) Calculate, in cm^3, the volume of the sphere made of metal **Y**.

(ii) Hence, calculate the density of the solid rod in g/cm^3.

(i) volume = ... cm^3 [1]

(ii) density = ... g/cm^3 [2]

29 The table shows data for some physical properties of some materials.

material	heat conductivity	electrical conductivity	melting point (°C)	density (g/cm^3)
graphite	poor	good	more than 4000	2.3
aluminium	good	good	660	2.7
plastic	poor	poor	170	0.8
glass	poor	poor	1500	2.8

(a) Which material should be chosen to make an electric iron? Explain.

.....

.....[2]

(b) Aluminium is used to make overhead electrical cables as it is lightweight.

Suggest why glass is not used to make overhead electrical cables even though glass and aluminium have similar densities.

.....[1]

30 (a) A vacuum flask has double glass walls. The space between the glass walls is a vacuum.

Which processes of heat transfer can be prevented by the vacuum?

.....[2]

(b) Fig. 30.1 shows a hot water tank with an electric heater.

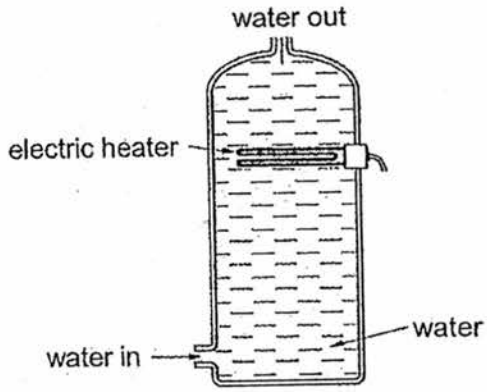


Fig. 30.1

(i) Draw arrows in Fig. 30.1 to show the convection current produced when the electric heater is turned on. [1]

(ii) The hot water tank in Fig. 30.1 does not heat water efficiently.

State a modification you would make to increase the efficiency of water heating.

.....[1]

(iii) To reduce heat loss, the tank should be made of ceramic rather than copper. Explain why.

.....

.....

.....[2]

(iv) What colour should the tank be painted to reduce heat loss? Explain your answer.

.....

.....

.....[2]

End of Section B

Section C

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

31 (a) A student eats some bread. After some time, he observed a sweet taste in his mouth.

Explain the observation.

.....

.....

.....[3]

(b) Explain why division of labour is important in a multicellular organism.

.....

.....

.....[2]

(c) The cell of a newly discovered organism was observed under a light microscope. The cell is shown in Fig. 31.1.

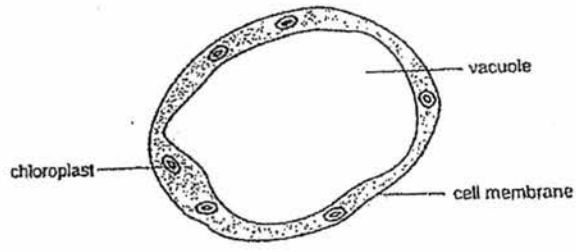


Fig. 31.1

(i) Suggest reasons why this cell cannot be classified as an animal cell.

.....

.....[2]

(ii) This cell has no nucleus.

Suggest a function that this cell cannot carry out.

.....[1]

(iii) State the name of the pigment in chloroplasts.

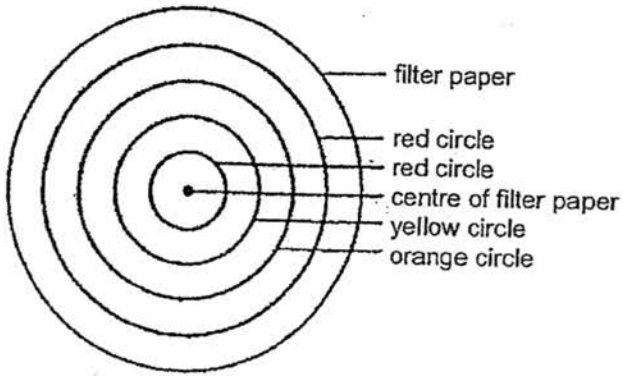
.....[1]

(iv) Other than the absence of nucleus, state a difference between the cell shown in Fig. 31.1 and a typical plant cell.

.....

.....[1]

32 The red colouring matter in a fizzy drink was extracted by a solvent. Two drops of the red colouring were placed at the centre of a filter paper and allowed to dry. Drops of pure solvent were slowly added to the centre of the filter paper. After some time, four coloured circles were seen, as shown in the diagram below.



(a) What is the name of the separation technique described above?

.....[1]

(b) How many different dyes are there in the fizzy drink?

.....[1]

(c) Name a suitable solvent that could be used for the separation.

.....[1]

(d) Suggest a reason why one dye moves further than the other dyes from the centre of the filter paper.

.....

.....

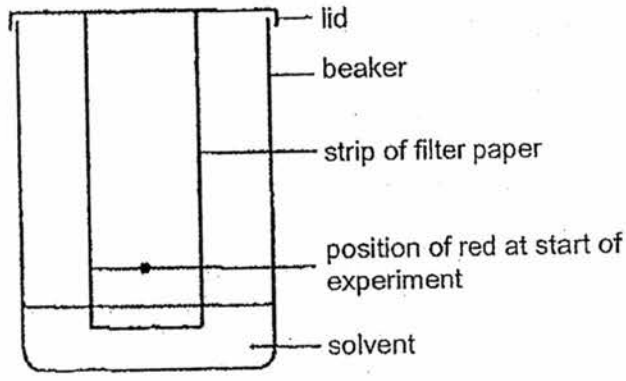
.....[2]

(e) Is the red colouring matter in the fizzy drink a mixture or a compound? Give a reason for your answer.

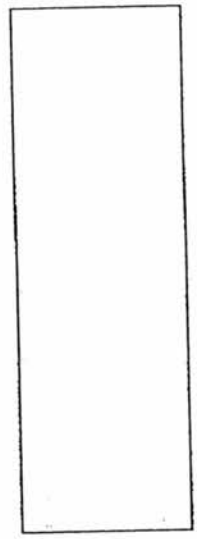
.....

.....[2]

(f) An alternative set of apparatus for this experiment is shown below. In this experiment, a strip of filter paper is used and the filter paper is dipped into a solvent.



On the strip of filter paper below, **draw** and **label** the results you would expect if the above set-up was left until the solvent reached near the top of the filter paper.



[3]

33 (a) Car J is following car K. The registration number of car J is **LEF 9Z**, as shown in Fig. 33.1 below.

Fig. 33.1

(i) Write down the registration number of car J as seen by the driver of car K in a plane mirror.

.....[2]

(ii) List **two** characteristics of the images formed by a plane mirror.

.....

.....

.....[2]

(b) Fig. 33.2 shows a person looking at a fish from above the water.

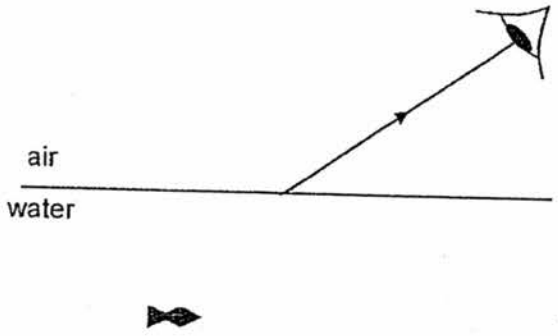


Fig. 33.2

(i) Draw a ray to show how the light from the fish reaches the eye. [1]

(ii) Using a construction line, locate the image of the fish that the person perceives. Draw this image and label it **I**. [2]

(iii) This person attempts to spear the fish but keeps missing.

Suggest where he should position his eyes (above the water) to increase the chances of spearing the fish. Explain your suggestion.

.....

.....

.....[2]

(iv) Explain why light bends when it travels from one medium to another.

.....

.....[1]

End of Paper

DATA SHEET
The Periodic Table Of The Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 +															

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

*58-71 Lanthanoid series
+90-103 Actinoid series

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.).

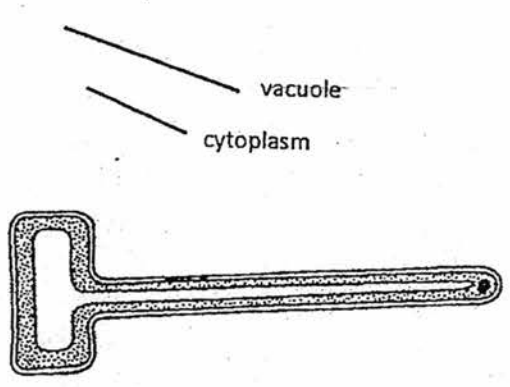
GMS(S)/LSS/EOY/2016/1E

GEYLANG METHODIST SCHOOL (SEC)
1 E EOY 2016 Marking Scheme

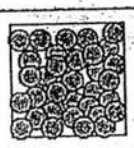
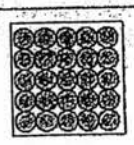
Section A

1	2	3	4	5	6	7	8	9	10
A	B	C	D	B	D	A	B	D	C
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C	B	B	A	D	C	D	B	A	D

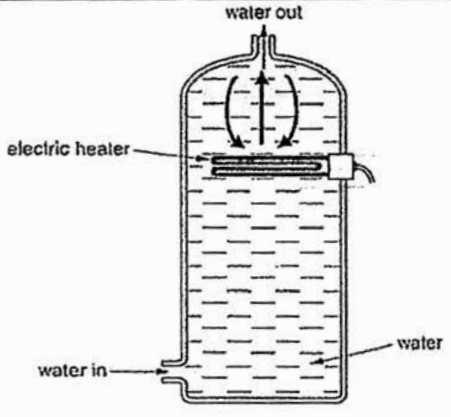
Section B

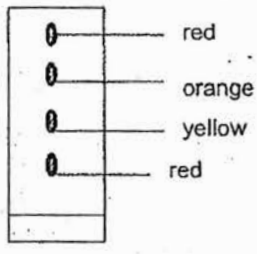
21	**(a)**	Bile	1
	(b)	A: mouth / oesophagus / stomach B: small intestine	1 1
	(c)	It provides energy to the body. It acts as <u>insulation</u> to reduce heat loss from the body.	1 1
22	**(a)**	Molecule A fits into the <u>active site</u> of enzyme X but molecule B does not fit into <u>active site</u> of enzyme A.	1 1
	(b)	Protease	1
	(c)	Chemical digestion. Reason: new products are formed / an enzyme is involved in chemical digestion / food molecule A is broken down into smaller molecules (any one)	1 1
23		The bumblebee habitat is destroyed by human activities / environmental damage and pollution kills bumblebees / introduction of species that prey on bumblebees / bumblebees were killed by diseases (any two)	2
24	**(a)**		1 1

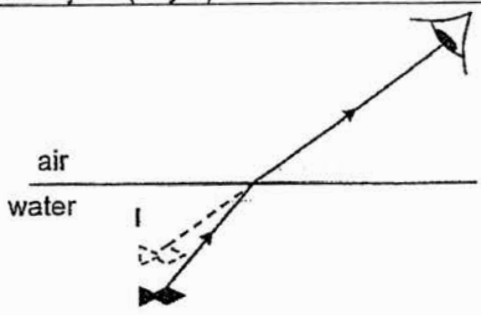
	(b)	There are many mitochondria. Energy is released from food by the process of respiration at mitochondria.	1 1
	25	A – compound B – element C – mixture D – compound	1 1 1 1

26	(a) (i)	Y and Z (both must be correct to score 1m)	1
	(ii)	Metallic element is a good conductor of electricity; non-metallic element is a poor conductor of electricity. Metallic element is shiny; non-metallic element is dull. (Any acceptable answers)	1 1
	(b)	X – aluminium , Al Y – sulfur, S Z – chlorine, Cl (both name and symbol must be correct to score 1m)	1 1 1
27 (a)	 carbon dioxide  oil  copper base		1m for each diagram
(b)			1m for each box

how particles differ	carbon dioxide	copper
arrangement	far apart and random	
movement	move freely and randomly in all directions at high speeds	vibrate about fixed positions
attraction between particles	weak forces of attraction	strong forces of attraction

28	(a)	mass = 200 x 10.5 = 2100 g = 2.1 kg	1 1: for conversion from g to kg
	(b)(i)	volume = 2070 / 13.8 = 150 cm^3	1
	(b)(ii)	density = (2100 + 2070) / (200 + 150) = 11.9 g/cm^3 (3 sf) (last mark not given if answer is not in 3sf)	1 1
29	(a)	Aluminium. It is a good conductor of heat.	1 1
	(b)	Glass is a poor electrical conductor.	1
30	(a)	Convection and conduction	1 1
	(b) (i)		1
	(b)(ii)	Place the electric heater at the bottom of the water tank.	1
	(b)(iii)	Ceramic is a poorer conductor of heat than copper. Hence, ceramic reduce heat loss through conduction.	1 1
	(b)(iv)	The tank should be painted white. White surfaces are poor emitters of radiation. (reject: shiny, polished)	1 1

Section C			
31	(a)	Bread contains starch which is digested by salivary amylase. Maltose is formed, which is a sugar, resulting in the sweet taste.	1 1 1
	(b)	It allows many functions to be performed at the same time. It allows the body to function efficiently.	1 1
	(c)(i)	Animal cells do not contain chloroplasts. Animal cells do not have a large central vacuole.	1 1
	(c)(ii)	It cannot reproduce.	1
	(c)(iii)	Chlorophyll	1
	(c)(iv)	The cell in Fig 31.1 has no cell wall but a typical plant cell does.	1
32	(a)	chromatography	1
	(b)	4	1
	(c)	water / ethanol / alcohol	1
	(d)	The dyes have different solubilities in the solvent. The more soluble dye will travel further away from the centre than the less soluble dye.	1 1
	(e)	Mixture, It contains four components that can be separated by physical method.	1 1
	(f)	 Show and label red, yellow, orange and red components in correct sequence.	3 1 mistake = less 1 mark

33	(a)(i)	∠e ⊣∃⌋	2
	(ii)	The images are upright, laterally inverted, virtual / same size as the object. (any 2)	2
	(b) (i) (ii)		1-ray from fish 1-dotted construction line 1-drawing image I
	(iii)	He should place his eyes directly above the fish. In this way, the fish and its image will be aligned.	1 1
	(iv)	Light bends because its <u>speed changes</u> as it moves from one medium to another of different optical density.	1