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Name:	Index Number:	Class:
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HUA YI SECONDARY SCHOOL

1E

Mid-Year Examination 2016

1E

SCIENCE

Section A

12 May 2016

1 h 30 min

Candidates answer on the Optical Answer Sheet (OTAS)
Additional Materials: OTAS

READ THESE INSTRUCTIONS FIRST

Write your Name, Index Number and Class on all the work you have done.
Write in soft pencil.

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

There are **twenty** questions on this paper. 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 Optical Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 9.

This document consists of **9** printed pages including the cover page.

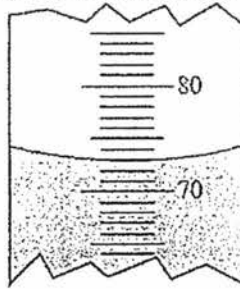
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[Turn Over]

Setter: Lim SY Belle

- 1 The diagram shows a section of a measuring cylinder containing water.

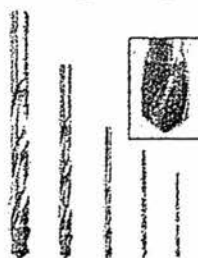


What is the reading shown?

- A 70.3 cm³
 B 70.4 cm³
 C 73.0 cm³
 D 74.0 cm³
- 2 Jane saw a symbol displayed at the door of a refrigerator in a hospital containing samples like urine, bacteria and viruses to be tested. Which of the following symbols is the one Jane saw?



- 3 The diagram shows drill bits that are reinforced with diamond. These drill bits are often used in the mining industry to drill through the ground to extract mineral ores.



Which of the following physical properties is the main reason for diamond to be used in reinforcing the drill bits?

- A Diamond has high melting point.
 B Diamond is very hard.
 C Diamond is very strong.
 D Diamond is water resistant.

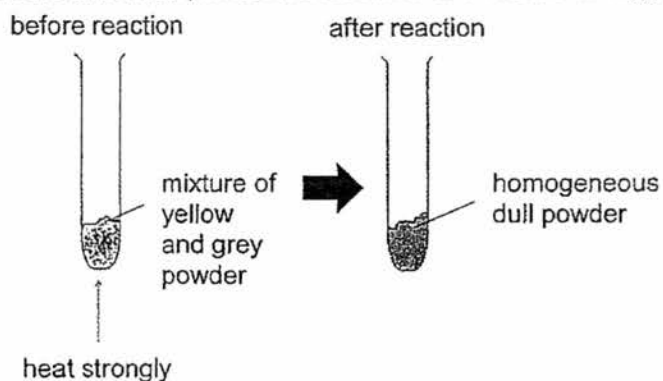
- 4 A student wanted to investigate the effects of volume of water added and soil acidity on the growth of lettuce. Soil acidity is measured on the pH scale, with 1 being the most acidic and 14 being the most alkaline. The student placed the seedlings in the pots of the same size and with soil of the same mass. He sets up three experimental groups as shown.

X		Y		Z	
volume of water added / ml	pH of soil	volume of water added / ml	pH of soil	volume of water added / ml	pH of soil
10	5	30	5	10	6
20	6	30	6	20	6
30	7	30	7	30	6
40	8	30	8	40	6

Which experimental setup(s) would provide the student with the most reliable data to assess the growth of lettuce?

- A X only
 B X and Y
 C X and Z
 D Y and Z
- 5 At an organ transplant centre, the donated organ has to be cooled and immersed in solutions to preserve it. The cooled organ is then transported in a plastic cooler box to the operation room. Which of the following properties explains why a plastic cooler box is used?
- A Plastic has a high boiling point.
 B Plastic has a high melting point.
 C Plastic is a good heat conductor.
 D Plastic is a good heat insulator.
- 6 A molecule of compound contains three oxygen atoms, two iron atoms and one sulfur atom. Which of the following is the correct chemical formula of the compound?
- A $\text{Fe}_2\text{O}_2\text{S}_3$
 B Fe_2SO_3
 C $\text{Ir}_2\text{O}_3\text{S}$
 D Ir_3OS_2

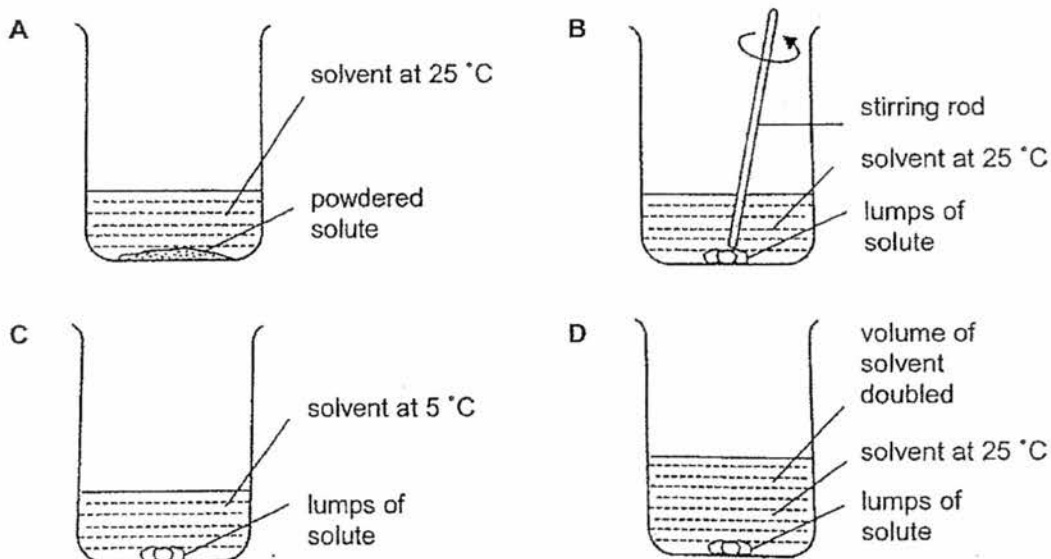
- 7 The diagram shows the observations before and after the reaction between powdered iron and powdered sulfur when placed in a test tube and heated strongly.



Which of the following statements correctly describes the powder in the test tube?

	before reaction	after reaction
A	mixture of compounds	pure compound
B	mixture of compounds	pure element
C	mixture of elements	pure compound
D	mixture of elements	pure element

- 8 In an experiment, 2 g of sugar was added to a given volume of solvent. Which of the following will take the longest time for the solute to dissolve completely?



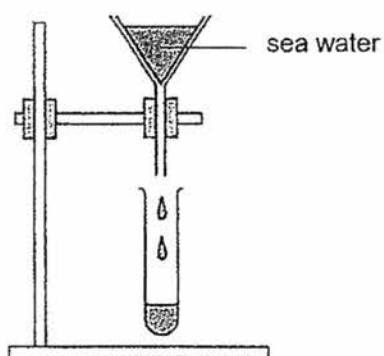
- 9 In the year 2013, the Pollutant Standards Index (PSI) in Singapore hit a record-high of 401. People were seen wearing surgical masks to prevent pollutants from the air from entering the respiratory system.
Which of the following best describes the method of separation in this scenario?
- A distillation
 - B evaporation
 - C filtration
 - D magnetic attraction
- 10 Which of the following statements is **not** correct?
- A A solution boils over a range of temperatures.
 - B A solution cannot be separated by physical means.
 - C A suspension is a mixture which can be separated by filtration.
 - D A suspension is usually a solid-liquid mixture.
- 11 When substances **X** and **Y** are placed in water, only substance **X** is retained by the filter paper after filtration.
Which of the following is true about substances **X** and **Y**?
- A Density of **X** is larger than **Y**.
 - B Mass of **X** is higher than mass of **Y**
 - C Size of particles of **X** is larger than **Y**.
 - D Solubility of **X** in water is higher than **Y**.
- 12 Microfiltration is used in water treatment to remove
- 1 dissolved solids.
 - 2 solid silt and sand particles.
 - 3 disease-causing micro-organisms.
- A 1 and 2
 - B 1 and 3
 - C 2 and 3
 - D 1, 2 and 3

13 Which of the following setups enables the collection of pure water from sea water?

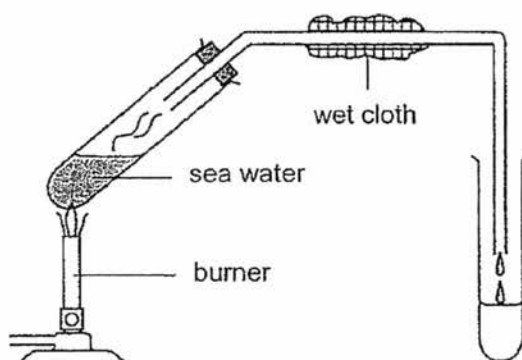
1



2



3

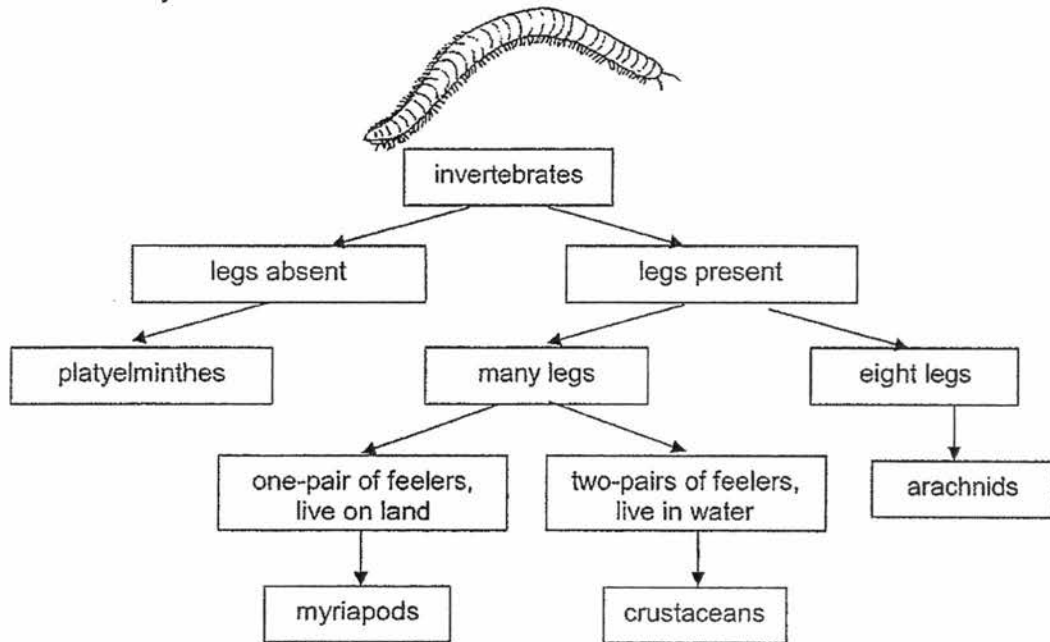


- A 1 only
- B 2 only
- C 1 and 3
- D 2 and 3

14 Which of the following statements on biodiversity 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 living things on earth.
- D Biodiversity is the existence of different kinds of plants on earth.

- 15 The diagram shows a millipede, which is an invertebrate, and a dichotomous key to be used to classify invertebrates.



Using this dichotomous key, how can millipedes be classified?

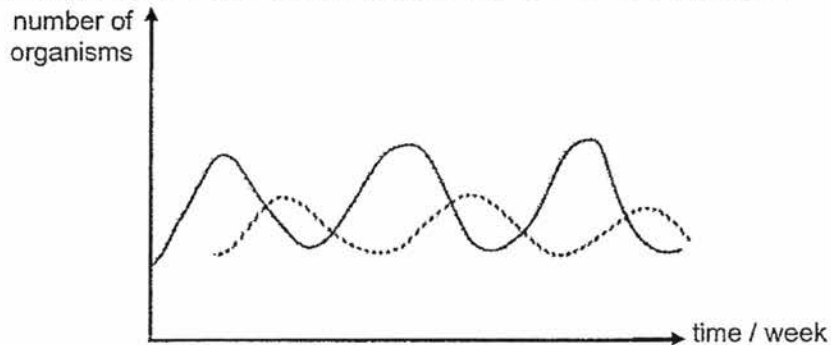
- A arachnids
 B crustaceans
 C myriapods
 D platyhelminthes
- 16 Bacteria can be found almost everywhere. Which of the following places where bacteria is found can be beneficial to human beings?
- 1 large intestine
 - 2 mouth
 - 3 waste treatment plants
- A 3 only
 B 1 and 2
 C 1 and 3
 D 2 and 3
- 17 Which of the following are benefits humans derive from biodiversity?
- 1 to obtain a variety of food like vegetables and meat
 - 2 to develop medicines like penicillin antibiotics
 - 3 to obtain cotton to make clothing
- A 1 and 2
 B 1 and 3
 C 2 and 3
 D 1, 2 and 3

- 18 Jimmy caught an angelfish from the sea and brought it home to place it inside his aquarium. After a few days, the fish was dead.

Which of the following reasons could most likely cause the death of the angelfish?

- A The aquarium was placed in an air-conditioned room.
- B The fish did not get enough oxygen in the aquarium.
- C The fish was not used to the artificial light.
- D The water in the aquarium came from the tap.

- 19 The graph shows a type of biotic relationship between two organisms.



Which of the following pairs of organism has the relationship depicted by the graph?

- A bee and flower
- B fish and coral
- C fleas and dogs
- D lion and zebra

- 20 What does the following diagram represent?



- A abiotic environment
- B community
- C ecosystem
- D population

End of Paper

The Periodic Table of the Elements

Group

I	II											III	IV	V	VI	VII	0

Name:	Index Number:	Class:
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HUA YI SECONDARY SCHOOL

1E

Mid-Year Examination 2016

1E

SCIENCE

Sections B & C

12 May 2016

1 h 30 min

Candidates answer on the Question Paper.

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your Name, Index Number and Class on all the work you have done.

Write in dark blue or black pen.

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

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

Section B and C

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

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 9 of Section A.

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

This document consists of **13** printed pages including the cover page.

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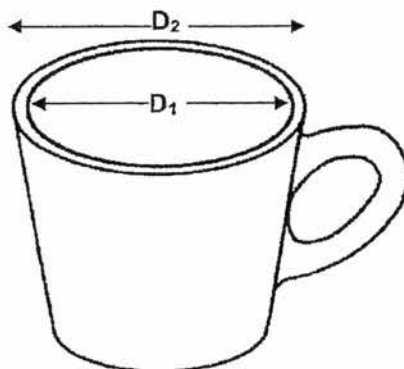
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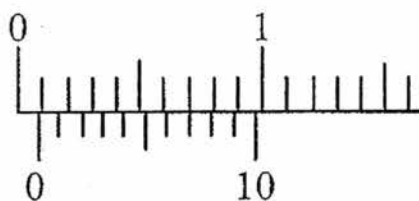
Setter: Ms Lim SY Belle

Section B (30 marks)Answer **all** the questions in this section.

- 1 Fig. 1.1 shows a cup that is being measured by a pair of vernier calipers. D_1 is the internal diameter of the cup and D_2 is the external diameter of the cup.

**Fig. 1.1**

- (a) (i) Fig. 1.2 shows part of the vernier calipers when its jaws are closed.

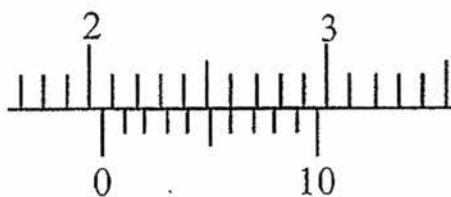
**Fig. 1.2**

State the error reading in Fig. 1.2.

.....cm

[1]

- (ii) Fig. 1.3 shows the reading taken when the inside jaws of vernier calipers are used to measure the internal diameter, D_1 of the cup.

**Fig. 1.3**

State the reading in Fig. 1.3.

.....cm

[1]

- (iii) Calculate the actual internal diameter, D_1 , of the cup. Show your working.

actual internal diameter =cm [1]

- (b) It was given that the thickness of the cup is 0.30 cm, as shown in Fig. 1.4.

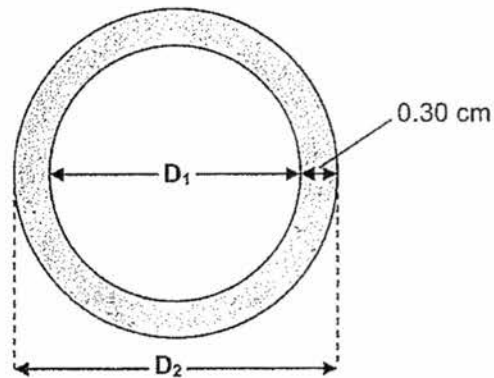


Fig. 1.4

Calculate the external diameter, D_2 , reading shown on the **same** pair of Vernier calipers when the outside jaws are used. Show your working.

reading of the outside jaws =cm [2]

[Total: 5]

- 2 Table 2.1 shows the densities of some common substances.

Table 2.1

substances	density / g cm^{-3}
alcohol	0.8
mercury	13.6
nail	7.9
stone	20.1

- (a) Alcohol is poured into a beaker until it reaches the 160 cm^3 mark.
Calculate the mass of the alcohol used.

mass = [2]

- (b) Fig. 2.1 shows the small stone with 20.1 g/cm^3 density.



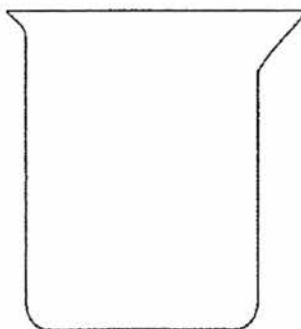
Fig. 2.1

Outline how its volume can be determined.

.....

 [3]

- (c) Some alcohol and mercury were poured into a large beaker and allowed to settle into two separate layers.
Sketch and label the positions of alcohol, mercury, nail and stone in the beaker.



[2]

[Total: 7]

- 3 Fig. 3.1 shows the solubility of potassium nitrate (KNO_3) and potassium chloride (KCl) in water at different temperatures.

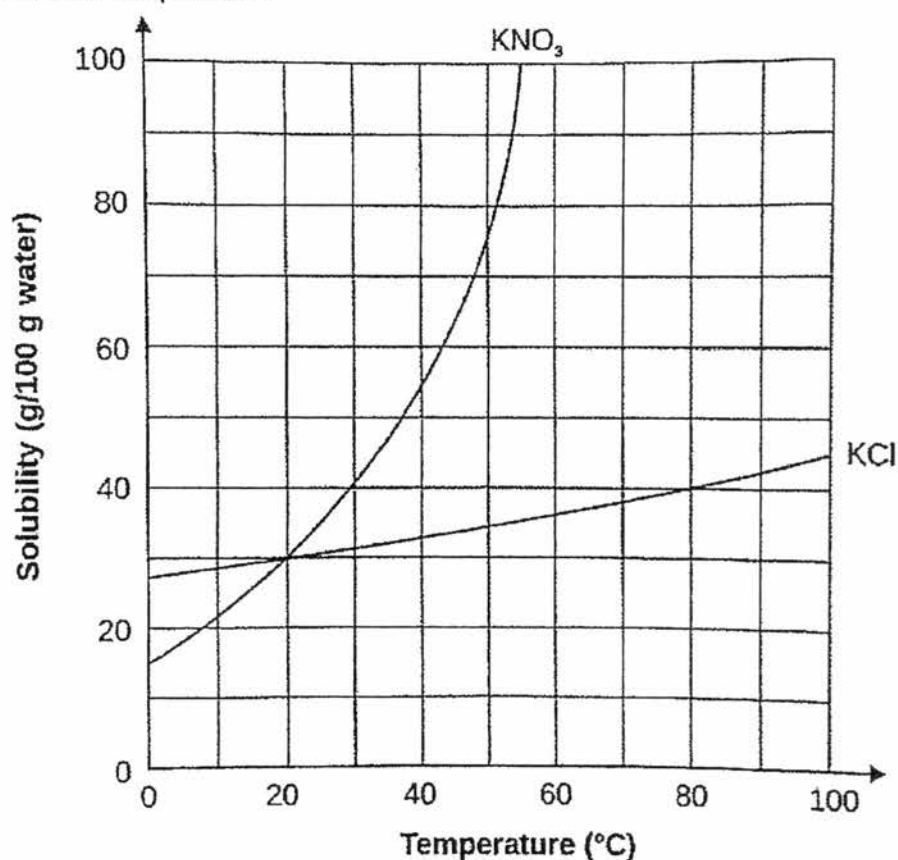


Fig. 3.1

- (a) State the solubilities of KNO_3 and KCl at 50 °C.

KNO_3 :g/100g water

KCl : g/100g water [2]

- (b) Determine the temperature where KNO_3 and KCl have the same solubility.

.....°C [1]

- (c) James concluded that the solubility of KNO_3 is always higher than KCl .
Is the conclusion made by James accurate? Explain.

.....

..... [1]

[Total: 4]

- 5 A group of scouts discovered an unexplored land in the middle of a forest. Fig. 5.1 shows some pictures of the organisms found.

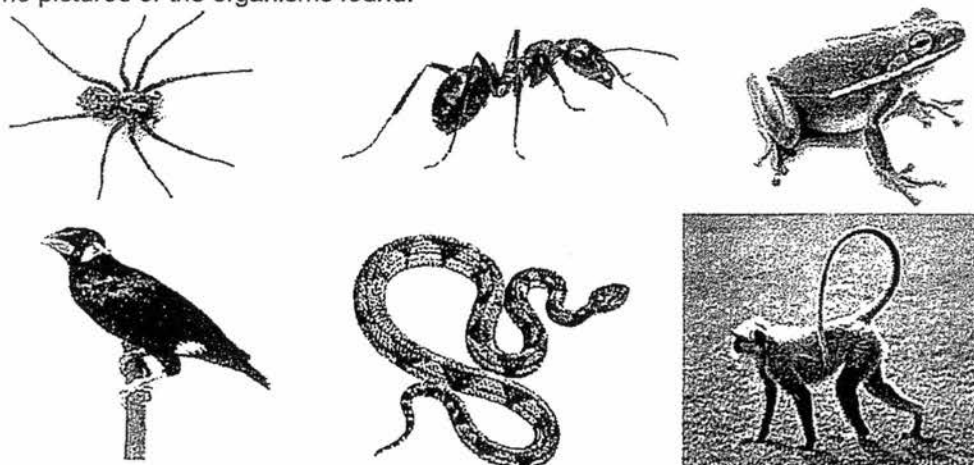


Fig. 5.1

- (a) Explain the significance of classification of the organisms from the new explored land.

..... [1]

- (b) Construct a dichotomous key of the organisms found in the forest by the scouts.

[5]

- (c) The scouts have also identified some plants in their expedition. They classified them into flowering and non-flowering plants. Some of the non-flowering plants they saw were mosses, ferns and gymnosperms as shown in Fig. 5.2.



Fig. 5.2

State two methods of reproduction of these non-flowering plants.

1.
2. [2]

[Total : 8]

Section C (20 marks)

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

- 6 Gusto is a trainee chef working in an Italian restaurant. He is tasked to run errands like buying ingredients and making soup.

Fig. 6.1 shows a bowl of mushroom soup prepared by Gusto.

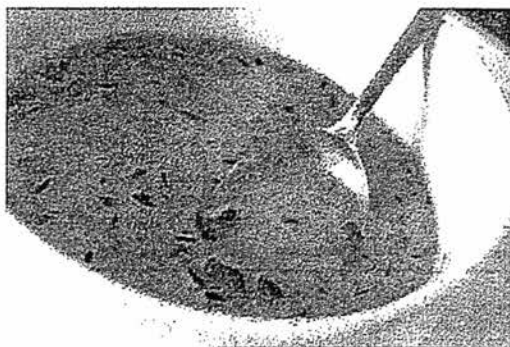


Fig. 6.1

- (a) State whether the soup is a solution or suspension. Explain with reference to Fig. 6.1.

.....

 [2]

- (b) There are two types of bowl, one ceramic and another stainless steel. Suggest which bowl Gusto should choose to serve the hot soup, and provide a reason for your choice.

.....

 [2]

- (c) The Ministry of Health announced that a certain dye in food colouring may cause cancer. Gusto is tasked to perform a paper chromatography test on the food colouring that the restaurant uses.

- (i) State **two** steps of precautions that Gusto needs to take when performing paper chromatography.

precaution 1:

.....

precaution 2:

..... [2]

- (ii) The chromatogram in Fig. 6.2 shows dyes A, B and C identified by the Ministry of Health to be illegal dyes.

Complete Fig. 6.2 by sketching the chromatogram of the food colouring used by the restaurant if it is safe to be consumed. The food colouring contains two different dyes.

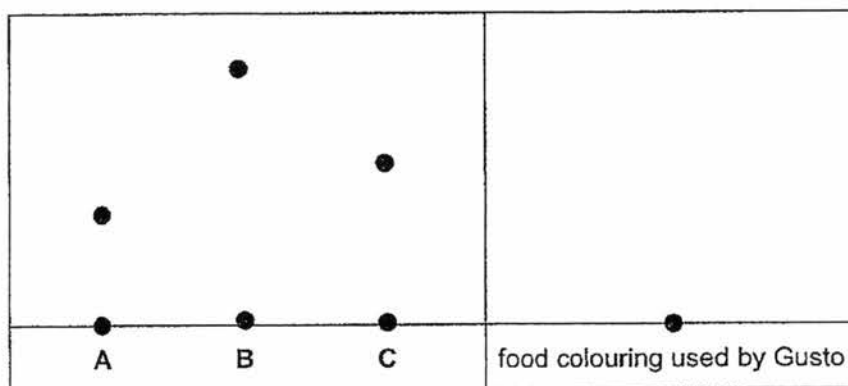


Fig. 6.2

[1]

- (iii) Rank the solubility of dyes A, B and C in the solvent used, starting with the least soluble dye.

..... [1]

- (d) Gusto accidentally spilled salt into a container of pepper.

Gusto knows that salt dissolves in water but pepper does not. Outline the steps that Gusto should take to separate these two solids.

step 1: Dissolve the mixture in water.

step 2:

step 3: [2]

[Total: 10]

- 7 (a) Fig. 7.1 shows a cross-section of an apparatus called a 'choice chamber'. The setup was used to investigate the conditions woodlice prefer. The experiment started with an equal number of woodlice in each chamber.

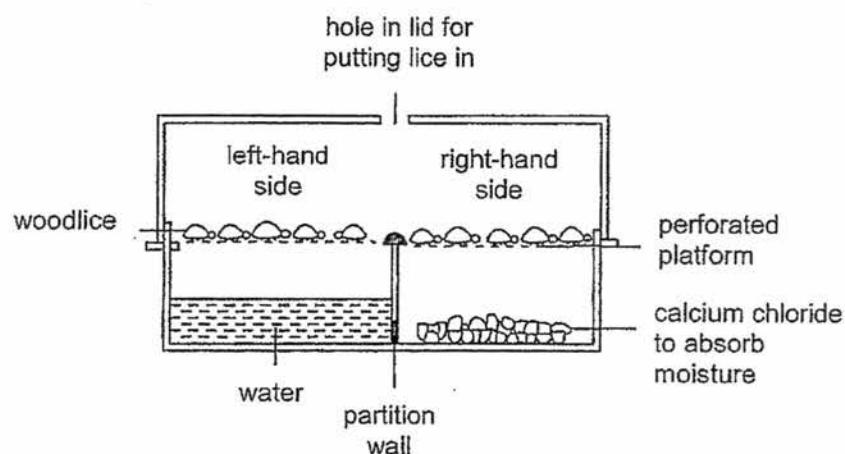


Fig. 7.1

The woodlice were placed in the choice chamber and the number of woodlice in each half was counted every two minutes for 10 minutes. The results are recorded in Table 7.1.

Table 7.1

time / min	number of woodlice on left-hand side of the chamber	number of woodlice on right-hand side of the chamber
0	5	5
2	4	6
4	5	5
6	8	2
8	9	1
10	9	1

- (i) Identify the following variables in this experiment.

independent:

dependent:

constant:

[3]

- (ii) With reference to Table 7.1, explain which condition was preferred by the woodlice.

.....

 [2]

- (iii) A student would like to investigate whether woodlice prefer darkness or bright conditions. Hence, he covered the left-hand side of the same chamber with a black card, while the right-hand side chamber was left unchanged. Fig 7.2 shows the modification to the setup.

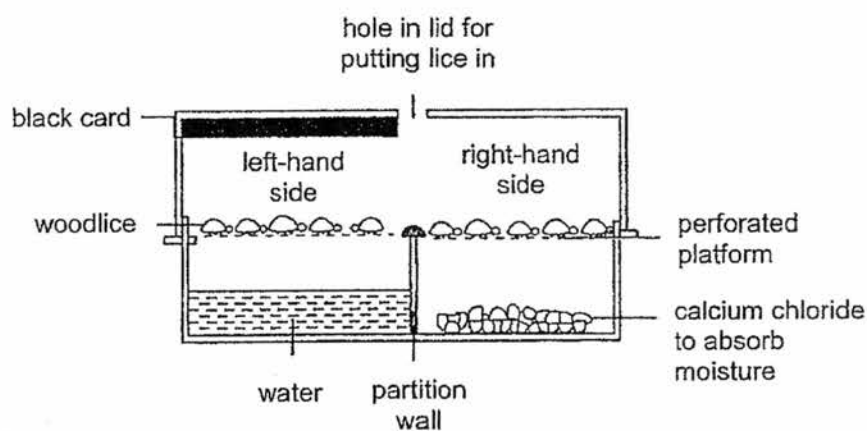


Fig. 7.2

After ten minutes, he found that all the 10 woodlice moved to the left-side of the chamber. Thus, he concluded that woodlice prefer darkness. Evaluate and explain whether the student's conclusion was reliable.

.....

 [1]

(b) Fig. 7.3 shows a picture of a typical rainforest and a picture of the same rainforest 10 years later.

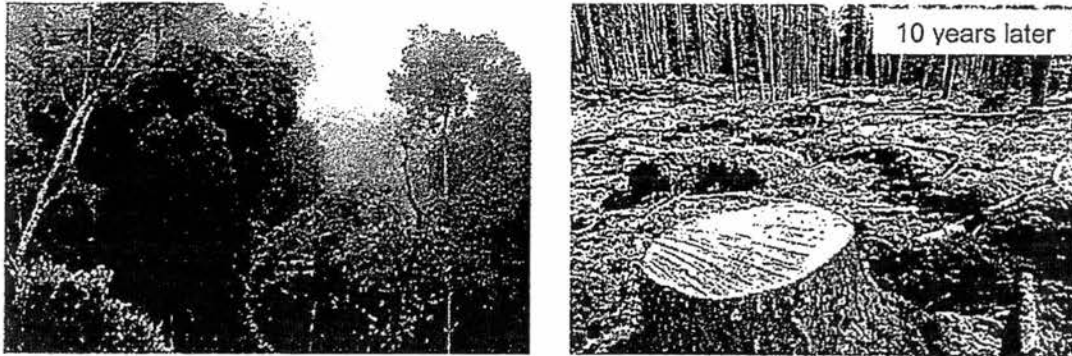


Fig. 7.3

- (i) Identify **one** key abiotic factor that affected the height of trees in the rainforest.

..... [1]

- (ii) State **two** importance of the tropical rainforest and **one** consequence of deforestation.

importance 1:.....

.....

importance 2:.....

.....

consequence of deforestation:

.....

..... [3]

[Total: 10]

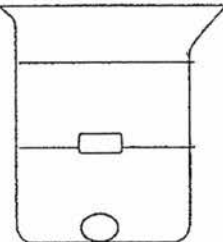
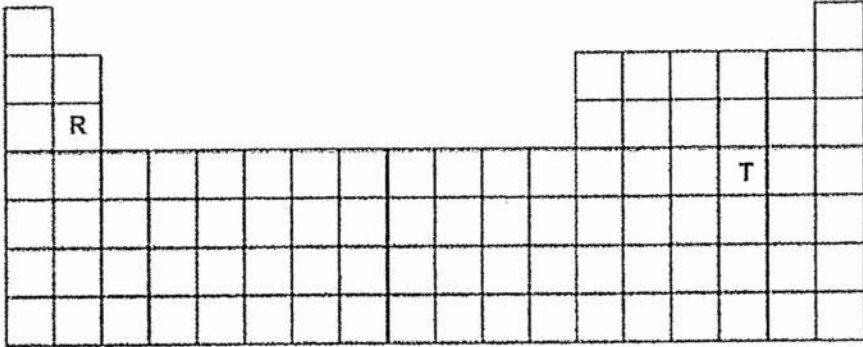
End of Paper

1E LSS Mid Year Exam 2016
Marking Scheme
Section A MCQ [Total 20]

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

Paper 2 [Total 70]
Section B [30]

Q No.		Marks
1	(a i) +0.07 cm	1
	(ii) 2.06cm	1
	(a iii) Corrected reading = $2.06 \text{ cm} - (+0.07 \text{ cm})$ = 1.99 cm <i>Allow ecf from 1(a)(i) and (ii)</i>	1
	(b) Reading on outside jaws = $2.06 + 0.3(2)$ = 2.66 cm Allow ecf from corrected reading. - Award working mark for students who use the wrong vernier caliper reading (i.e. 1.99 cm).	1 1
	Total	5
2	(a) $m = 0.8 \times 160$ (working) = 128 g No units – 1m	1 1
	(b) - measure the initial volume of the water in a measuring cylinder - drop the rock into the measuring cylinder and record the final volume. - the difference in the initial and final volume is the volume of the stone. OR - Place the stone in a displacement can - Overflow liquid is collected in a measuring cylinder - The volume of water collected is the volume of the stone OR	1 1 1

		- Using mass / electronic / beam balance - To measure mass of the stone - Use Mass / density to get the volume	
	(c)	alcohol iron mercury stone  position of liquids position of solids wrt to liquids	1 1
		Total	7
3	(a)	75 g/100g water A: 74 to 77 35g/ 100g water A: 33 to 36	1 1
	(b)	20 °C	1
	(c)	No. the solubility of KNO₃ is lower than KCl before 20 °C. For temperature higher than 20°C, the solubility of KNO ₃ is higher than KCl	1
		Total	4
4	(a)	P and Q Both – 1m	1
	(b)	P is a good conductor of heat and electricity but U is not a good conductor of heat and electricity. OR P appears shiny but U appears dull	1
	(c)	I. The new substance can only be separated by chemical methods. II. the new substance have different properties from the elements that make the it up. OR The new substance have fixed melting and boiling point / The elements in the new substance are combined in fixed proportion by mass.	1 1
	(d)		2
		Total	6
5	(a)	Classification allows grouping of organisms in a systematic way / Allows us to identify how the new found organisms are related./	1

	Provides a reference for the scouts to identify the organisms	
(b)	<pre> graph TD animals --> vertebrate animals --> invertebrate vertebrate --> Cold_blooded[Cold blooded] vertebrate --> warm_blooded[warm blooded] Cold_blooded --> With_legs[With legs] Cold_blooded --> Without_legs[Without legs] With_legs --> frog Without_legs --> snake warm_blooded --> With_hair[With hair] warm_blooded --> With_feathers[With feathers] With_hair --> Mynah_bird[Mynah / bird] With_feathers --> monkey invertebrate --> 6_legs[6 legs] invertebrate --> more_than_6_legs[>6 legs] 6_legs --> ants more_than_6_legs --> spider </pre>	1 Each branch
(c)	1. spores 2. seeds	1 1
Total		8

Section B [Total 20]

6	(a)	Suspension - Because there are solid particles suspended in the soup - The soup is not homogenous (mushroom solid and soup is liquid) Any of the above explanation R: floating / solid-liquid mixture	1 1
	(b)	Ceramic bowl. Because it has <u>low thermal conductivity to prevent hot soup from becoming cold too fast/ to prevent scalding the hands of server or consumer.</u> <u>(physical property with its reason)</u> R: heat insulator , reverse argument	1 1
	(c i)	1: the solvent level must be below the starting line 2: the food colouring must be soluble in the solvent used. 3: the starting line must be drawn in pencil 4: cover the test tube with lid to prevent the evaporation of solvent Any two R: solvent must not touch the starting line, must not go over the starting line	1 1
	(c ii)	2 spots not coinciding with the spots of A, B and C All two spots must be correct	1

	(iii)	A<C<B	1
	(d)	1. Dissolve the mixture in water 2. Filter the pepper as residue 3. Evaporate the filtrate to dryness to obtain salt. R: using filtrate as the word filter A: evaporation to dryness (AW) salt is left.	1 1 1
		Total :	10

Section C

7	(a i)	Independent: Humidity / moisture/presence of water Dependent: number of lice on each side of the chamber at every 2 mins intervals (<i>must show contrast to that of initial number of lice</i>) Constant: initial number of wood lice in each chamber / light intensity / species of wood lice / time interval to count the lice	1 1 1
	(a ii)	Woodlice prefer moist condition. Results from data shows that after 10 mins, most woodlice are found on the chamber with water.	1 1
	(a iii)	The student's result is not reliable. Because the experiment has two independent variables (moisture and presence of light), AW	1
	(b i)	Sunlight/ nutrients / moisture / salinity / pH R: temperature / air	1
	(b ii)	Habitat/food source/reduces risk of flooding/reduces soil erosion/absorbs CO ₂ and provide O ₂ / recycle nutrients/increase biodiversity / provide medicine / raw materials Consequence: Risk of flooding/soil erosion/ loss of habitat resulting in decreasing in the biodiversity/ endangering animals/ global warming / enhanced greenhouse effect	2 1
		Total	10