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BEDOK VIEW SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2022

CANDIDATE NAME

REGISTER NUMBER

CLASS

LOWER SECONDARY SCIENCE
Secondary 1 Express

Paper 1 Multiple Choice

05 October 2022
45 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name and index number on the Answer Sheet in the spaces provided unless this has been done for you.

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.

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 paper.
The use of an approved scientific calculator is expected, where appropriate.
A copy of the Periodic Table is found on page 14.

The maximum marks for this paper is 30 marks.

Setter(s): Ms Wong W L

This document consists of **14** printed pages.

Answer **all** the questions in this section.

1 Which of the following correctly refers to 'open-mindedness' of a good scientist?

A Not falsely report one's observations to fit beliefs.

B Be willing to accept that something could happen contrary to popular belief.

C Stick to the truth until the scientist's discovery is proven.

D Conducting the investigation a few times to obtain reliable results.

2 The following hazard symbols are found on a bottle containing a chemical in the laboratory.

I

II

III

Which row correctly identifies the representation of each hazard symbol?

	I	II	III
A	irritant	explosive	corrosive
B	corrosive	flammable	irritant
C	corrosive	explosive	toxic
D	irritant	flammable	toxic

3 The following hazard symbol is found on the bottle of an unknown chemical.

What harm is the person exposed to if he does not handle this substance with care?

A The substance may cause damage to body parts in contact with the chemical.

B The substance can kill plants and animals and harm the environment.

C The substance can damage body organs and cause cancer.

D The substance may explode and cause breathing difficulties when leaked in an enclosed space.

4 Judy measured 5.0 g of salt and dissolved it in 30.0 cm^3 of water.
What apparatus are able to accurately measure these?

A electronic balance and boiling tube

B test tube and measuring cylinder

C electronic balance and measuring cylinder

D electronic balance and beaker

5 Which process should be conducted before carrying out an experiment?

A analyse data

B recording data

C forming conclusions

D proposing hypothesis

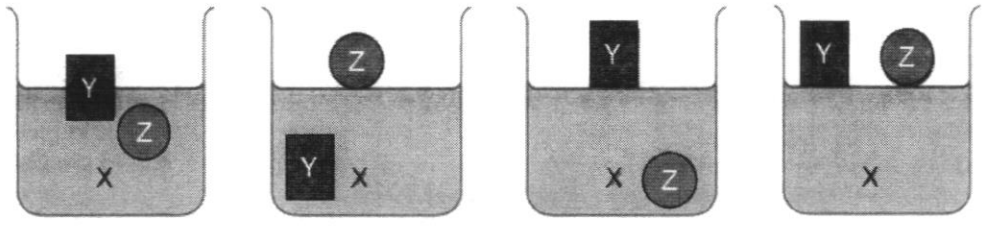
6 Which one of the following physical quantities is correctly matched to its S.I. unit?

	physical quantity	S.I. unit
A	time	second
B	temperature	degree celsius
C	length	centimetre
D	mass	gram

7 The densities of three different substances are given in the table below.

substance	density (g/cm^3)
liquid X	0.8
solid Y	0.3
solid Z	0.8

Which of the following diagrams shows the observations correctly when the three substances are placed together in a beaker?



A B C D

8 In the Periodic Table, in which direction does the properties of the elements change from metallic to non-metallic?

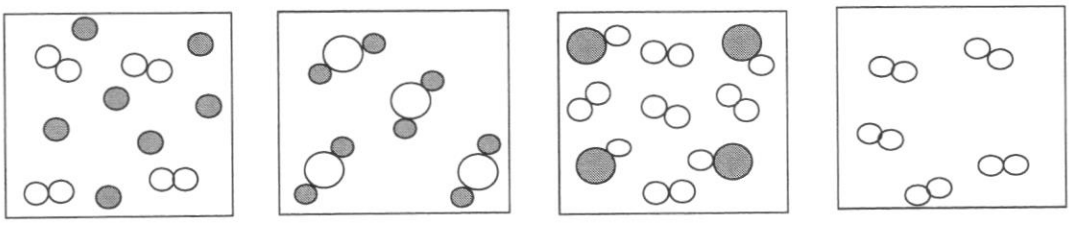
A down the group

B across a period from left to right

C across a period from right to left

D up the group

9 Which of the following shows a mixture of elements?



A B C D

10 Which substance is made up of **four** elements?

A $LiNO_3$

B $C_6H_{12}O_6$

C $NaHCO_3$

D CH_3COOH

11 Which of the following statements support that magnesium oxide is a compound?

1 Magnesium oxide cannot be separated into its components by physical methods.

2 Magnesium oxide contains magnesium and oxygen chemically combined together.

3 Magnesium oxide cannot dissolve in water.

4 Magnesium oxide does not have the same properties as magnesium and oxygen.

A 1 and 2 only

B 2 and 4 only

C 1, 2 and 4 only

D All of the above

12 The solubility of a substance depends on the ..... .

1 nature of the solute

2 temperature of the solution

3 surface area of the solute

4 nature of the solvent

A 1 and 2 only

B 2 and 4 only

C 1, 2 and 4 only

D All of the above

13 Which of the following mixtures can be separated by magnetic attraction?

A copper and gold coins

B iron pins and tin foil

C bronze and brass buttons

D silver and aluminium foil

14 Which one of the following statements about evaporation is correct?

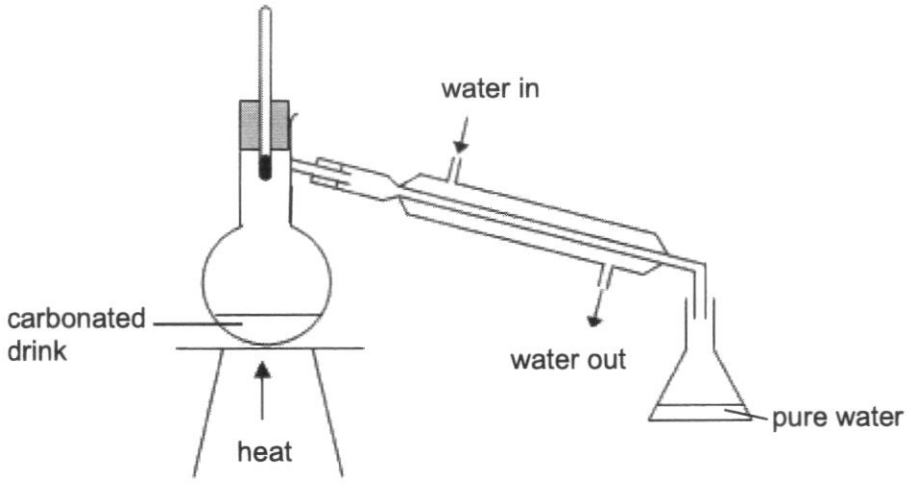
A It can be used to detect the use of illegal drugs at sporting events.

B It can be used to check for purity of food products.

C It can be used to obtain water from seawater.

D It can be used to obtain salt from seawater.

15 A group of students set up the apparatus below to obtain pure water from carbonated drinks for their science experiment.



Which of the following procedures would improve the efficiency of the process?

A reverse the order of the flow of water

B heat the flask with a luminous flame

C place the thermometer lower into the flask

D use a beaker to collect the distillate instead of a conical flask

16 Three substances K, L and M are solids. The table shows some information about K, L and M.

substance	soluble in water	soluble in ethanol
K	✓	×
L	×	✓
M	×	×

Which of the following sequence of steps is required to obtain a pure, dry sample of M?

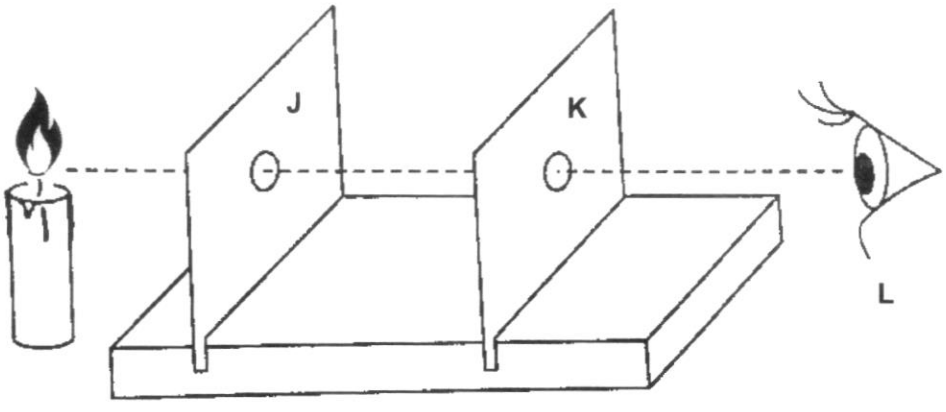
A dissolve in water → filter → evaporate filtrate

B dissolve in water → filter → collect residue

C dissolve in water → filter → dissolve residue in ethanol → filter → collect residue

D dissolve in water → filter → dissolve residue in ethanol → filter → evaporate filtrate

17 In an experiment, two pieces of cardboard J and K, each with a tiny hole in the middle, are arranged in a straight line.



Which of the following statements are true?

1 The candle flame can be seen by the eye at L.

2 If cardboard J is shifted 3 cm to its left, the candle flame can still be seen.

3 The experiment shows that light travels in a straight line.

4 If cardboard K is shifted 3 cm to its right, the candle flame cannot be seen.

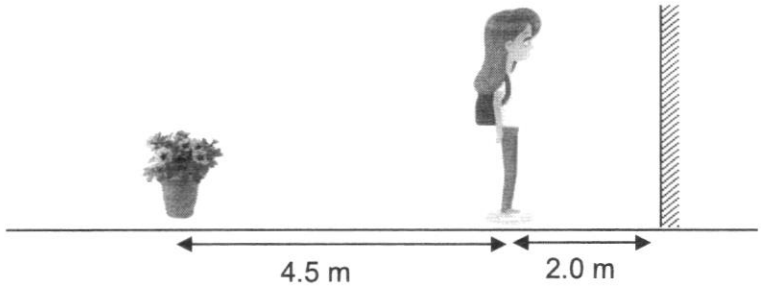
A 1 and 2 only

B 2 and 3 only

C 1 and 3 only

D 1, 3 and 4 only

18 Tricia stands 2.0 m in front of a mirror. A pot of flowers is located 4.5 m behind her.



What is the distance from Tricia's eyes to the image of the pot of flowers?

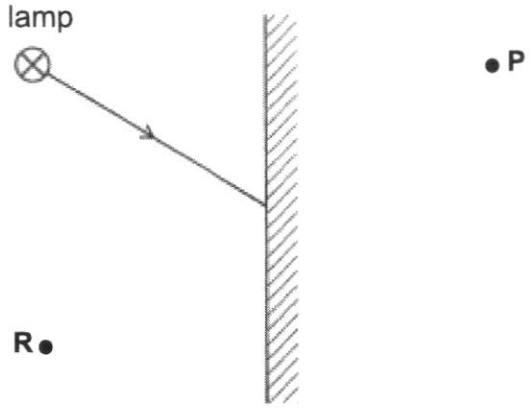
A 4.5 m

B 6.5 m

C 8.5 m

D 13.0 m

19 The diagram shows a light ray from one point on a lamp striking a plane mirror.



Which of the following statements describe the image of the lamp formed by the plane mirror?

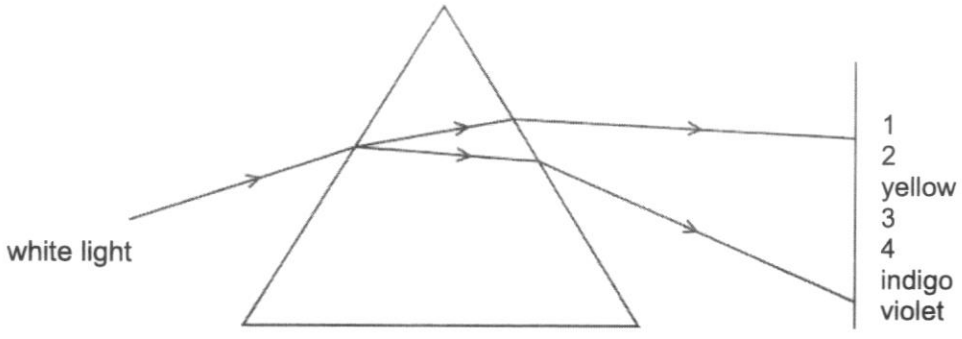
A The image is formed at P and is real.

B The image is formed at R and is real.

C The image is formed at P and is virtual.

D The image is formed at R and is virtual.

20 The diagram shows a ray of white light that is dispersed by a glass prism. A spectrum of 7 colours is produced.



Which of the following shows the correct list of missing colours, 1, 2, 3 and 4?

	1	2	3	4
A	red	green	orange	blue
B	infra-red	red	green	ultra-violet
C	red	orange	green	ultra-violet
D	red	orange	green	blue

21 Which statement is true about an unicellular organism?

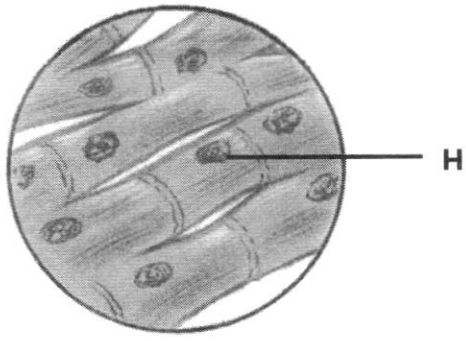
A All of the organism's functions are carried out by a single cell.

B The organism consists of many types of tissues.

C Each cell specialises in performing one specific function.

D There is a division of labour in the organism amongst tissues, organs and systems.

The diagram shows a structure in the human body. Use it to answer questions **22** and **23.**



22 Which level of organisation best represents the diagram above?

A cell

B organ

C organ system

D tissue

23 Which of the following describes the function of structure H?

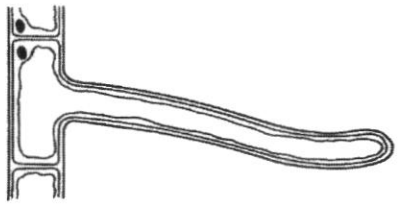
A controls cell activities

B controls substances that enter and exit the cell

C stores water and nutrients

D site of chemical reactions

24 The diagram shows a specialized cell from a plant.



Which function is the cell modified to perform?

A photosynthesis

B storage of food

C exchange of gases

D absorption of water

25 Which of the following statements are examples of division of labour?

1 The heart and blood vessels form a network to transport blood around the body.

2 The nucleus in the cell carries genetic information for cell division.

3 Chloroplasts carry out photosynthesis by converting light energy to chemical energy.

4 The transport system of plants carries food, mineral salts and water throughout the plant.

A 1 and 2 only

B 2 and 4 only

C 1, 2 and 4 only

D All of the above

26 Which of the following shows how bacteria can be beneficial and harmful to humans?

	beneficial	harmful
A	bacteria are found on our skin	bacteria come in different shapes and sizes
B	bacteria break down waste matter into harmless products	bacteria found in our intestines digest food
C	bacteria can convert milk into food products like yoghurt	bacteria can cause our food to spoil
D	bacteria produce toxins that can cause food poisoning	bacteria living in the mouth can cause bad breath

27 Which of the following indicates the effect of expansion on the mass and volume of matter?

	mass	volume
A	increases	remains the same
B	decreases	decreases
C	remains the same	increases
D	increases	increases

28 Which observation demonstrates that matter exists as tiny particles in constant, random motion?

A Ice melts at room temperature.

B Iron can be beaten into sheets.

C Some gases are less dense than air, while others are more dense than air.

D The aroma of fried rice fills the room when its container is opened.

29 When an inflated balloon is placed in the refrigerator, the gas particles in the balloon

A move slower and become further apart.

B move slower and become closer together.

C move faster and become closer together.

D move faster and become further apart.

30 During the process of boiling a liquid,

A the particles throughout the liquid lose energy.

B the particles throughout the liquid gain energy.

C the particles at the surface of the liquid gain energy.

D the particles become closer to each other.

End of Paper

BEDOK VIEW SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2022

CANDIDATE NAME

REGISTER NUMBER

CLASS

LOWER SECONDARY SCIENCE
Secondary 1 Express

Paper 2 Theory

5 October 2022
1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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

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

Write your answers in the spaces provided on the Question Paper.

For Examiner's Use	
Total	/ 50

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
A copy of the Periodic Table is found on page 14.

The maximum marks for this paper is 50 marks.

Setter(s): Ms Wong W L

Parent's / Guardian's Signature: .....

This document consists of **14** printed pages.

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

For examiner's use

1 Danial was tasked to investigate the most suitable material for table tennis balls. The manufacturing plant uses celluloid to make the table tennis ball shown in Fig. 1.1.

Danial is considering plastic as an alternative material as he believes that this will enable the table tennis ball to rebound to a greater height upon contact with the table tennis table.

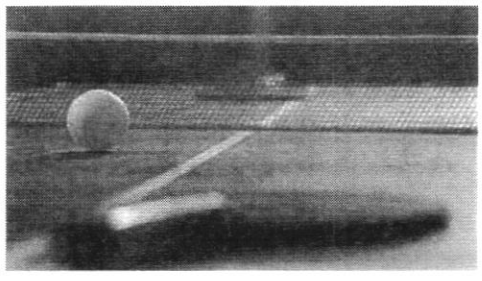


Fig. 1.1

(a) State the hypothesis in Danial's experiment.

.....

..... [1]

(b) State one variable that should be controlled.

..... [1]

(c) State the independent variable in this experiment.

..... [1]

(d) The diameter of the table tennis ball is measured to be 3.88 cm using an instrument as shown in Fig. 1.2.

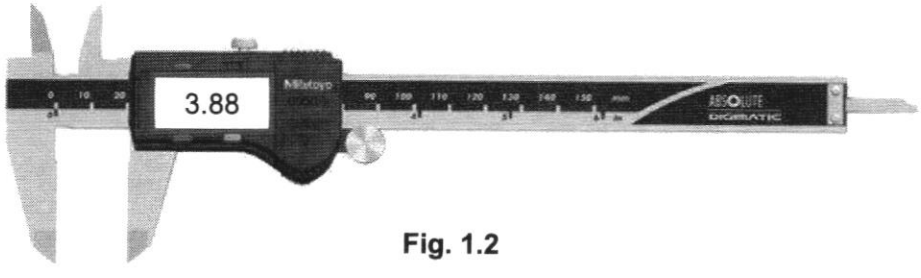


Fig. 1.2

(i) State the name of the instrument in Fig. 1.2.

..... [1]

For examiner's use

(ii) A zero error was identified in the instrument in Fig.1.2. Its reading is - 0.02 cm when fully closed. Calculate the actual diameter of the table tennis ball. Show your working clearly.

actual diameter = ... [1]

[Total: 5]

2 Fig. 2.1 shows a diagram of a brick apartment building.

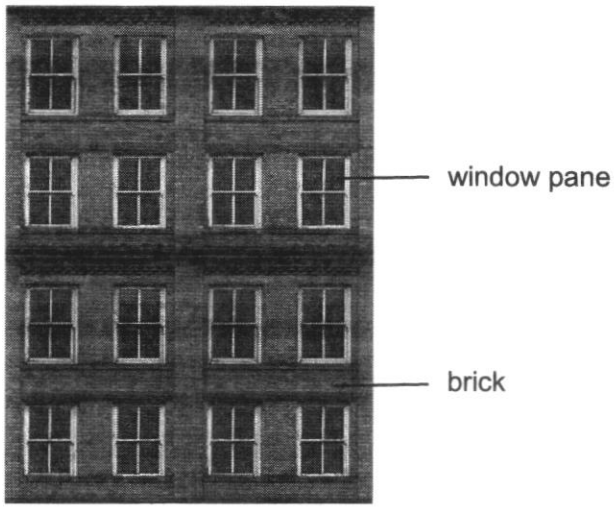


Fig. 2.1

(a) Define "strength".

..... [1]

(b) Give a reason why the strength of the material is important to the structure in Fig. 2.1.

.....

..... [2]

(c) Given that brick is a poor conductor of heat, explain why it is a suitable material for the apartment.

.....

..... [1]

[Total: 4]

For examiner's use

3 Calista is tasked to investigate the density of an irregularly- shaped object for a project. She first measured the mass of the petri dish and then the mass of the petri dish with the object using an electronic mass balance as shown in Fig. 3.1 and Fig. 3.2 respectively.

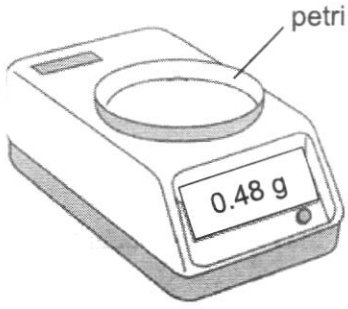


Fig. 3.1

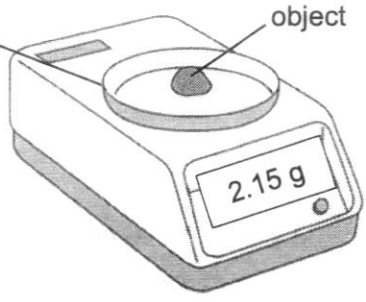


Fig. 3.2

(a) Calculate the mass of the object.

mass of object = ... [1]

(b) Given that the object has a volume of 1.4 cm^3, calculate its density. Give your answer to 2 decimal places.

density of object = ... [2]

(c) Calista placed the same object into a beaker of pure water. The object is removed from the beaker, dried with a piece of cloth and then transferred into another beaker of solution X. The results are shown in Fig. 3.3 and Fig. 3.4 respectively.

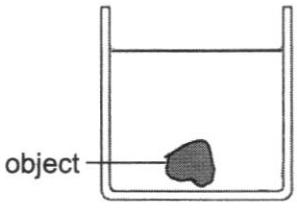


Fig. 3.3

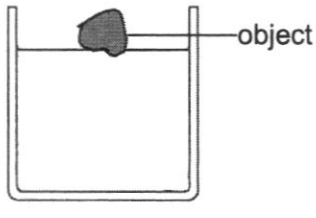


Fig. 3.4

With reference to Fig. 3.3 and Fig. 3.4, compare the density of pure water, and solution X. Explain your answers.

.....

.....

..... [2]

[Total: 5]

For examiner's use

4 Table 4.1 shows the properties of three unknown substances, J, K and L.

Table 4.1

substance	ability to break down when electricity is passed through it	ability to be separated by physical methods such as filtration
J	breaks down when electricity passes through it	can be separated by physical method
K	breaks down when electricity passes through it	cannot be separated by physical method
L	does not break down when heated and when electricity passes through it	cannot be separated by physical method

(a) Define the term *compound*.

.....

..... [1]

(b) Use Table 4.1 to identify J, K and L as an element, a compound or a mixture.

J: .....

K: .....

L: ..... [2]

[Total: 3]

5 Solubility refers to how well a solute dissolves in a fixed volume of a particular solvent. Fig. 5.1 shows the solubility curve of two substances, P and Q.

For examiner's use

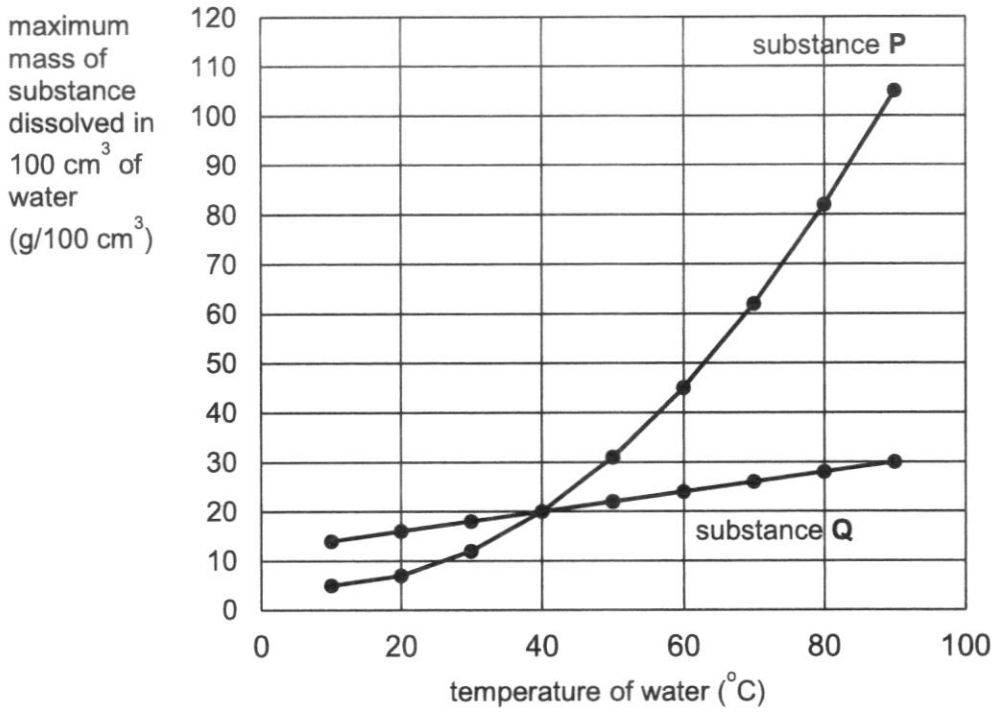


Fig. 5.1

(a) **(i)** State the temperature in which both substances P and Q have the same solubility.

..... [1]

(ii) With reference to Fig. 5.1, describe what you would observe when 50 g of substance Q is added into 100 cm^3 of water at 90 °C.

.....

..... [1]

(iii) With reference to 5.1, explain your answer in **(ii)**. Show your working in your answer.

.....

.....

..... [2]

(b) A student ground another sample of substance P into a fine powder and repeated the experiment using powdered substance P.

For examiner's use

Explain how grinding substance P into fine powder would affect its rate of dissolving in water.

.....

.....

..... [2]

[Total: 6]

6 A ceramic cup is coated with paint T. A sample of paint T is sent to the laboratory to check whether it contains banned chemicals that are harmful to the human body.

For examiner's use

A paper chromatography test is done using T and three chemicals, X, Y and Z that are known to be harmful to the human body. Fig. 6.1 shows the test results.

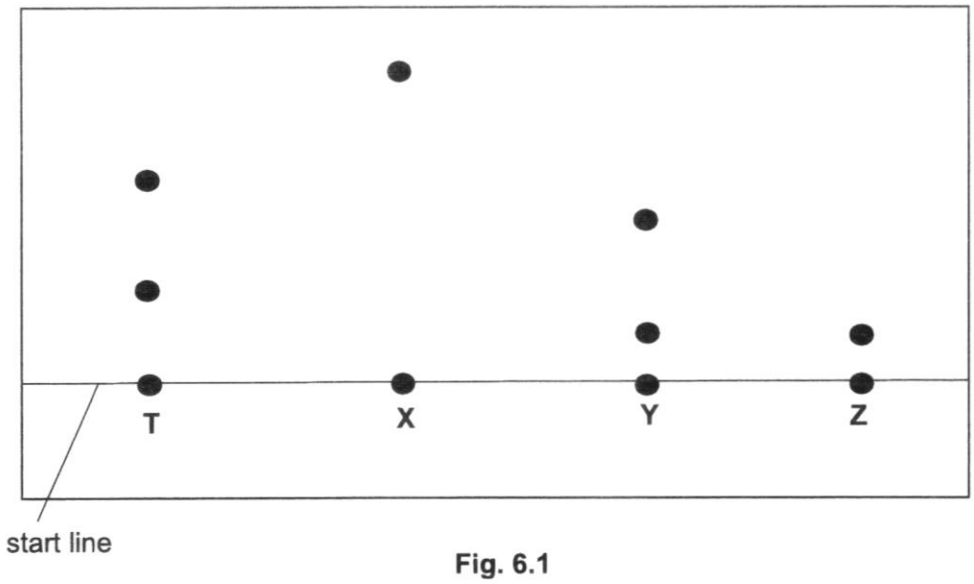


Fig. 6.1

(a) Explain why the start line is drawn in pencil.

.....

.....

..... [1]

(b) From the results, state whether paint T is a pure substance or a mixture. Give a reason for your answer.

.....

..... [2]

(c) Using the paper chromatography results in Fig 6.1, explain whether paint T is harmful to the human body.

.....

.....

..... [2]

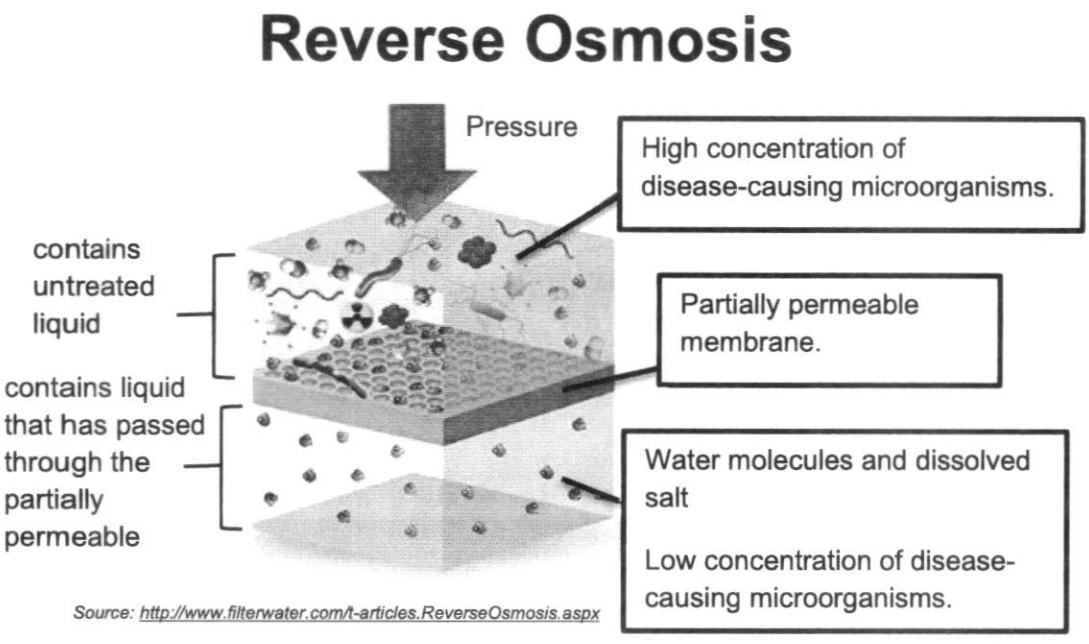
[Total: 5]

7 Water covers about 80% of the earth's surface. However, most of this water is trapped in oceans and ice caps.

For examiner's use

With advancement in science and technology, reverse osmosis has become a highly reliable method to obtain clean drinking water from used water.

Fig. 7.1 shows a simplified version of the reverse osmosis process.



Source: http://www.filterwater.com/t-articles.ReverseOsmosis.aspx

(a) Describe how the partially permeable membrane can help to reduce the concentration of disease-causing microorganism in the liquid that has passed through.

.....

.....

.....

..... [2]

(b) Predict what would happen if pressure was not exerted in the region containing the untreated liquid.

.....

..... [1]

(c) Suggest a reason why processes such as reverse osmosis are important to Singapore.

.....

..... [1]

[Total: 4]

For examiner's use

8 **(a)** Fig. 8.1 shows a ray of light passing from air to glass.

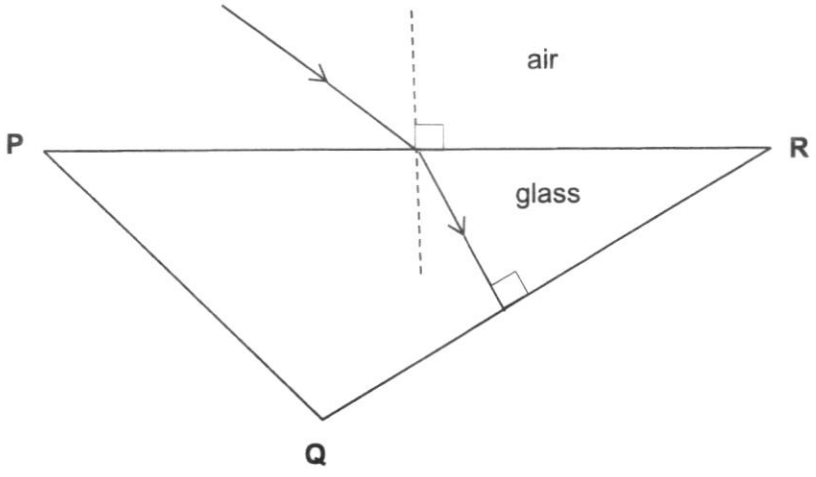


Fig. 8.1

(i) On Fig. 8.1, draw and label the angle of incidence with (i) and angle of refraction with (r). [1]

(ii) Describe and explain the change in the path of the light ray as it travels from air into glass.

.....

.....

.....

..... [2]

(iii) On Fig. 8.1, draw the path of the light ray as it exits from side QR to the air. [1]

For examiner's use

(b) Fig 8.2 shows Tommy standing at the edge of a pond. Tommy tried to catch the fish with a spear but failed. He realised that he should not aim exactly at the fish.

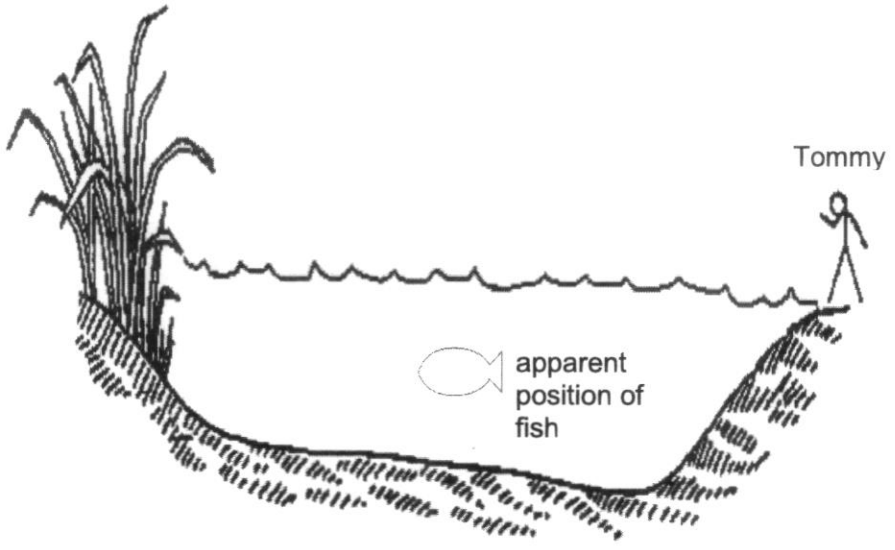


Fig. 8.2

Explain why he could not catch the fish when the spear was aimed at the apparent position of the fish.

.....

..... [1]

(c) To limit the spread of the Covid-19 virus, there has been an increasing use of electromagnetic radiation to sterilize rooms and detect a person with fever through thermal imaging cameras.

(i) Name the type of electromagnetic radiation that can be used to sterilise rooms.

..... [1]

(ii) State the type of electromagnetic radiation used in thermal imaging cameras.

..... [1]

(iii) State the benefit of light in our lives and the harmful consequence of light in our lives.

benefit: .....

harmful: ..... [2]

[Total: 9]

For examiner's use

9 **(a)** Fig. 9.1 shows a cell that was discovered by a group of scientists on a remote planet.

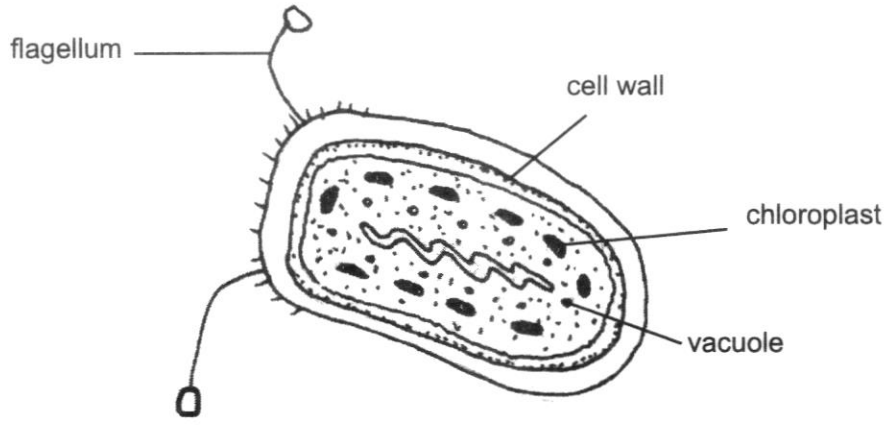


Fig. 9.1

With your knowledge on cells, explain why the scientists could not agree on whether this cell originated from a plant or an animal or both.

.....

.....

.....

.....

..... [2]

(b) Judy says that the heart is a tissue and not an organ. Do you agree or disagree with Judy's claim? Explain.

.....

.....

..... [2]

[Total: 4]

For examiner's use

10 Table 10.1 shows information on three substances.

Table 10.1

substance	melting point (°C)	boiling point (°C)
W	-110	18
Y	- 39	357
Z	660	2467

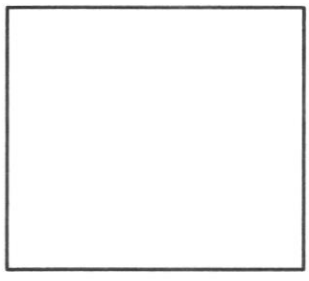
With reference to Table 10.1,

(a) State the physical states of the following substances at room temperature.

(i) substance W ..... [1]

(iii) substance Z ..... [1]

(b) Draw how the particles are arranged in substance Y at room temperature in the box below.



[1]

(c) Explain, in terms of particulate nature of matter, the change in state that occurs during boiling.

.....

.....

.....

..... [2]

[Total: 5]

End of Paper

BEDOK VIEW SECONDARY SCHOOL
2022 EYE 1E SCIENCE

Paper 1

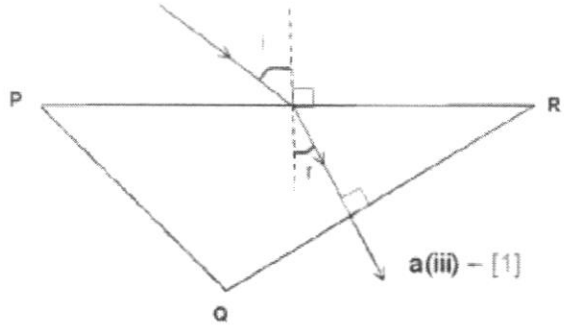
1	2	3	4	5	6	7	8	9	10
B	B	C	C	D	A	A	B	A	C
11	12	13	14	15	16	17	18	19	20
C	C	B	D	A	C	D	C	C	D
21	22	23	24	25	26	27	28	29	30
A	D	A	D	D	C	C	D	B	B

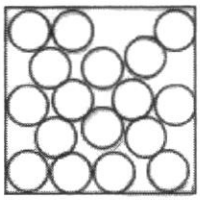
Paper 2

Q/No.	Answer	Marks
1a)	Table tennis balls that are made of plastic are able to rebound to a higher height compared to table tennis balls made of celluloid.	B1
b)	• surface/material that the table tennis ball rebound from • height from which balls are dropped. • Size/volume/mass of the ball any 1 point	B1
c)	Independent variable: material of the table tennis ball.	B1
di)	Digital vernier caliper A: minor error e.g. 1 letter wrong spelling	B1
ii)	Observed Reading = 3.88 cm Final reading = Observed reading – zero error = 3.88 – (- 0.02) = 3.90 cm or Actual Diameter = 3.88 + 0.02 = 3.90 cm	working needed to score B1 R: no units
		T=5
2a)	The strength of a material is the ability to withstand / support a heavy load without changing its shape permanently.	B1
b)	The apartment needs to withstand heavy load without changing shape [1] from the weight of people and furniture residing in it. [1] Reject: • Heavy winds or winds. • Withstand heavy weight without making reference to contents of building. • structure of the building (from stem of question)	B2

c)	It does not conduct heat well, the apartment can be kept cool on a hot day. A: can insulate against cold air from outside. Reject: • Prevent building from getting too hot (w/o elaboration about condition outside E.g. hot day, summer) • House will not catch on fire. • Link heat to humidity • People will not get scalded • Bricks will not expand and crack.	B1
		T=4
3a)	mass of the object = 2.15 g - 0.48 g = 1.67 g	B1 R: no units
b)	density = mass / volume = 1.67 / 1.4 = 1.19 g/cm^3 (allow ecf e.g. mass)	working needed to score M1 A1 No units (minus 1 total for qns)
c)	Solution X has a greater density than pure water. [1] The object floated in solution X, suggesting that it is less dense than solution X, but it sank in pure water, suggesting that is denser than pure water.	B1 B1
		T=5
4a)	A compound consist of two or more elements that are chemically combined together.	B1
b)	J: mixture K: compound L: element Award 1m - 2 correct 2m - 3 correct	B2
		T=3
5ai)	40°C	B1

aii)	Some substance Q will remain insoluble in water. A: form a suspension in water. A: Not all of substance Q will dissolve in water.	B1
aiii)	Solubility of substance Q at 90°C in 100 cm^3 of water = 30 g Only 30 g of Q will dissolve. The remaining mass = 50 -30 = 20 g of Q remains insoluble in water.	B1 working needed to score B1
b)	P: Grinding P to results in smaller size / increases the exposed surface area of solute particles Q O: Faster rate of dissolving	B1 B1
		T= 6
6a)	Pencil line does not dissolve/is insoluble in the solvent and hence does not interfere with the chromatography result	B1
b)	Mixture.[1] Two dyes/spots/components are present.[1] Reject: dots	B2
c)	T is not harmful. [1] Conponents of T do bot match those of harmful dyes. [1] Accept: All the harmful chemicals are not present in T.	B2
		T= 5
7a)	P: A partially permeable membrane is used to cnsure that particles such as the disease -causing or ganisms that are bigger than its pores will not be able to pass through [1] R : this allows the separation of the disease-causing microorganisms from the water molecules and dissolved salt, reducing the concentration of disease -causing microorgamisms/contaminated water. [1] Or P: A partially permeable membrane allows some substances to pass through but not others [1] R: Only small substances like water molecules and dissolved salts are able to pass through. O: Disease-causing microorganisms are larger and would be trapped in the membrane.	B2
b)	The process would take place over a longer period of time.	B1
c)	Singapore has a shortage of natural resources such as water. Reverse osmosis can help provide for Singapore's water needs./ shortage/lack of water sources.	B1

	0 m: if just state that Singapore has a shortage of natural resources. Answers must be linked to addressing Singapore's water needs.	
		T= 4
8ai)	 a(iii) – [1]	B1
aii)	As the ray of light travels from a optically less dense (air) to an optically denser medium (in glass), its speed decreases [1], it will be refracted / bend towards the normal.[1]	B1 B1
aiii)	Refer to diagram above: emergent ray should not bend. [1]	B1
b)	Image (at apparent position) of the fish is higher than its actual position due to refraction. or Actual position of fish is lower than the apparent position of the image of the fish.	B1
ci)	ultraviolet light A: UV light	B1
cii)	Infrared radiation	B1
ciii)	Benefit: allows us to see at night Harmful: • light can damage objects such as photos • Impacts the sleeping routine/cycle negatively • Affects the migration of birds. Artificial lights confuse the birds who depend on sun light to gauge the change in season	B2
		T= 9
9a)	P/R: Presence of flagellum/ many vacuoles shows that this organism is an animal. It has animal origin. P/R: Presence of chloroplast/ cell wall shows that this organism is a plant. It has plant origin.	B1 B1

	1m: identify one structure each and to explain animal and plant origin respectively.	
b)	Disagree. [1m]. The heart is an organ made up of different types of tissues working together to carry out a specific function. Or The heart is an organ made up of more than one type of tissue [1m] such as muscle tissue, blood vessel, fat tissue, nervous tissue, connective tissue that work together to pump blood.	B1 B1
		T= 4
10ai) aii)	Substance W: gas Substance Z: Solid	B1 B1
b)	 Particles should be of the same size disorderly arrangement, still close together	B1
c	Particles gain heat energy to move faster and further apart from one another. The particles eventually gain enough energy to overcome the strong forces of attraction between them where liquid become gas/ to moving at high speeds in all directions.	B1 B1
		T= 5