KENT RIDGE SECONDARY SCHOOL
MID-YEAR EXAMINATION 2019

SECONDARY 2 NORMAL (TECHNICAL) **SCIENCE**

Monday 13 May 2019 **1 hour 30 minutes**

Name: ______________________________ ( ) **Class: Sec 2N1**

ADDITIONAL MATERIALS
Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST
Write your name, class and index number clearly in the spaces at the top of this page.
Write in ink, except for graphs and diagrams.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Calculators are allowed in this paper.
Do not open this question paper until you are told to do so.

Section A
There are **forty** 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 Multiple Choice Answer Sheet.

Section B
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

FOR EXAMINER'S USE	
Section A	30
Section B	50
Total	80

The number of marks is given in brackets [ ] at the head of each section.
The total mark for this paper is **80**.

Section A

The total mark for this section is **30**.

1 Many substances dissolve easily in water.

What does this tell us about the nature of water?

A Water is a gas.

B Water is a suitable solute.

C Water is a universal solvent.

D Water is colourless.

2 When washing an oily plate, a hawker notices that oil droplets float on water.

Which of these statements is true?

A The oil droplets cannot dissolve in water.

B The oil droplets will dissolve in water if the hawker stirs the oil and water mixture.

C The oil droplets will dissolve in water if boiling water is used.

D The oil droplets will dissolve in water if the water and oil mixture is left to stand.

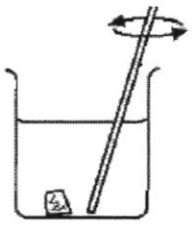
3 When a solid is ____**X**____ in water, the mixture appears __**Y**__. The mixture is a ____**Z**____.

Choose from the following, the best option to complete the above sentence.

	X	Y	Z
A	soluble	clear	solution
B	soluble	cloudy	suspension
C	insoluble	cloudy	solution
D	insoluble	clear	suspension

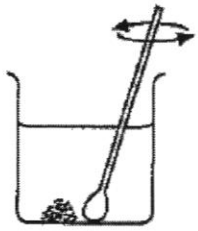
4 Four students used the following ways to dissolve a sugar cube in water. Which of the following is not the way to speed up the dissolving process?

A



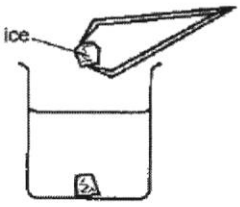
stir continuously

B



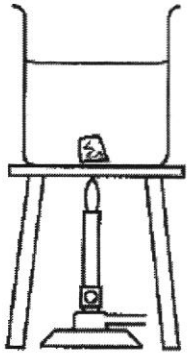
crush the sugar cube into small pieces with a spoon

C



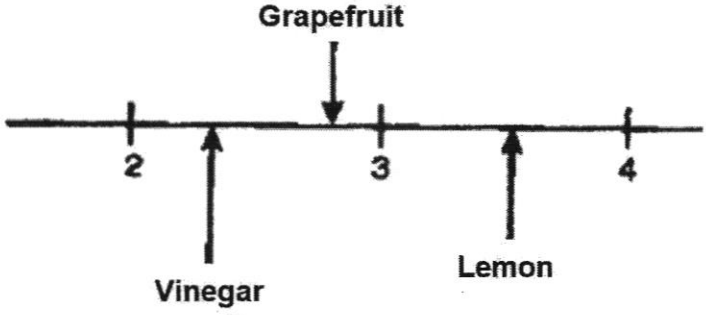
lower the temperature of water by adding ice

D



increase the temperature of water by heating

5 Study the pH scale shown below. Which of the following statements given below is correct?



Part of a pH scale

A Grapefruit is more acidic than vinegar and lemon.

B Grapefruit is more acidic than vinegar but less acidic than lemon.

C Lemon is most acidic and vinegar is least acidic.

D Vinegar is most acidic and lemon is least acidic.

6 Which of the following is a property of an alkaline solution?

A flammable

B soapy

C sour

D turns moist blue litmus paper to red

7 The following information gives the colour change of three indicators, **P**, **Q** and **R**.

pH	2	3	4	5	6	7
P	red		yellow			
Q	red				yellow	
R	yellow					blue

Which of the following solutions will make the three indicators appear yellow?

A A solution of pH 4

B A solution of pH 5

C A solution of pH 6

D A solution of pH 7

8 What is a disadvantage of using litmus paper to determine whether a solution is an acid or alkali? Choose the best answer.

A The litmus paper cannot be used to identify the strength of an acid or alkali.

B The litmus paper may fall into the beaker and will be difficult to take out.

C The litmus paper will get wet.

D The results may be inaccurate and the experiment must be repeated.

9 Which situation below is not an example of water pollution?

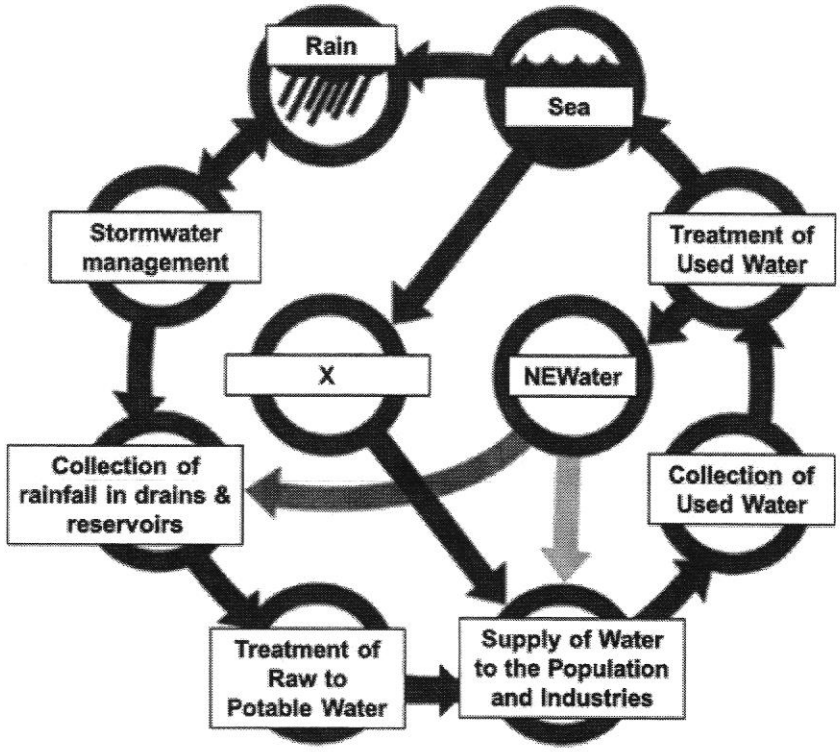
A Addition of chlorine to water in swimming pool.

B Leakage of oil from a cruise ship at Harbourfront Cruise Centre.

C Spraying chemicals in the drains to prevent breeding of mosquitoes.

D Throwing sweet wrappers and empty bottles into the canals.

10 The diagram below shows "The Water Loop", how water is collected from different sources and converted to potable water for use in Singapore.



Which of these terms will fit in X?

A Desalination

B Mineral Water

C NEWater

D Sewage

11 Oil spills can kill marine plants and animals in the water. This is because the oil ..... .

A encourages the growth of algae.

B encourages the growth of bacteria.

C suffocates the marine life.

D turns the water black.

12 What happens during the "microfiltration" stage of the NEWater treatment process?

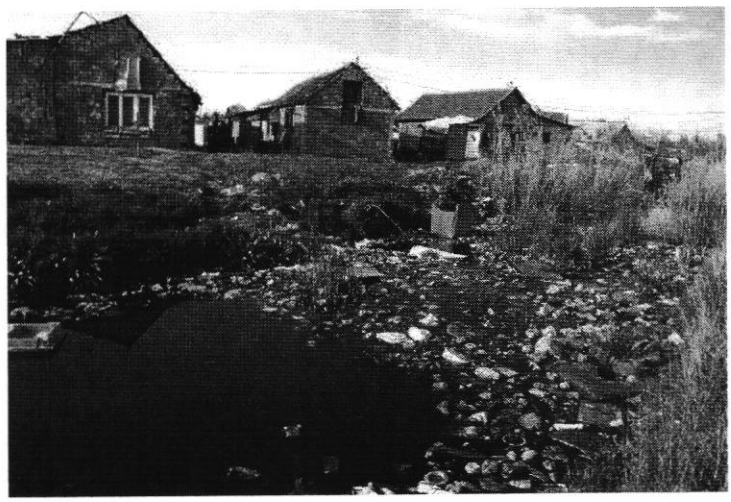
A Chlorine is pumped into the water to kill microscopic particles like bacteria and viruses.

B Large solids are removed from the water.

C Microscopic particles like bacteria and viruses are removed from the water.

D Minerals are added to the water.

13 With reference to the picture below, suggest the most likely source of pollution.



A Dumping of litter into the river by people living in the small town

B Industrial wastes from factories nearby

C Oil spills from ships

D Washing clothes by the river

14 Which of the following is an air pollutant?

A carbon dioxide

B carbon monoxide

C nitrogen

D oxygen

15 The following are ways to reduce air pollution except ..... .

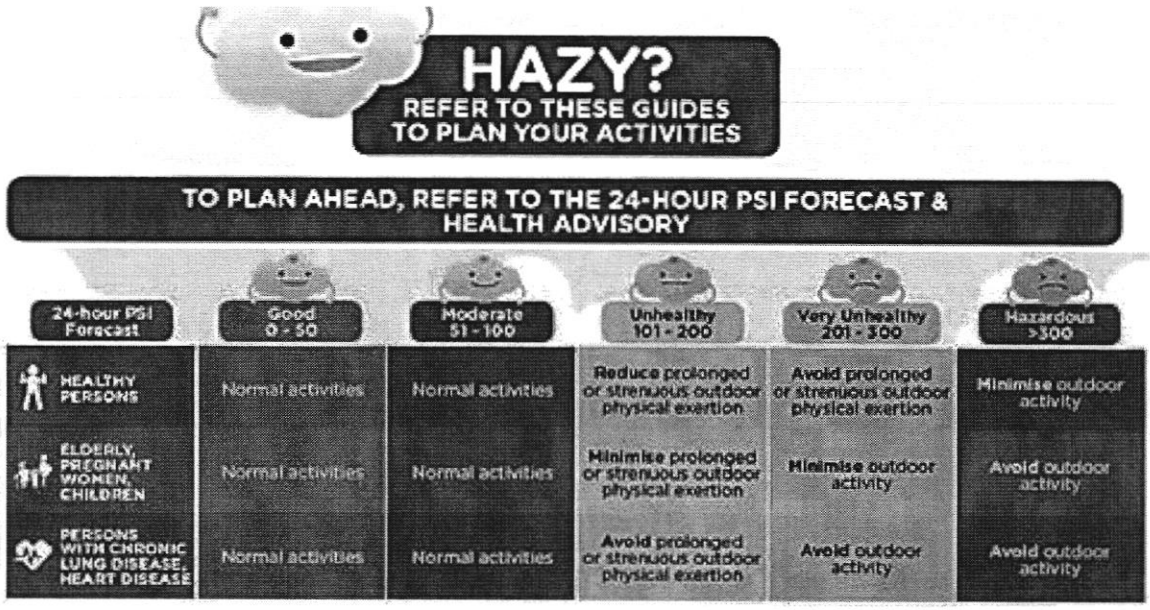
A keeping the drains free of litter

B planting more trees

C recycle materials to reduce the amount of rubbish burnt at incineration plants

D riding a bicycle to school or work

16 The poster below is an advisory notice on haze from the National Environment Agency.



With reference to the poster, at what PSI level should an elderly person with chronic heart disease starts to avoid outdoor activity?

A 51-100

B 101-200

C 201-300

D >300

17 Haze can cause .....

(I) acid rain formation
(II) breathing difficulties
(III) visibility to be reduced

A (I) only

B (I) and (II) only

C (II) and (III) only

D (I), (II) and (III)

18 What is the main source of haze experienced in Singapore?

A fumes from vehicle exhaust

B fumes from power plants

C smoking

D uncontrolled and illegal burning of forests in neighbouring countries

19 The presence of carbon monoxide is hard to detect because ..... .

A it has a pungent smell

B it is a green gas

C it is colourless and odourless

D it is denser than air

20 Greenhouse gases such as ..... traps ..... from the sun and cause global warming.

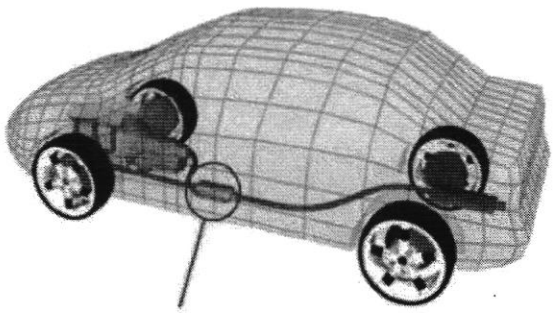
A carbon dioxide, light

B oxides of nitrogen, light

C oxygen, heat

D methane, heat

21 In Singapore, all cars need to be fitted with a catalytic converter, like the one shown below.



What can happen if the cars are used without the catalytic converter?

A The air will be much cleaner.

B The temperature of the air will be higher than normal.

C There will be no vapour released into the air.

D There will be more greenhouse gases released.

22 The most basic unit of life is the ..... .

A cell

B chromosomes

C genes

D nucleus

23 Which statement does not describe a white blood cell?

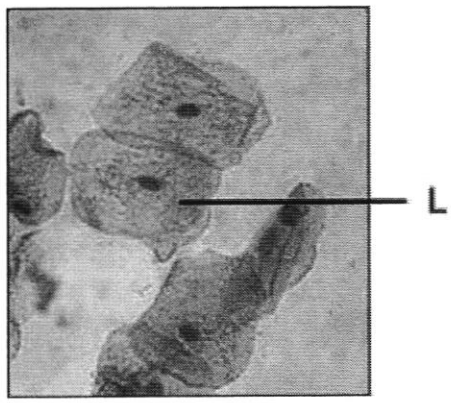
A It contains chromosomes.

B It fights foreign bacteria.

C It has a nucleus.

D It helps blood to clot.

24 The diagram shows some animal cells under a microscope. Which part of the cell is **L**?



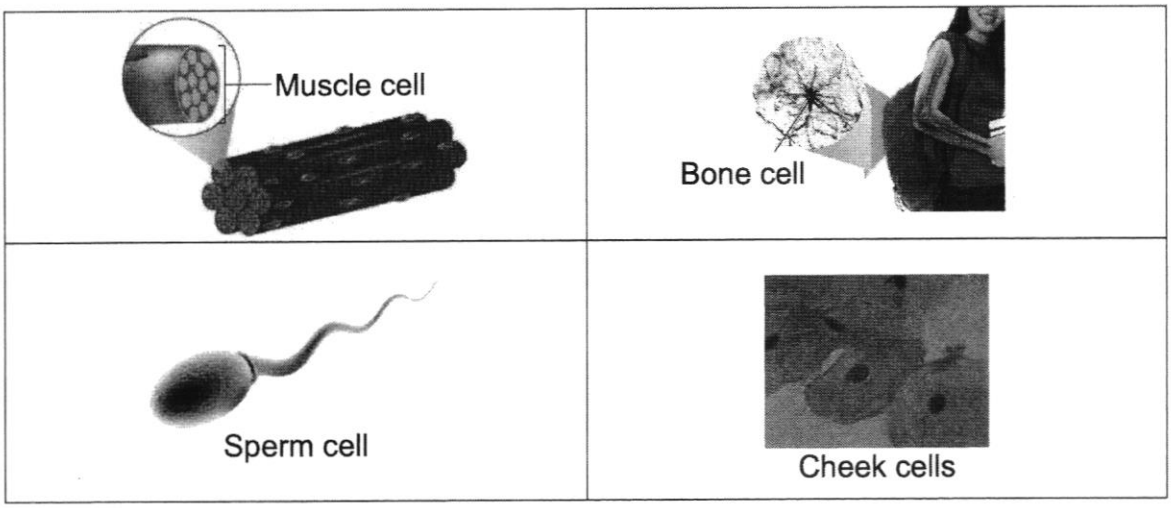
A Cell membrane

B Cell wall

C Cytoplasm

D Nucleus

25 Four kinds of cells are shown below.



Which statement is true for all of these cells?

A They are found in human only.

B They are found in all living things.

C They can be seen with the naked eye.

D They do not have cell walls.

26 The skin is an example of a/an ..... .

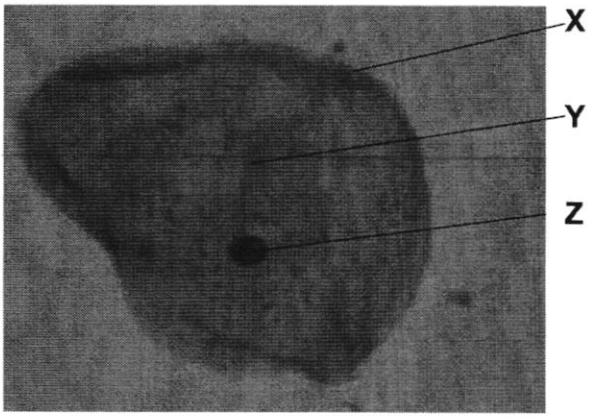
A cell

B tissue

C organ

D organ system

27 The diagram below shows a typical human cell.



Which part(s) of the cell will carry information which will determine our physical characteristics?

A **X** and **Y**

B **X**, **Y** and **Z**

C **Y** and **Z**

D **Z** only

28 Which of the following is not true about a specialised cell?

A A specialised cell carries out a unique and special function.

B A specialised cell can take over the function of many other specialised cells.

C A specialised cell can carry out its special function effectively.

D There are many types of specialised cells.

29 What is the benefit of having many different types of cells in a multicellular organism?

A It enables the efficient functioning of processes in the organism.

B It enables the organism to protect itself against bacteria.

C It reduces the energy needed by the organism to survive.

D It reduces the waste products produced by the organism.

30 Which of the following is an example of the process of heredity?

A Passing of characteristics of fur colour from adult tigers to their young.

B Passing of characteristics from children to their parents.

C Passing of diseases from adults to children.

D Passing of instructions from grandparents to grandchildren.

End of Section A

Section B

The total mark for this section is **50**.

1 Reyes grew two identical plants under identical conditions. Unfortunately, the water that was used to water Plant **Y** was accidentally mixed with acidic substances. The diagram below shows the growth of the plants after two weeks.

Plant **X** Plant **Y**

(a) Give one comparison between the appearance of Plant **X** and Plant **Y**. [1]

.....

.....

(b) How did the acidic water affect the growth of the plant **Y**? [1]

.....

.....

(c) Based on your observation, suggest how acid rain can affect the natural environment? [1]

.....

.....

(d) State two effects of acid rain on human activities or properties . [2]

.....

2 The properties of three solutions are as follows:

Solution **X** turns moist blue litmus paper to red.
Solution **Y** turns moist red litmus paper to blue.
Solution **Z** does not turn moist red litmus paper to blue.

(a) Solution **X** has a pH ..... (lesser / greater) than 7. [1]

(b) Solution **Y** is an ..... (acid / alkali). [1]

(c) Solution **Z** can be either a ..... solution or an ..... . [2]

(d) Suggest a method to find out whether solution **Z** is neutral, acidic or alkaline. [1]

.....

.....

3 In many parts of the world, clean water is not easily available. Many people still use filtration systems like the one shown below to obtain clean water from dirty water.

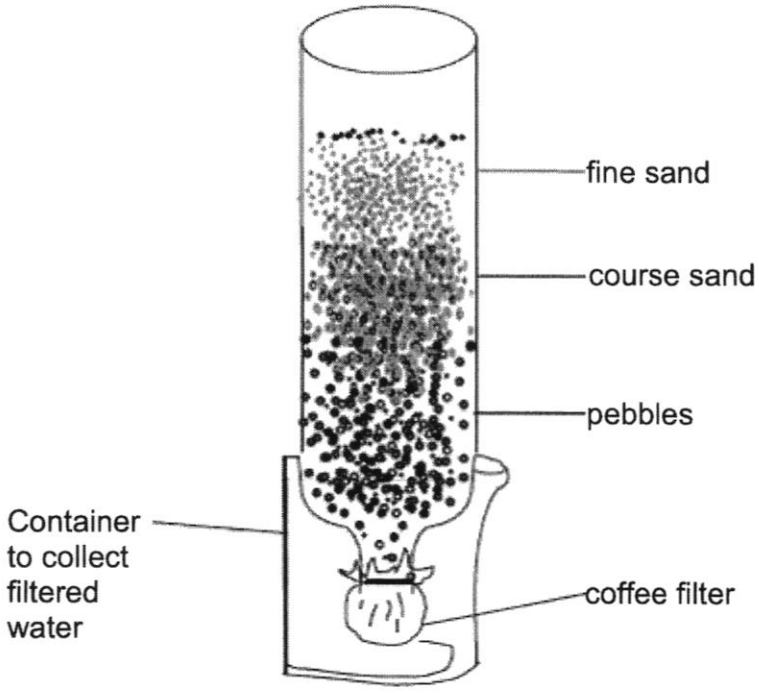


Fig. 2.1

(a) **(i)** Suggest a reason why different layers of different sized sand and pebbles are used. [1]

.....

.....

(ii) Is the water collected at the end of filtration using this filtration system safe for drinking? [1]

.....

(iii) Explain your answer in **(a)(ii)**. [1]

.....

.....

(iv) Suggest what can be done further to make the water collected safer for drinking? [1]

.....

(b) Match the statement in **Column A** with the most appropriate option in **Column B**. [3]

Column A		Column B
This is the first stage of the NEWater process.	●	● Reverse osmosis
Water undergoes further treatment and all organisms are destroyed.	●	● Microfiltration
A special membrane is used.	●	● Ultraviolet Light Treatment

(c) The picture shows a polluted ocean.

(i) Name two water pollutants shown in the picture. [2]

Pollutant 1 : .....

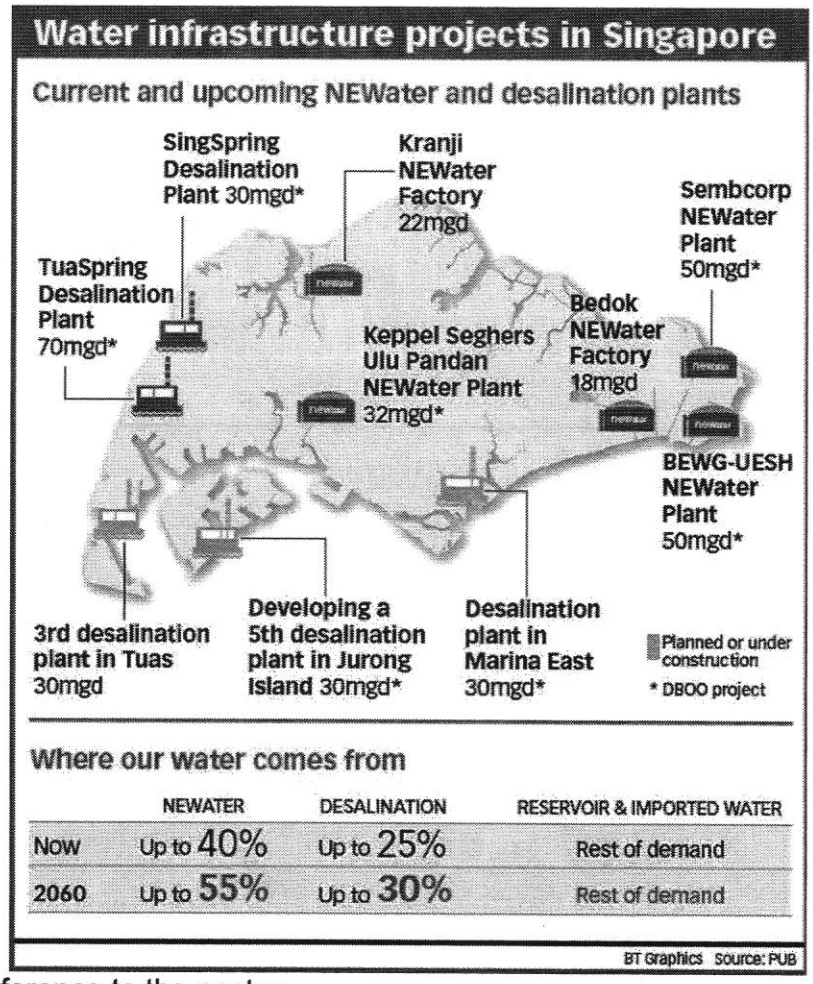
Pollutant 2 : .....

(ii) State two effects these water pollutants have on seabirds. [2]

Effect 1: .....

Effect 2: .....

(d) The information in the poster below was taken from Public Utilities Board (PUB).



With reference to the poster,

How many desalination plants and Newater plants will we have in the future? [2]

number of desalination plants .....

number of NEWater plants .....

(e) State the four National Taps of Singapore. [4]

1. ..... 3. .....

2. ..... 4. .....

4 Eason went to take PSI readings in two areas for a science project.

Area **Q** – Outside a shopping centre near a busy road
Area **R** – Outside a factory that produces waste gases

The Pollutant Standard Index (PSI) readings are provided in Table 4.1.

PSI Value	Air Quality
0 – 50	Good
51 – 100	Moderate
101 – 200	Unhealthy
201 – 300	Very unhealthy
Above 300	Hazardous

Table 4.1

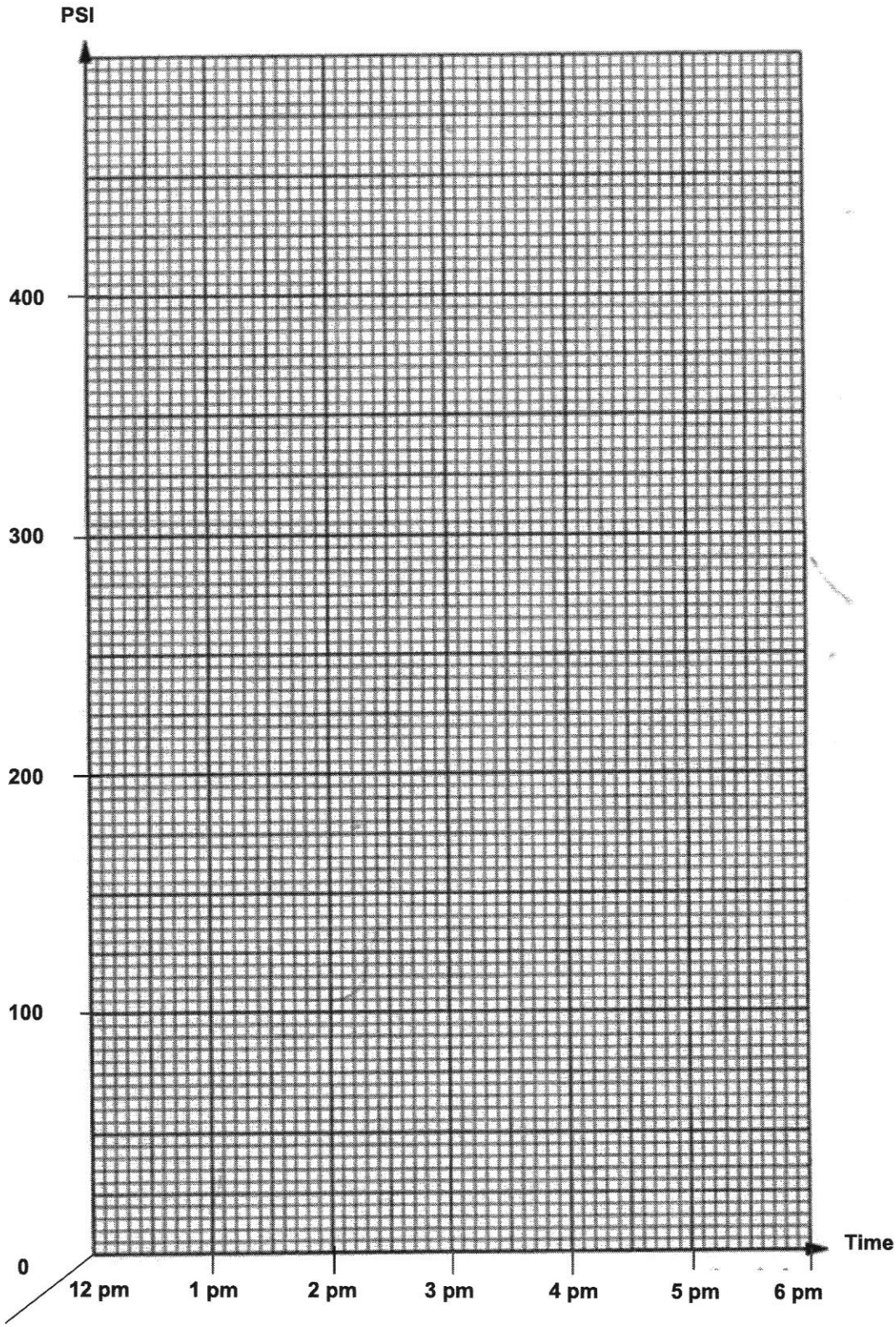
He noted the air quality of each area and took readings of the air quality over a 6 hour period. He recorded the PSI values in Table 4.2.

PSI Readings every hour [4]

	PSI Reading	
Time (pm)	Area Q	Area R
1	55	230
2	60	310
3	55	250
4	65	190
5	120	130
6	150	120

Table 4.2

(a) Plot the readings on the grid provided.


PSI
400
300
200
100
0
Time
12 pm
1 pm
2 pm
3 pm
4 pm
5 pm
6 pm

(b) **(i)** Name one possible air pollutant that could be present in Area **Q**. [1]

.....

(ii) Name one possible air pollutant that could be present in Area **R**. [1]

.....

(iii) Suggest why the PSI in area **Q** increased from 5 to 6 pm while the PSI in area **R** decreased in the same time period. [2]

.....

.....

(iv) State two effects to people's health when the PSI reaches the "Very Unhealthy" range. [2]

.....

.....

(v) State two ways on how Eason can protect himself when the PSI reaches the "Very Unhealthy" range. [2]

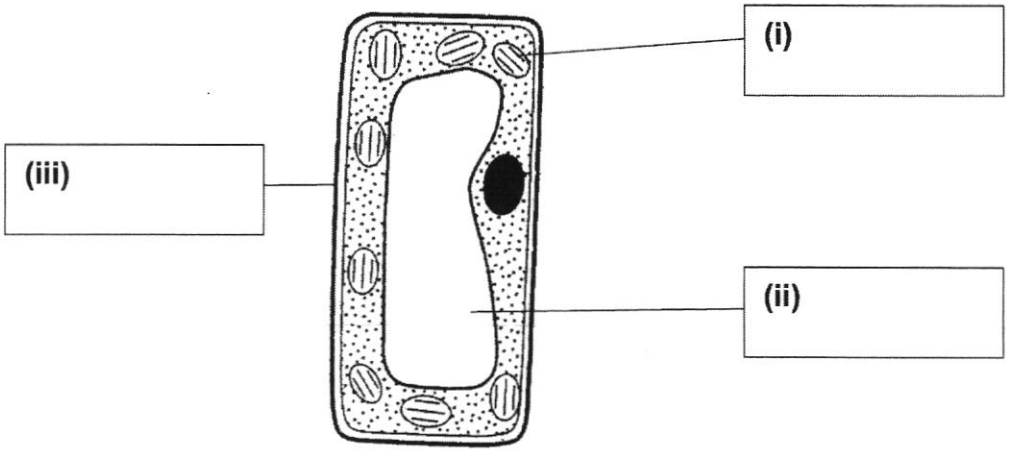
(i) .....

(ii) .....

5 (a) The diagram below shows a typical plant cell. [3]

Label the different parts of the plant cell with the help of the given helping words.

cell wall chloroplast large central vacuole



(iii) State **one** difference between a plant cell and an animal cell. [1]

.....

.....

(b) There are different cells in our body. Each cell has a specific function. [4]
Draw the top view and side view of a **red blood cell** in the space below.
Label the parts of the cells in your drawings.

Top view	**Side view**

(c) **(i)** What is the function of a red blood cell? [1]

.....

.....

(ii) How does the structure of the red blood cell allow it to carry out its function? [1]

.....

.....

(d) What is the benefit of different cells working together in a body? [1]

.....

.....

End of Paper

MID-YEAR EXAMINATION
MARKING SCHEME 2NT SCIENCE (80 marks)

Section A (30 marks)

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

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

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

Section B (50 marks)

1	(a)	Plant Y leaves wilted compared to Plant X which is upright. *(Accept if they describe the condition of the leaves.)*	1
	(b)	Acid causes plant X to stop growing.	1
	(c)	Acid rain slows down the growth of plants in the environment, OR may provide less food for animals due to slower growth.	1
	(d)	Acid rain affects food crop production and damages buildings	1 1

2	(a)		lesser	1
	(b)		alkali	1
	(c)		Neutral/ alkali	1 1
	(d)		Use a blue litmus paper to test/ Use indicator paper/ universal indicator /Or pH meter	1
3	(a)	(i)	To filter out objects of different sizes // to ensure all objects are removed from the water AW ; *(Accept any answer which suggests that the different sized pebbles will ensure that the filtration process removes as much impurities from the water.)*	1
		(ii)	No ;	1
		(iii)	There may be bacteria / viruses / microorganisms that cannot be seen, still in the water.	1

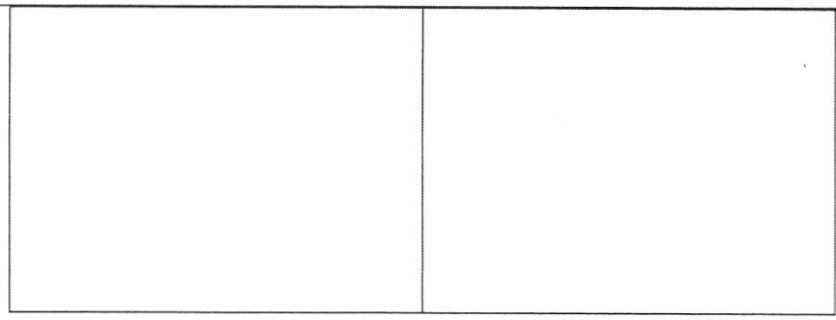
			(Accept any answer which suggests that there may be microscopic / tiny particles which will not be removed by the filtration process.)	
		(iv)	Boiling to kill the bacteria/ microorganisms	**1**
	(b)			**3**

Column A		**Column B**
This is the first stage of the NEWater process.		Reverse osmosis
Water undergoes further treatment and all organisms are destroyed.		Microfiltration
A special membrane is used.		Ultraviolet Light Treatment

	(c)	**(i)**	Oil spill	**1**
			Plastic bags	**1**
		(ii)	Oil spill – coat the feathers of birds with oil, unable to fly and find food	**1**
			Plastic bags – ingested by birds and unable to digest plastic bags and causes injury or death//	**1**
			Toxic substances – can injure the birds and may even cause death.	Any 2 ans
	(d)	**(i)**	5	**1**
			5	**1**
		(ii)	Imported water;	**1**
			Local catchment;	**1**
			Newater;	**1**
			Desalination	**1**

4	(a)			• 1m: point plotted correctly for Q • 1m: point plotted correctly for P • 1m: Draw Q • 1m: Draw P
	(b)	(i)	dust ; carbon monoxide; oxides of nitrogen	1
		(ii)	Sulfer dioxide; oxides of nitrogen	1
		(iii)	More vehicles travelling along the roads during peak hours from 5 – 6 pm. the factories stopped work and /no gases are released into the air from 5 – 6 pm.	1 1
		(iv)	Breathing difficulties / asthma / eyes, nose, throat irritation.	1 1
		(v)	Wear N95 mask; closed windows indoor; avoid strenuous activities outdoor	1 1

5	(a)	(i) chloroplast (ii) large central vacuole (iii) cell wall (iv)		1 1 1
		Plant cell	**Animal cell**	Any 1
		Cell wall	No cell wall	
		chloroplasts	No chloroplasts	
		Large central vacuole	Numerous small vacuoles	

	(b)			1 m for top view 1 m for side view 1 m – cell membrane 1 m - cytoplasm
	(b)	(i)	Transport oxygen to all parts of the body	1
		(ii)	It has no nucleus; so it can carry more oxygen./ OR It is biconcave in shape, so that it can move through small blood vessels easily.	Either 1
		(iii)	Allows the cells to work efficiently.	1

END OF MARKING SCHEME