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**ASSUMPTION ENGLISH SCHOOL
MID-YEAR EXAMINATION 2019**

LOWER SECONDARY SCIENCE



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LEVEL: Sec 2 Normal (Technical)

DATE: 15 May 2019

CLASS: Sec 2/5

DURATION: 2 hours

Additional Materials provided: 1 piece of OAS paper

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your NAME and INDEX NUMBER at the top of this page.

Section A - Multiple Choice Questions (40 marks)

There are 10 questions in this section. Answer **ALL** questions. For each question, there are four possible answers A, B, C and D. Choose the correct answer and record your choice in soft or 2B pencil on the OAS paper provided.

Section B – Short Structured Questions (60 marks)

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

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

For Examiner's use:	
Section A	/ 40
Section B	/ 60
Total	/ 100

At the end of the examination, hand in your OAS paper and question booklet separately.

Section A – Multiple Choice Questions (40 marks)

Answer **all** questions. For each question, there are four possible answers **A**, **B**, **C**, and **D**. Choose the correct answer and record your choice in soft or 2B pencil on the **OAS** paper provided.

- 1 Mixture **X** allows light to pass through and cannot be separated using filtration. Which statement best describes mixture **X**?

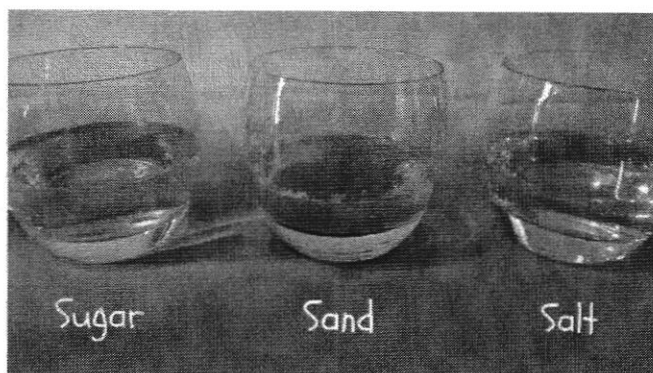
A It is a solute. **B** It is a solution.
C It is a solvent. **D** It is a suspension.

- 2 Ben added some soil to a beaker of water slowly. After some time, the soil did not dissolve and remains at the bottom of the beaker.

Which is the most likely reason to explain why this happened?

A He added too much soil.
B He did not heat the soil and water mixture.
C He did not stir the soil in water.
D Soil is not soluble in water.

- 3 Three glasses of water containing sugar, sand and salt are stirred and filtered using filter papers separately. Which glass(es) can a residue be found on the filter paper?



A with sand only **B** with sand and salt
C with salt and sugar **D** with sugar only

- 4 The solubility of a substance in water is defined as the
- A greatest amount of substance that can be dissolved in a given volume of water
 - B greatest amount of substance that can be dissolved in any volume of water
 - C least amount of substance that can be dissolved in a given volume of water
 - D least amount of substance that can be dissolved in any volume of water
- 5 Jenny is trying to dissolve three sugar cubes in her cup of tea. What can she do to make the sugar cubes dissolve faster?
- I Jenny can heat the cup of tea.
 - II Jenny can stir the cup of tea.
 - III Jenny can add ice to the cup of tea.
- A I only
 - B I and II only
 - C II and III only
 - D I, II and III
- 6 Strawberry tastes sour and is considered to be
- A acidic
 - B alkaline
 - C neutral
 - D overly ripe
- 7 A few drops of Universal Indicator are added into a test tube of an unknown solution. The solution turns blue.
- What is the pH value of this solution?
- A pH 3
 - B pH 7
 - C pH 8
 - D pH 14
- 8 Water is said to be neutral. It is neither acidic nor alkaline. It has a pH value of
- A 5
 - B 6
 - C 7
 - D 8

9 The following substances are acidic except for

- | | |
|---------------------|----------------------|
| A detergent | B lemon juice |
| C lime juice | D vinegar |

10 The contents of a cough mixture is found on a label as shown below.

Cough Mixture

Each 5 ml contains:

Water	85%
Syrup	3%
Active medicine ingredients	12%

Which is the solvent in the cough mixture?

- | | |
|--------------------------------------|------------------|
| A active medicine ingredients | B alcohol |
| C syrup | D water |

11 A polluted river contains less

- | | |
|-------------------------|-----------------------------|
| A carbon dioxide | B harmful substances |
| C oxygen | D water |

12 Which situation below is **not** an example of water pollution?

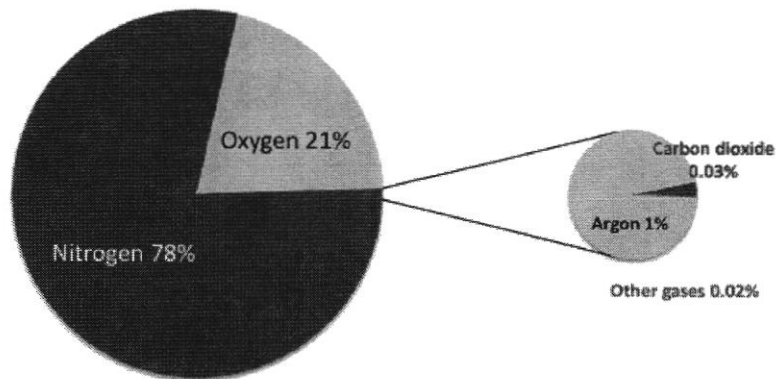
- A** addition of chlorine to water in the swimming pool
- B** contamination of water in drains and rivers
- C** disposing of waste materials from industries into the river
- D** spillage of oil from an oil tanker accident in the harbor

13 Cholera is a disease that is transmitted through contaminated water. Which water pollutant contains the bacteria that cause cholera?

- | | |
|----------------------|-------------------------------|
| A fertilisers | B pesticides |
| C sewage | D waste from factories |

- 14 What is an effect of litter, such as plastic bags and nets, on the sea?
- A It does not affect the aquatic life.
 - B It kills bacteria.
 - C It kills water plants, such as algae.
 - D It traps and suffocates aquatic animals who eat the litter as their food.
- 15 What are the **most** common types of water pollution from farms?
- A fertilizers and pesticides
 - B fertilizer and toxic waste
 - C litter and pesticides
 - D oil and toxic waste
- 16 Too much pesticides used in farms can pollute rivers as pesticides can dissolve in and flow to the rivers.
- A rain water
 - B seawater
 - C sewage water
 - D tap water
- 17 Discharging household wastes directly into rivers could promote to grow in large amounts.
- A bacteria
 - B fish
 - C oil
 - D water plants
- 18 Which is **not** a "National Tap" for Singapore?
- A bottled mineral water
 - B imported raw water (from Malaysia)
 - C NEWater (recycled waste water)
 - D rainwater in reservoir

- 19 Singapore's main water supply does **not** come from desalination because
- A it is an expensive process
 - B it requires many steps
 - C the desalination plant takes up too much land space in Singapore
 - D the process uses a lot of sea water
- 20 Which is **not** an effort to reduce water pollution?
- A clean up polluted beaches and rivers
 - B clear rubbish-clogged rivers, drains and canals
 - C providing bins along waterways
 - D walk or cycle to work instead of using private transport
- 21 Air is a mixture of many gases.



- Which gas is present in the greatest amount in air?
- A argon
 - B carbon dioxide
 - C nitrogen
 - D oxygen
- 22 Which statement best describes air pollutants?
- A They are gases and solid particles that harm the environment and human health.
 - B They are gases that are difficult to detect.
 - C They are gases that have irritating smells.
 - D They are gases that warm the earth.

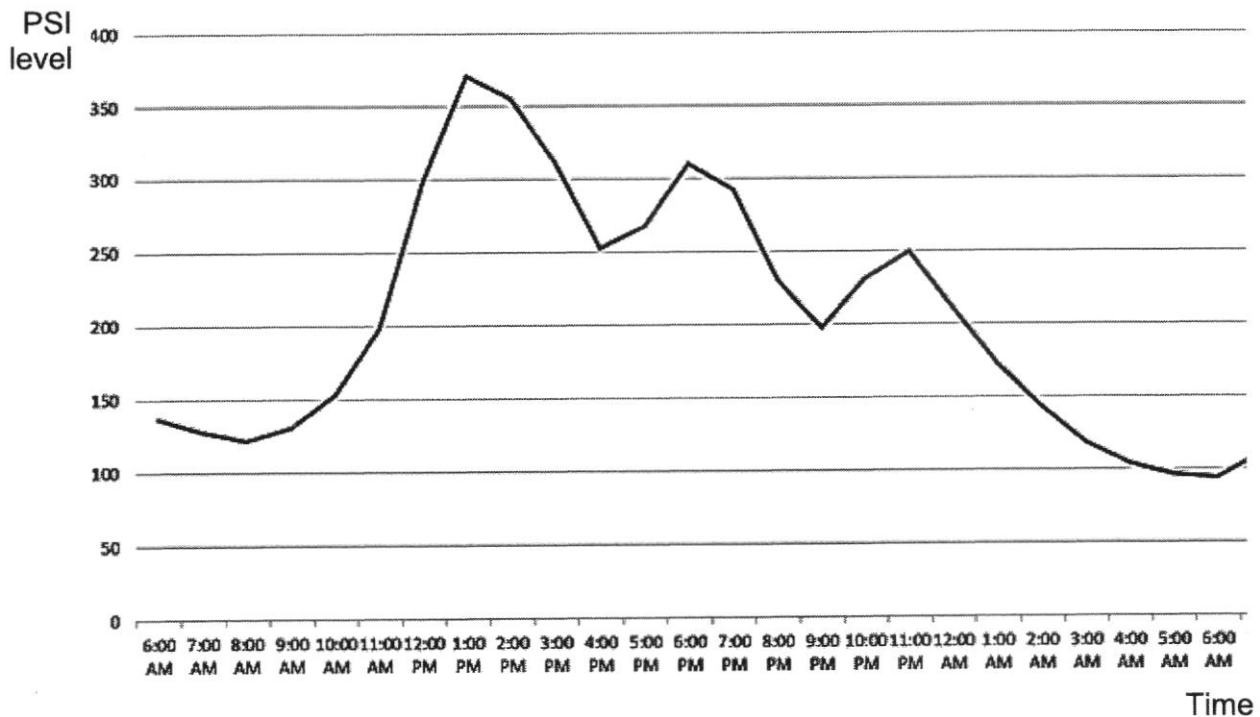
23 Which gas is **not** an air pollutant?

- A carbon dioxide B carbon monoxide
C oxides of nitrogen D sulfur dioxide

24 Which is **not** an effect of air pollution?

- A formation of acid rain
B formation of haze
C global warming
D lead poisoning

25 The graph below indicates the PSI levels in Singapore on a certain hazy day.



Which period is the air most unsuitable for outdoor activities?

- A 5 p.m. to 6 p.m.
B 7 p.m. to 8 a.m.
C 11 p.m. to 12 a.m.
D 12 p.m. to 1 p.m.

- 26 Which disease is more common in air-polluted cities?
- A heart diseases B kidney diseases
C liver diseases D lung diseases

- 27 What is / are the harmful effect(s) of carbon monoxide?

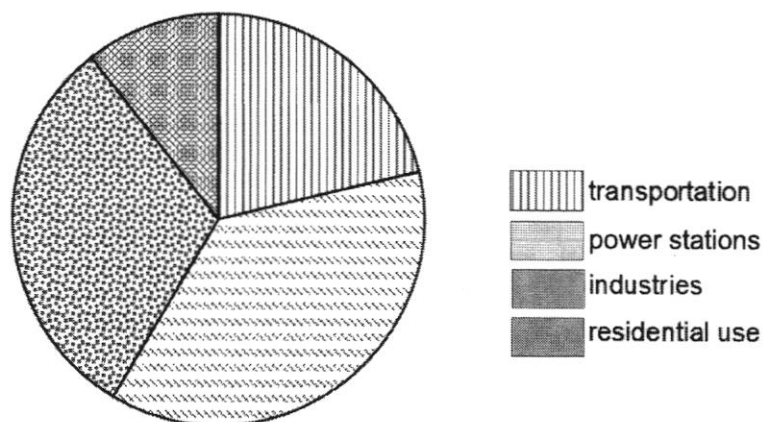
- A dizziness, headache and death
B gastric ulcer
C inflammation of liver
D insomnia

- 28 Which human activity helps to control air pollution?

- A allowing more vehicles on the road
B deforestation
C using products which are not air friendly
D vehicles fitted with catalytic converters

- 29 The diagram below shows the annual greenhouse gas emissions from different sectors in **Country Z**.

Annual Greenhouse gas emissions in Country Z



Which sector contributes the highest amount of greenhouse gases?

- A industries B power stations
C residential use D transportation

30 Which method reduces global warming?

- A Build more industries.
- B Burn off rubbish from home regularly.
- C Plant more trees.
- D Take a car to school.

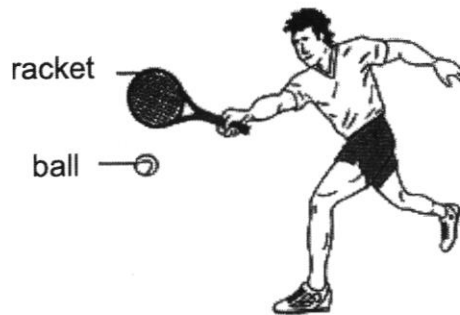
31 What is the SI unit for force?

- | | |
|------------|----------|
| A kilogram | B metre |
| C newton | D second |

32 Which action involves a pushing force?

- | | |
|---------------------------|----------------------------|
| A lifting a pail of water | B pressing a door bell |
| C stretching a spring | D towing a broken down car |

33 The picture shows a tennis player. Which does **not** change when the racket hits the ball?

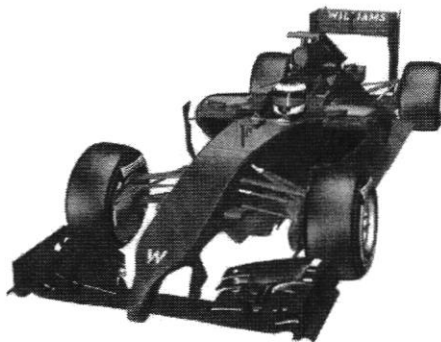


- A direction of movement of the ball
- B mass of the racket
- C shape of the ball
- D shape of the racket

34 Which instrument is used to measure force?

- | | |
|------------------|---------------|
| A beam balance | B ruler |
| C spring balance | D thermometer |

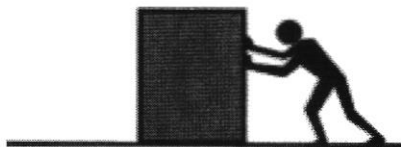
- 35 The tyres of a racing car are very wide.



What is the reason for such wide tyres?

- A They allow for more wear and tear.
- B They give the engine more power.
- C They make the car look more attractive.
- D They provide more grip on the roads.

- 36 A box is pushed across the room.



In which direction is the friction acting.

- A ←
- B →
- C ↑
- D ↓

- 37 Which method reduces friction between two surfaces rubbing against each other?

- A by applying more pressure between the two surfaces
- B by applying the two surfaces with oil
- C by bringing the two surfaces closer together
- D by making the two surfaces rough

38 In a waste disposal centre, iron is removed easily from waste by

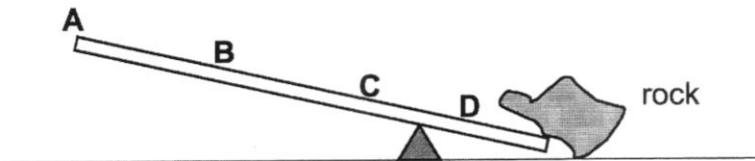
A electrical force

B gravitational force

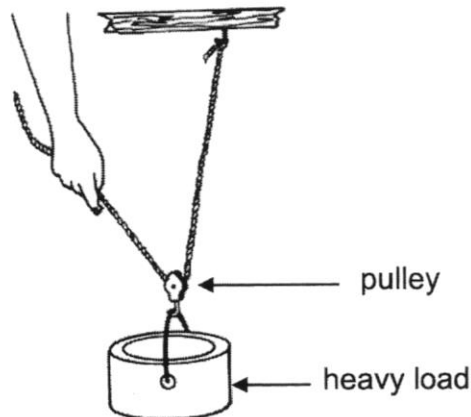
C magnetic force

D nuclear force

39 Where should you apply your effort on the pole so that the **least** force is used to move the rock?



40 The diagram shows how a pulley system is used to lift a heavy load.



The pulley system above uses a (i) pulley and the effort required to lift the load is (ii) than the weight of the load.

	(i)	(ii)
A	fixed	higher
B	fixed	lower
C	movable	higher
D	movable	lower

Section B – Short Structured Questions (60 marks)

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

- 1 Tom added 5 g of rock salt to 20 cm³ of water in a beaker at room temperature.



rock salt

- (a) Identify the **solute** and **solvent** used above.

solute -

solvent -

[2]

- (b) State **three** ways that he can do to dissolve the salt faster in the water.

1.

2.

3. [3]

- (c) Describe **two** differences between a solution and a suspension.

1.

.....

2.

..... [2]

- 2 Jane added Universal Indicator to five different solutions to find their pH values. Her results are shown below.

solution	G	H	I	J	K
pH	2	4	7	9	12

For questions (a) to (f), write **G, H, I, J** or **K** in the blanks provided. You may use each letter more than once.

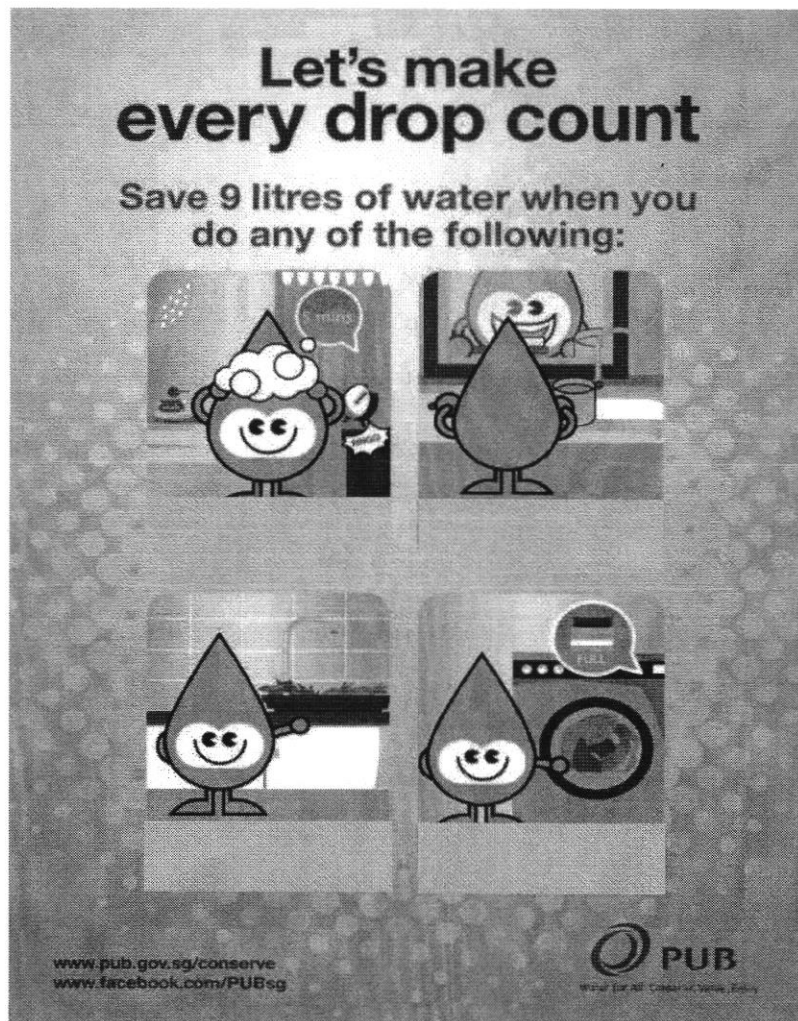
- (a) Which solution is a strong acid? [1]
- (b) Which solution is a weak alkali? [1]
- (c) Which solution will not change the colour of blue or red litmus paper? [1]
- (d) When Universal Indicator is added, which solution will turn green? [1]
- (e) Which pH would detergent belong to? [1]
- (f) Which pH would hydrochloric acid in your stomach belong to? [1]

- 3 (a) Complete the table with correct information about our National Taps using the words provided.

reservoirs	seawater	waste water	Malaysia
------------	----------	-------------	----------

National Tap	Source of Water
NEWater	Water obtained from
imported water	Water bought from
desalinated water	Water obtained from
local catchment water	Rain water collected in

- (b) The poster below shows one of the public campaigns done by the Singapore's National Water Agency to spread awareness on saving water.



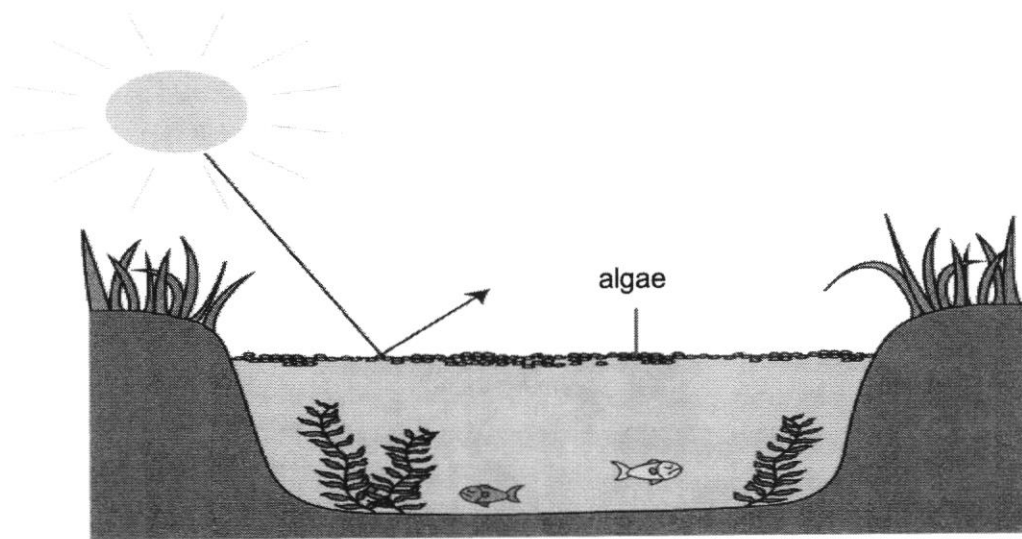
- (i) Using the poster above, state **two** recommended methods of saving water at home.

.....
 [2]

- (ii) State **one** way that Singaporeans can do to help reduce water pollution.

.....
 [1]

- 4 Study the diagram below and answer the questions that follow.



- (a) What is the cause of the large amount of algae covering the surface of the water?

..... [1]

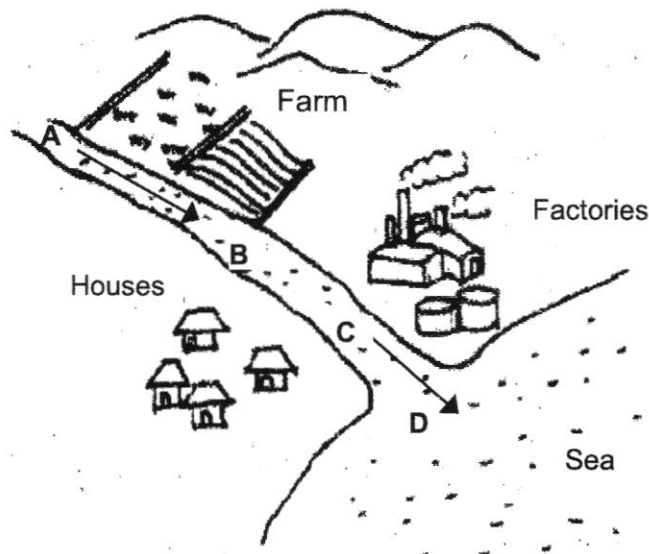
- (b) Explain why the fishes and aquatic plants would eventually die.

.....
.....
.....
..... [3]

- (c) State how this problem can be prevented.

..... [1]

- 5 The diagram shows a river with a factory and some vegetable farms along it. The arrows in the river indicate the direction in which the water is flowing.



- (a) At which point, **A**, **B** or **C**, is the river water least polluted?

..... [1]

- (b) Name one type of pollutant that you can find at point **B** of the river.

..... [1]

- (c) Name one source of water pollution at point **C** of the river.

..... [1]

- (d) Name one cause of water pollution that will **not** occur in the diagram.

..... [1]

- 6 Match the boxes using a straight line between each pollutant and its source.

Pollutant		Source
dust and soot	●	released from factories
sulfur dioxide	●	released from forest fires
carbon monoxide	●	released from lightning activity
oxides of nitrogen	●	exhausts emissions from vehicles

[4]

- 7 (a) The diagram below shows a corroded statue.



Name **two** air pollutants responsible for the above.

..... [2]

- (b) Explain how the air pollutants in (a) cause the corrosion of the statue.

..... [1]

- 8 Table 8.1 shows the Pollutant Standard Index (PSI) readings of various categories of air quality.

Table 8.1

PSI readings	categories of air quality
0 – 50	Good
51 – 100	Moderate
101 – 200	Unhealthy
201 – 300	Very unhealthy
Above 300	Hazardous

David and his friends were in the following locations during the Labour Day holiday.

location **X** – AMK bus interchange

location **Y** – Petroleum factory in Jurong industrial estate

location **Z** – Sungai Buloh Nature Reserve

At each location, he used a datalogger to check the air quality. He recorded his readings in Table 8.2 below.

Table 8.2

PSI readings	location
14	
60	
130	

- (a) Using the letters **X**, **Y** and **Z**, suggest the possible location David recorded the following PSI readings in Table 8.2. [3]

- (b) Name one possible air pollutant that could be present in location **Y**.

..... [1]

- (c) State two effects on people's health when the PSI reading is above 300.

1.

.....

2.

..... [2]

- (d) What can David and his friends do to protect themselves if the PSI reading is very high?

1.
 2.
- [2]

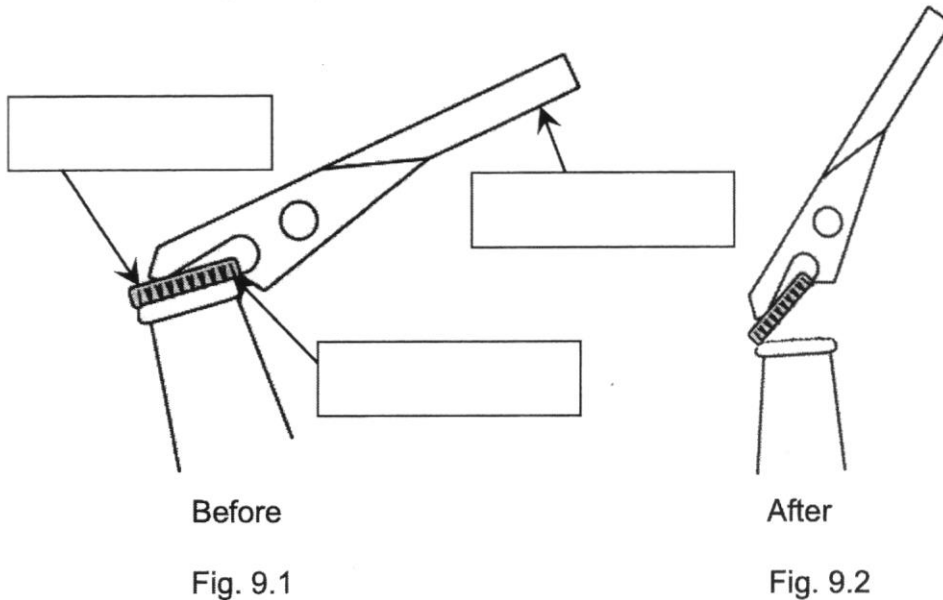
- 9 (a) Classify the following objects into three types of machines.

pliers	ladder	broom	ramp	cable car	flag pole
--------	--------	-------	------	-----------	-----------

lever	inclined plane	pulley

[6]

- (b) Fig. 9.1 and 9.2 show a bottle opener that can be used to help open metal a bottle cap easily.

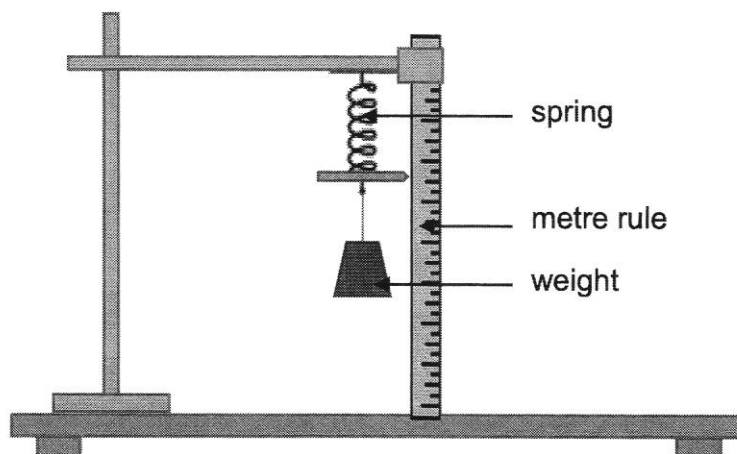


In Fig. 9.1, label the **effort**, **fulcrum** and **load** clearly.

[3]

- 10 A student wants to determine how the weight of loads hung from a spring affects the extension of the spring.

The following apparatus is set up as shown below.

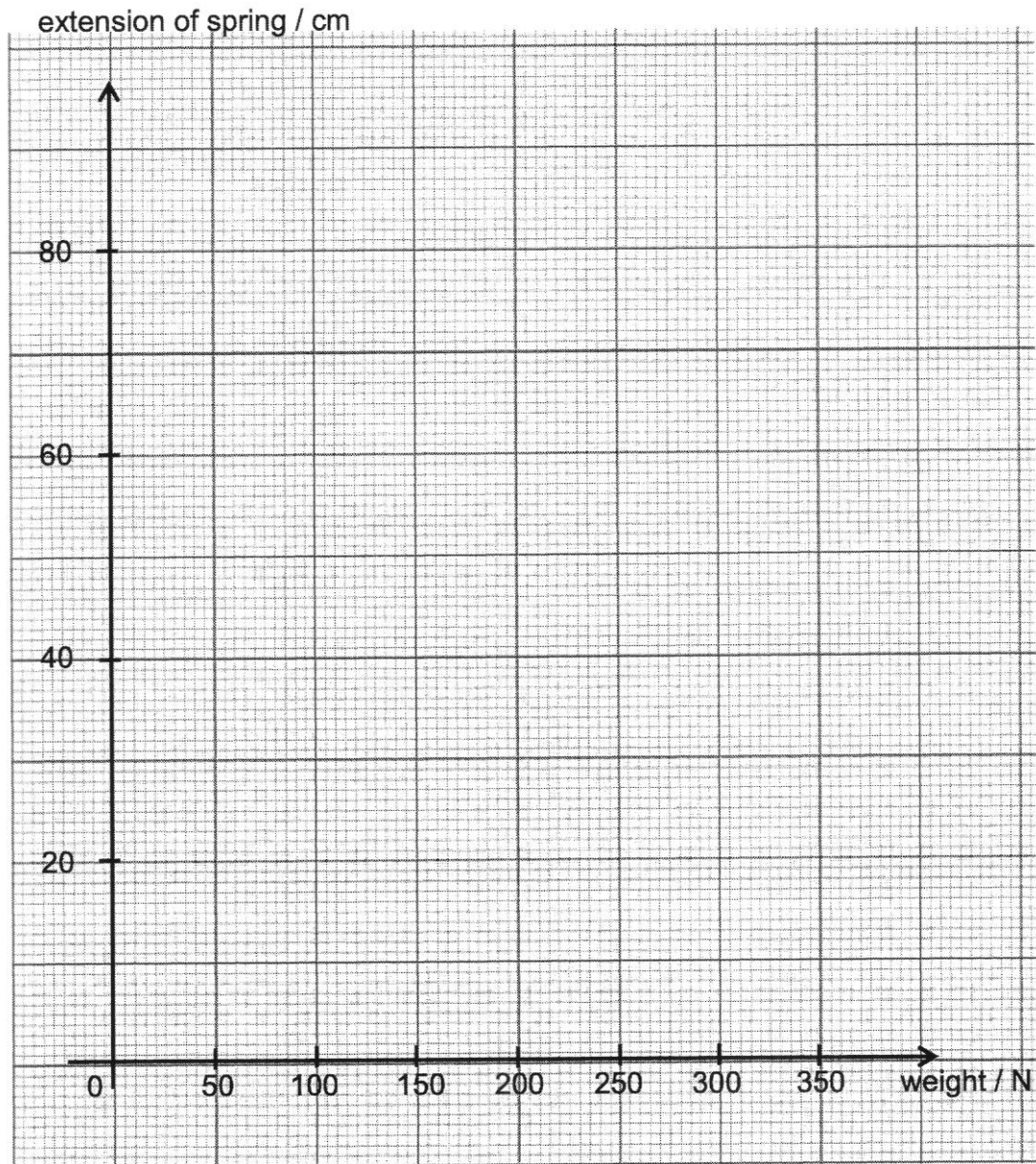


Each time the student increases the load hung from the spring, he measures the extension of the spring. He then records the weight of the loads and the corresponding extension of the spring.

The table below shows the data collected by the student.

weight of load / N	extension of spring / cm
0	0
50	10
100	20
150	30
200	40
250	50

- (a) Plot a graph of extension of spring against weight of load on the graph paper provided on page 21. [3]



- (b) From the graph above, when the weight of load
(increases / decreases) the extension of the spring
(increases / decreases).

[2]

(c) From the graph,

- (i) what is the extension of the spring when a 180 N load is hung from it?

extension = cm [1]

- (ii) what is the weight of the load when the extension of the spring is 42 cm?

load = N [1]

– END OF PAPER –

ASSUMPTION ENGLISH SCHOOL
Sec 2NTScience Marking Scheme
Mid-Year Examinations 2019

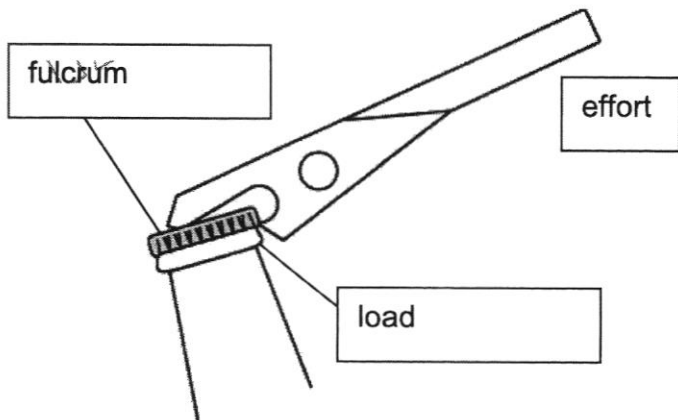
Section A (40 m)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B	D	A	A	B	A	C	C	A	D
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
C	A	C	D	A	A	A	A	A	D
Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
C	A	A	D	D	D	A	D	B	C
Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40
C	B	B	C	D	B	B	C	A	D

Section B (60 m)

1	(a)	solute – salt solvent - water	1 1										
	(b)	Stir Increase temperature Pound the salt to increase surface area	1 1 1										
	(c)	<table><tr><th>Solution</th><th>suspension</th></tr><tr><td>Looks clear</td><td>Looks cloudy</td></tr><tr><td>Homogeneous The colour, physical and chemical properties are the same throughout the solution.</td><td>Non-homogeneous. The colour, physical and chemical properties are not the same throughout the suspension.</td></tr><tr><td>When left to stand, will not separate back into the solute and solvent</td><td>When left to stand, the insoluble solids will settle to the bottom of the solvent.</td></tr><tr><td>When filtered, the solution will pass through the filter paper completely</td><td>When filtered, the insoluble solids will remain on the filter paper.</td></tr></table> <i>Any two</i>	Solution	suspension	Looks clear	Looks cloudy	Homogeneous The colour, physical and chemical properties are the same throughout the solution.	Non-homogeneous. The colour, physical and chemical properties are not the same throughout the suspension.	When left to stand, will not separate back into the solute and solvent	When left to stand, the insoluble solids will settle to the bottom of the solvent.	When filtered, the solution will pass through the filter paper completely	When filtered, the insoluble solids will remain on the filter paper.	2
	Solution	suspension											
Looks clear	Looks cloudy												
Homogeneous The colour, physical and chemical properties are the same throughout the solution.	Non-homogeneous. The colour, physical and chemical properties are not the same throughout the suspension.												
When left to stand, will not separate back into the solute and solvent	When left to stand, the insoluble solids will settle to the bottom of the solvent.												
When filtered, the solution will pass through the filter paper completely	When filtered, the insoluble solids will remain on the filter paper.												
2	(a) (b) (c) (d) (e) (f)	G J I I K G	6										

3	(a)	NEWater - Waste water Imported water - Malaysia Desalinated Water - Seawater Local Catchment Water - Reservoirs	1 1 1 1
	(b)(i)	Do not take long showers Turn off the tap while brushing your teeth Rinse vegetables in container Wash clothes in washing machine only when full load <i>Any 2</i>	2
	(ii)	Do not litter into open drains. Clear clogged waterways. <i>Any other possible answer</i>	1
4	(a)	Runoff of fertilisers from farmland	1
	(b)	Fertilisers cause algae to grow rapidly on the water surface. This prevents sunlight from reaching the bottom of the pond. Aquatic plants cannot photosynthesise and die, this causes the oxygen levels in the water to decrease and fishes die.	1 1 1
	(c)	Fine farmers who pollute the rivers	1
5	(a)	A	1
	(b)	Fertilisers / pesticide	1
	(c)	Sewage / chemical waste	1
	(d)	Oil spill	1
6			
		Pollutant dust and soot sulfur dioxide carbon monoxide oxides of nitrogen Source released from factories released from forest fires released from lightning activity exhausts emissions from vehicles	4
7	(a)	Sulfur dioxide and oxides of nitrogen	2
	(b)	Sulfur dioxide and oxides of nitrogen dissolve in rain water to form acid rain.	1

8	(a)	<table><tr><td>PSI readings</td><td>Area</td></tr><tr><td>14</td><td>Z</td></tr><tr><td>60</td><td>X</td></tr><tr><td>130</td><td>Y</td></tr></table>	PSI readings	Area	14	Z	60	X	130	Y	3	
PSI readings	Area											
14	Z											
60	X											
130	Y											
	(b)	sulfur dioxide / oxides of nitrogen	1									
	(c)	- breathing difficulties - eye irritation - throat/lung irritation Any 2	2									
	(d)	- stay indoors as far as possible - minimise outdoor activities - wear a face mask when outdoors - portable air purifiers can be used to further reduce the indoor particle level	2									
9	(a)	<table><tr><td>lever</td><td>inclined plane</td><td>pulley</td></tr><tr><td>broom</td><td>ramp</td><td>cable car</td></tr><tr><td>pliers</td><td>ladder</td><td>flag pole</td></tr></table>	lever	inclined plane	pulley	broom	ramp	cable car	pliers	ladder	flag pole	6
lever	inclined plane	pulley										
broom	ramp	cable car										
pliers	ladder	flag pole										
	(b)		3									
10	(a)	All points plotted correctly Line drawn Line drawn passing through all points	1 1 1									
	(b)	Increases increases	1 1									
	(c)(i)	46 ± 5	1									
	(c)(ii)	210 ± 5	1									

