



**FUCHUN SECONDARY SCHOOL  
END OF YEAR EXAMINATION 2019  
SECONDARY 2 NORMAL TECHNICAL**

NAME:

CLASS:

INDEX NUMBER:

**SCIENCE SYLLABUS T**

**8 October 2019  
1 hour 30 Minutes  
Max Mark: 100**

Additional Materials: Multiple Choice Answer Sheet

**READ THESE INSTRUCTIONS FIRST**

Do not use staples, paper clips, highlighters, glue or correction fluid.  
Write your name, class and index number on the Answer Sheet in the spaces provided.

The use of an approved scientific calculator is expected, where appropriate.  
You may lose marks if you do not show your working or if you do not use the appropriate units.

**Section A**

There are **forty** questions on this paper. Answer **all** questions. For each questions 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.

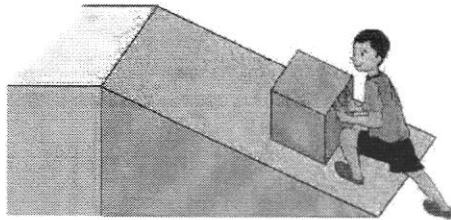
**Section B**

Answer all questions in the spaces provided.

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

**Section A**  
**Answer all questions.**

- 1 The diagram below shows a boy pushing a heavy box, with the use of a simple machine.  
What is this simple machine?



- A** inclined plane  
**B** lever  
**C** pulley  
**D** wheel
- 2 A ping-pong ball is rolling in a straight line on a level ground with a steady speed.  
A wind is blown on it.  
Which event will **not** happen?
- A** The ball changes its direction.  
**B** The ball changes its mass.  
**C** The ball comes to a stop.  
**D** The ball moves more slowly.
- 3 What is the S.I. unit for force?
- A** joule  
**B** kilogram  
**C** newton  
**D** tonne
- 4 Which of the following does **not** involve friction as a useful force?
- A** walking on a road  
**B** holding a pen  
**C** pushing a heavy box across a rough surface  
**D** using sand paper to polish wood

5 Which object does **not** have any kinetic energy?

- A a blinking headlight on a bicycle
- B a moving electric scooter
- C a spinning fan
- D a ticking clock

6 Which statement on energy is **not** correct?

- A Energy is conserved at all times.
- B Energy cannot be created but can be destroyed.
- C Energy has many forms.
- D Energy is the ability to do work.

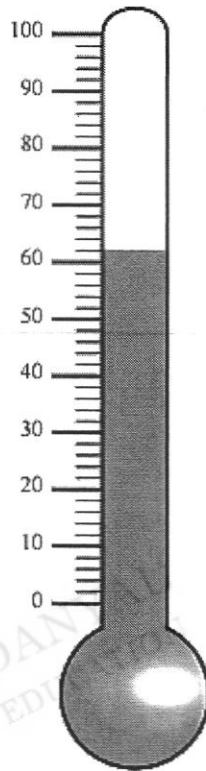
7 The diagram shows solar panels placed on the top of buildings in Singapore.



What is the advantage and disadvantage of using solar energy?

	advantage	disadvantage
A	pollution free	limited
B	pollution free	no energy when there is no sunlight
C	renewable	no energy when there is no wind
D	renewable	pollutes the environment

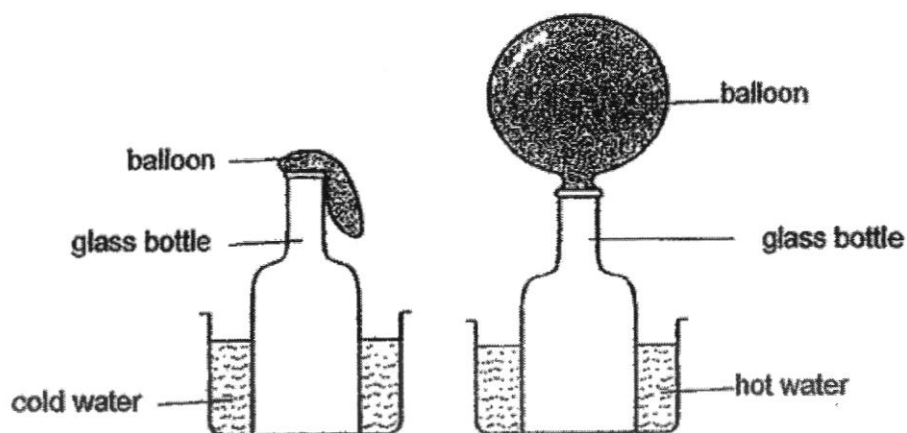
- 8 A cup of hot water is placed in a bucket of ice.  
Which statement is correct?
- A Heat travels from the ice to the hot water.
  - B Heat travels from the hot water to the ice.
  - C Temperature travels from the ice to the hot water.
  - D Temperature travels from the hot water to the ice.
- 9 The diagram below shows a thermometer.



What is the **highest** reading that this thermometer can show?

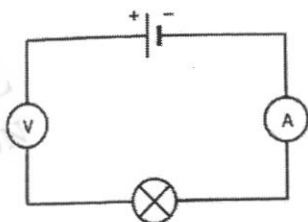
- A 60
- B 62
- C 70
- D 100

- 10 An experiment is set up as shown.

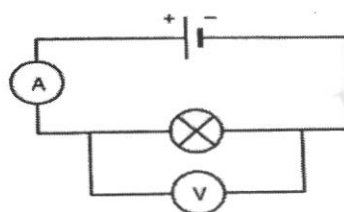


What does the experiment show?

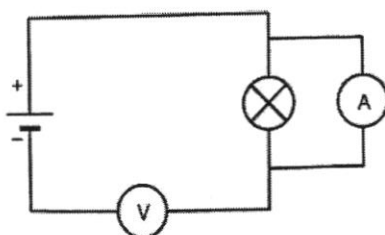
- A Air expands when heated.
  - B A balloon has a shape that can change.
  - C Heat is transferred from the hot water to the glass bottle.
  - D Heat is transferred from the glass bottle to the cold water.
- 11 What is the unit for resistance?
- A ampere
  - B ohm
  - C volt
  - D watt
- 12 Which diagram shows both the voltmeter and ammeter connected correctly in an electric circuit?



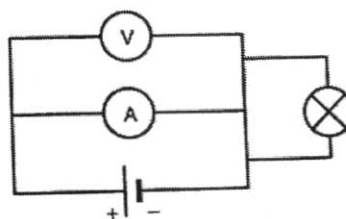
A



C

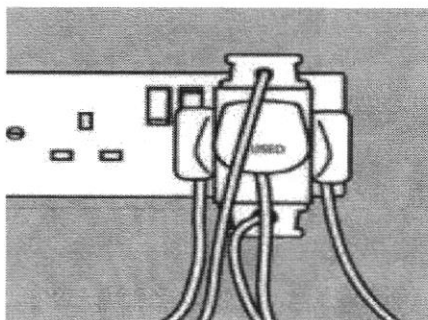


B



D

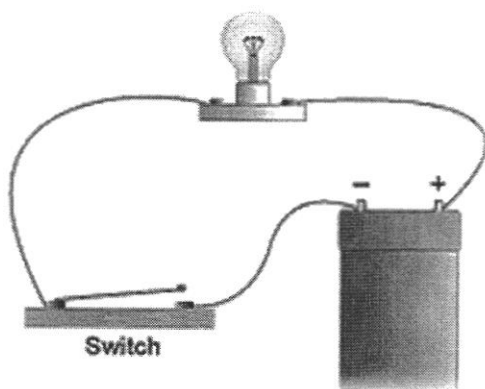
- 13 The diagram shows an electrical hazard.



What is the electrical hazard and a possible consequence of the hazard?

	hazard	consequence
A	damaged insulation	electric shock
B	damaged insulation	overheating
C	overloaded circuit	electric shock
D	overloaded circuit	overheating

- 14 A student sets up an electrical circuit.



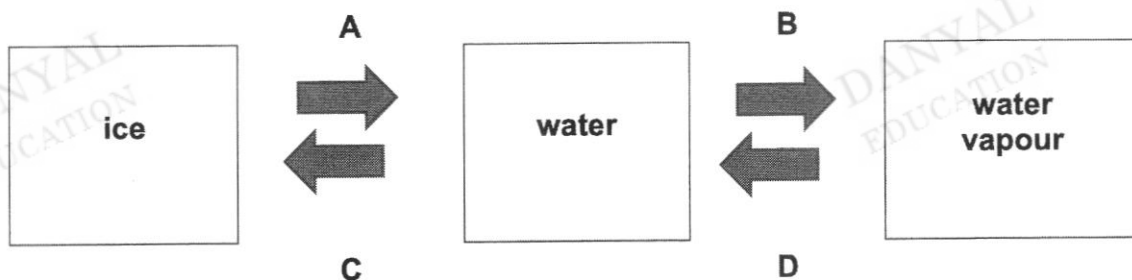
Which object can replace the switch, such that the bulb will light up?

- A 50-cent nickel coin
- B glass rod
- C plastic fork
- D rubber sheet

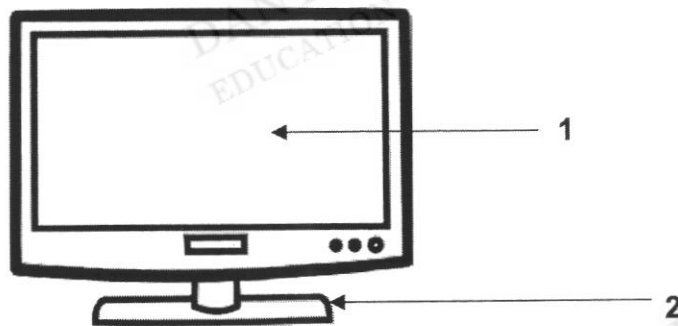
- 15 Oil at room temperature is in the liquid state.  
Which statement is true about oil at room temperature?

**A** It has a fixed volume and a fixed shape.  
**B** It has a fixed volume but no fixed shape.  
**C** It has no fixed volume but has a fixed shape.  
**D** It has no fixed volume and no fixed shape.

- 16 The diagram shows the different processes for changes of state.  
Which process represents freezing?



- 17 The diagram shows a computer monitor.



Which materials should be used to make the parts labelled 1 and 2?

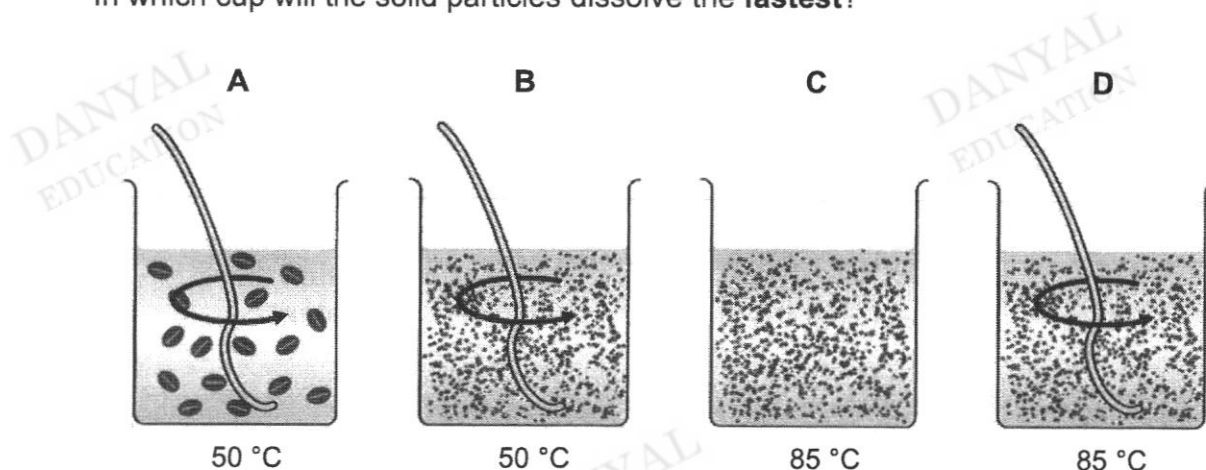
	material for part labelled 1	material for part labelled 2
<b>A</b>	fabric	metal
<b>B</b>	glass	plastic
<b>C</b>	metal	rubber
<b>D</b>	rubber	glass

18 Which statement(s) is/are correct for an acid?

- I feels soapy
- II tastes sour
- III turns blue litmus paper red

- A I only
- B I and II only
- C I and III only
- D II and III only

19 A student prepares four different cups of coffee.  
In which cup will the solid particles dissolve the **fastest**?

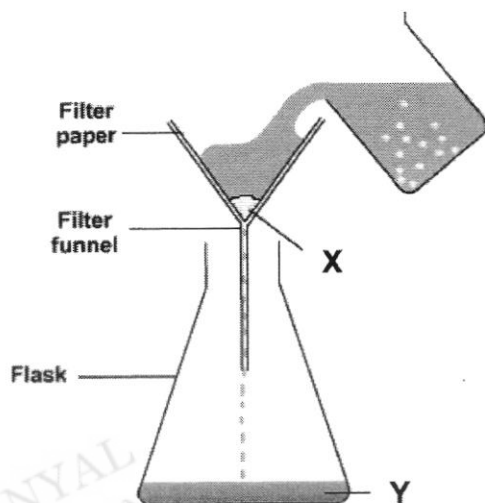


20 When sugar is added to water, it dissolves to form a sugar solution.  
Which are the solute and the solvent in this mixture?

	solute	solvent
A	water	sugar
B	sugar	water
C	sugar	sugar solution
D	water	sugar solution



- 21 The diagram shows the process of filtration.  
A mixture of sand, salt and water was stirred and poured through the filter funnel.



What are most likely to be found in the parts labelled X and Y?

	X	Y
A	sand	salt and water
B	sand	water
C	salt	sand
D	water	salt and sand

- 22 Clean water is important to humans.  
Which statement is **not** describing the importance of clean water for humans?

- A Clean water is needed for cooking food.
- B Clean water is used for bathing.
- C Clean water is needed to form clouds on a sunny day.
- D Humans drink clean water on a hot day.

- 23 What is the purpose of ultraviolet light treatment in the production of NEWater?

- A to kill the bacteria in the water
- B to remove large solids from the water
- C to remove small particles from the water
- D to make the water taste better

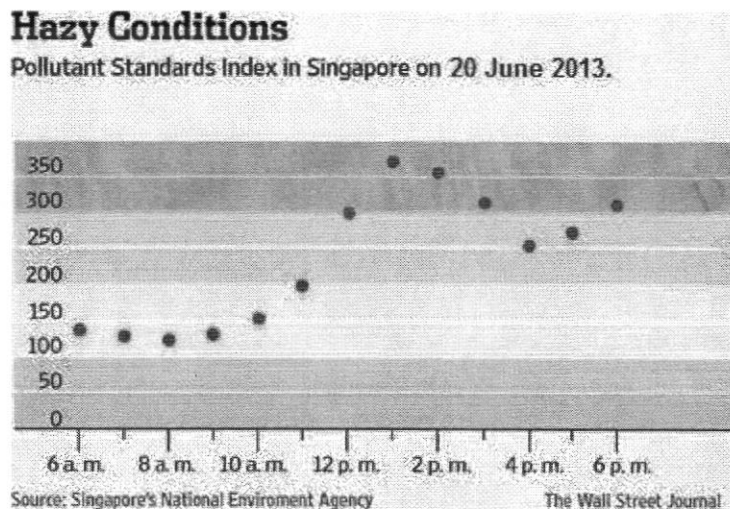
- 24 Which situation below is **not** an example of water pollution?

- A Untreated industrial waste water is discharged into seas.
- B Weekly maintenance of swimming pool done by adding chlorine water.
- C Oil spills as a result of collision between ships and oil tankers.
- D Water soluble chemicals are easily washed by rain into the water bodies.

25 Singapore faces the problem of haze occasionally.  
What is the most likely cause for haze?

- A smoke from cigarettes
- B exhaust gases from vehicles
- C burning of rubbish in the incinerators
- D clearing of forested areas by slash and burn

26 The graph below shows the Pollutant Standard Index (PSI) readings in Singapore on 20 June 2013.



The PSI value and the corresponding air quality descriptor is summarised in the table below.

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

What is the air quality in Singapore at 5 p.m. on 20 June 2013?

- A moderate
- B unhealthy
- C very unhealthy
- D hazardous

27 Which substance dissolves in rainwater to form acid rain?

- A nitrogen gas
- B oxygen gas
- C soot
- D sulfur dioxide

28 Which gas is formed when petroleum is burnt with a limited amount of oxygen?

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

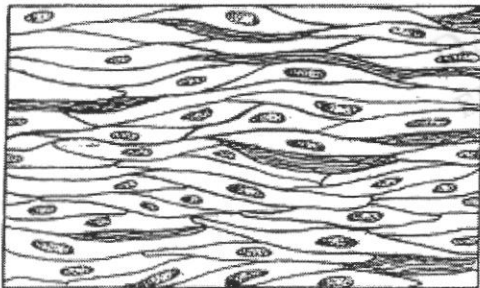
29 Which statement explains most correctly what is meant by a *cell*?

- A basic building block of matter
- B basic building block of living things
- C basic building block of an animal
- D basic building block of a plant

30 Which statement about cells is **not** true?

- A Cells carry out respiration.
- B Cells can change in their functions from time to time.
- C Cells are replaced every day.
- D Each type of cell has its own function to play.

31 The diagram shows muscle cells.



Which cells work with muscle cells to enable a person to move?

- A bone cells
- B cheek cells
- C red blood cells
- D white blood cells

32 At which part of the digestive system does food get cut into pieces?

- A oesophagus
- B mouth
- C large intestine
- D small intestine

33 A student would like to build up more muscles.

Which nutrient should he include more of in his diet?

- A carbohydrates
- B fats and oils
- C proteins
- D water

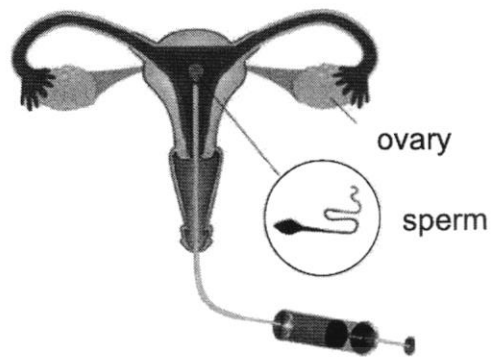
34 What is the role of acid in the stomach?

- A break down nutrients into simpler substances
- B kill bacteria in food
- C transport large pieces of food to the small intestine
- D to smoothen the walls

35 Which change takes place in **both** males and females during puberty?

- A hair grows around the genitals
- B hips become broader and rounder
- C shoulders become wider
- D voice becomes coarser

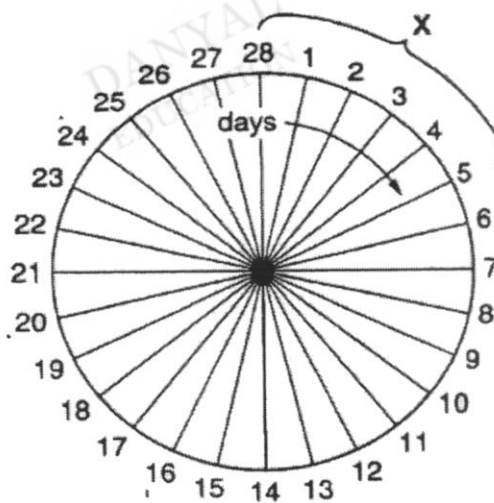
- 36 The diagram shows a method of facilitated reproduction.



Which method of facilitated reproduction is shown?

- A artificial insemination
- B In-vitro fertilisation
- C implantation
- D ligation

- 37 The chart represents the menstrual cycle.



If menstruation takes place on the days during the part marked X, on which day will sexual intercourse most likely result in pregnancy?

- A day 2
- B day 7
- C day 14
- D day 21

**38** What does *passive smoking* mean?

- A** breathing in the smoke from other people's cigarettes
- B** smoking a cigarette once a month
- C** smoking a cigarette only at social gatherings
- D** smoking only when the person wants to pass time

**39** It is advisable that a person who has taken a large amount of alcohol should not drive.

What is a possible explanation?

- A** It could damage his liver.
- B** It could cause him to speed as he is too excited.
- C** It could cause him to vomit onto the steering board.
- D** It could make him react slowly and cause traffic accidents.

**40** Drug abuse often leads to social problems.

Which social problems could be encountered by drug abusers who are still schooling?

- I** They often end up doing illegal jobs to get enough money to buy drugs.
- II** They cannot concentrate on their studies and may leave school.
- III** They have stable family relationships.
- IV** They exercise regularly and are healthy.

- A** I and II only
- B** II and III only
- C** I and III only
- D** II and IV only

**End of Section A**

## Section B

Answer all the questions in the spaces provided.

- 1 (a) Fig. 1.1 shows two bimetallic strips, made of metals 1, 2 and 3.

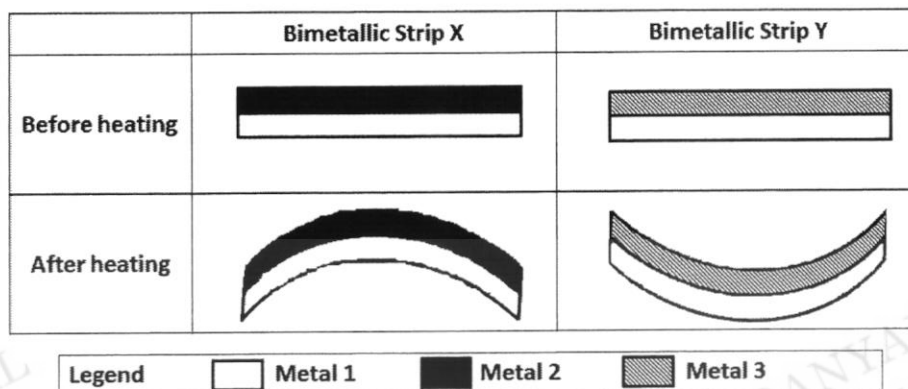


Fig. 1.1

- (i) Circle the correct word in brackets for each of the statements.

Metal 1 expands ( more / less ) than metal 2.

Metal 1 expands ( more / less ) than metal 3.

[2]

- (ii) Metals 2 and 3 are made into a bimetallic strip Z as shown in Fig. 1.2. Draw a diagram to show what happens to the bimetallic strip Z after heating.

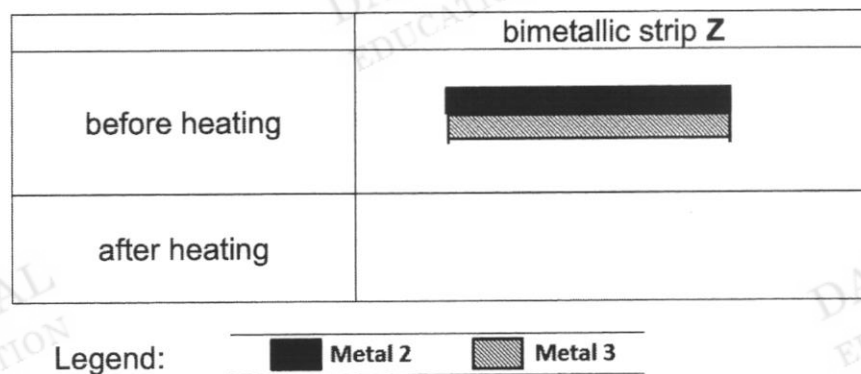


Fig. 1.2

[1]

- (iii) Based on the diagram that you had drawn, circle the correct word in the statement below.

Metal 2 expands ( more / less ) than metal 3.

[1]

- (b) Fig.1.3 below shows a short section of MRT rail with gaps between them.

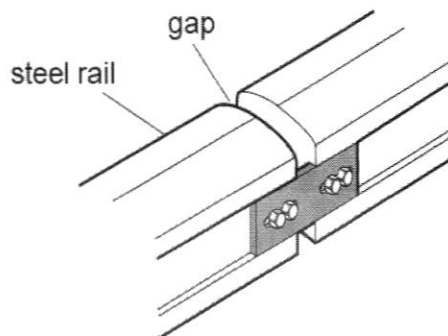


Fig. 1.3

- (i) Explain why there are gaps in the steel rail.

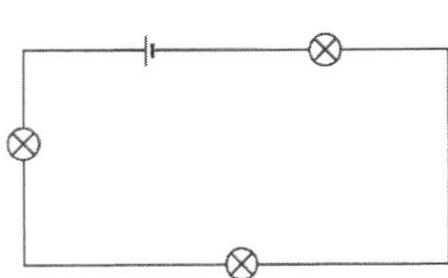
.....  
..... [1]

- (ii) Suggest what happens to the steel rail on days when the weather became very hot if there are no gaps.

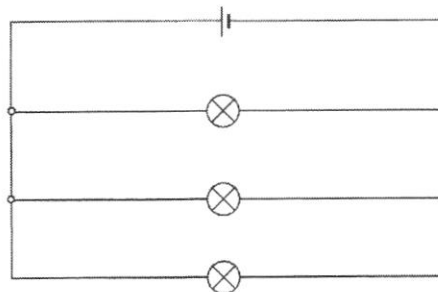
.....  
..... [1]



- 2 A man wants to install lighting at his new place. He fitted the light bulb in two different ways, as shown in **circuit A** and **circuit B** in Fig. 2.1.



**Circuit A**



**Circuit B**

**Fig 2.1**

- (a) State whether the light bulbs in each circuit are arranged in series or parallel.

**circuit A:** .....

**circuit B:** ..... [2]

- (b) Predict what will happen to the other bulbs if one of the bulbs blows in each circuit.

**circuit A:** .....

**circuit B:** ..... [2]

- (c) Which circuit should the man use to install the lighting?  
Explain your answer.

.....  
..... [2]

- (d) Why is it important to use electricity wisely at home?

..... [1]

- 3 Fig. 3.1 shows a cell from the human body.

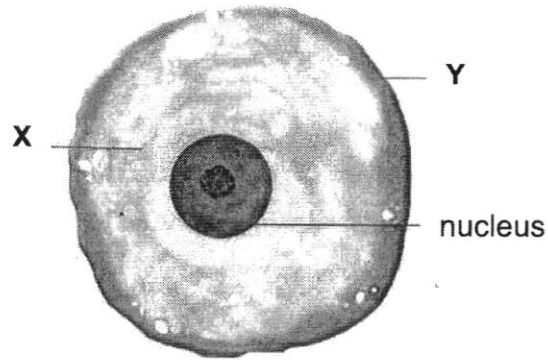


Fig 3.1

- (a) Identify structures **X** and **Y** in the cell.

structure **X** : .....

structure **Y** : ..... [2]

- (b) Explain what would happen to the cell if structure **Y** was damaged.

..... [1]

- (c) What is the function of the nucleus?

..... [1]

- (d) What is contained in the nucleus that is passed down from the previous cell?

..... [1]

- 4 (a) 2 g of sugar and 2 g of chalk powder were added separately into two test tubes containing 5 cm<sup>3</sup> of water.

Complete Table 4.1 to show the expected observations for each mixture. Circle the correct word in each box.

observation	mixture of sugar and water	mixture of chalk and water
Are there particles settling at the bottom of the test tube?	(yes / no)	(yes / no)
Is the solid soluble in water?	(soluble / insoluble)	(soluble / insoluble)
Is there a residue on the filter paper when the mixture is filtered?	(yes / no)	(yes / no)
What is the appearance of the mixture?	(clear / cloudy)	(clear / cloudy)

[4]

**Table 4.1**

- (b) Draw a straight line to connect each National tap to its correct description. Match the National Taps to their correct descriptions.

national Tap		description
reservoir water	•	• rain is captured and stored in large areas
NEWater	•	• water is purchased from Malaysia
desalinated water	•	• water is reclaimed from sewage
imported water	•	• water obtained through distilling saltwater

[3]

- 5 Fig. 5.1 shows a pack of cigarettes with a label, which warns people that cigarette smoke contains carbon monoxide.

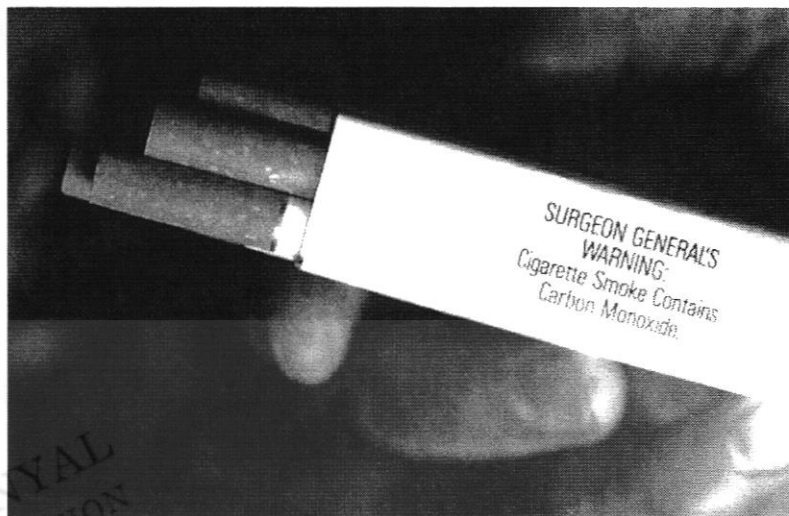


Fig. 5.1

- (a) From the list of words below, circle **two** other substances found in cigarette smoke that are harmful.

tar

carbon dioxide

ash

caffeine

alcohol

nicotine

[2]

- (b) How does carbon monoxide affect the oxygen supply to the body?

..... [1]

- (c) The label on the pack of cigarettes is one way to discourage people from picking up smoking.

Suggest two **other** ways to discourage people from smoking.

1 .....

2 ..... [2]

- (d) Table 5.1 shows the death rates from lung cancer for smokers and non-smokers.

average number of cigarettes smoked per day	deaths from lung cancer per year per 100 000 persons
0	10
1 to 14	78
15 to 25	127
26 or more	251

**Table 5.1**

- (i) What is the average number of cigarettes smoked per day, that caused 78 deaths from lung cancer for every 100 000 persons?

..... [1]

- (ii) For 15 to 25 cigarettes smoked per day, how many people die from lung cancer out of 100 000 person?

..... [1]

- (iii) For non-smokers, what is the number of deaths from lung cancer for every 100 000 persons?

..... [1]

- (iv) As the number of cigarettes smoked per day increases, what happens to the number of deaths from lung cancer?

..... [1]

6 Fig. 6.1 shows a male reproductive system.

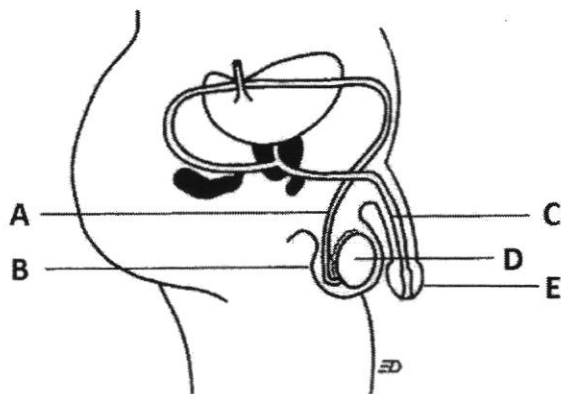


Fig. 6.1

Complete Table 6.1 by writing the letter and the name of the part that matches with each function.

function	letter label (A, B, C, D, E )	name of the reproductive part
produces sperms		
transports both sperms and urine		
erects and penetrates the vagina during sexual intercourse		
transports sperms		

[8]

Table 6.1

7 Fig. 7.1 shows the energy conversions that take place in a power station.

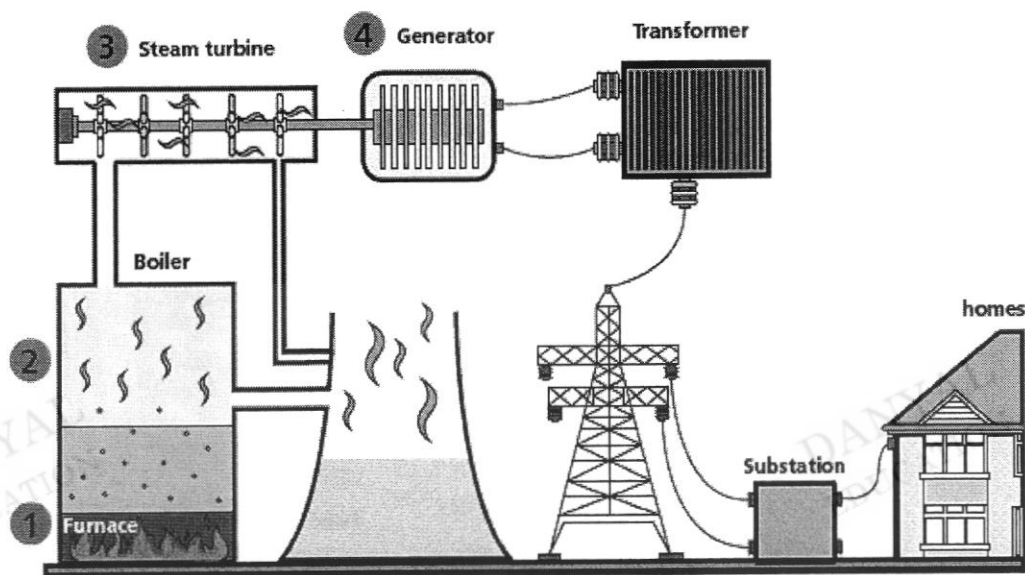


Fig. 7.1

Complete the blanks below on the energy conversion taking place in a power station.

You may use the helping words below. Each option can be used **once**, **more than once** or **not at all**.

chemical potential	electrical	gravitational potential	kinetic	light	heat
--------------------	------------	-------------------------	---------	-------	------

(a) In the furnace, the fossil fuels were burnt.

..... energy → ..... energy [2]

(b) At the boiler, water is turned into steam, which moves up into the steam turbine.

..... energy → ..... energy [2]

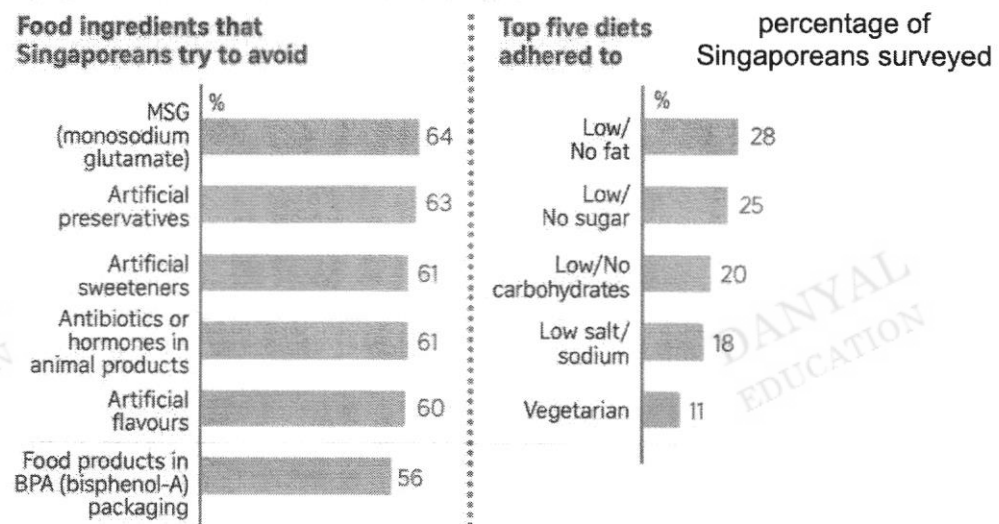
(c) The steam then turns the steam turbine.

..... energy of steam → kinetic energy of turbine [1]

(d) Turning turbines cause the generator to produce ..... energy. [1]

- 8(a) Fig. 8.1 shows the top five diets and food ingredients that Singaporeans try to avoid.

### Diets and food ingredients: Singaporeans' preferences



Source: NIELSEN GLOBAL HEALTH AND INGREDIENT-SENTIMENT SURVEY  
STRAITS TIMES GRAPHICS

Fig. 8.1

(image taken from: <https://www.straitstimes.com/singapore/over-50-here-watch-what-they-eat-survey-finds>)

- (i) Which food ingredient is most avoided by Singaporeans? [1]  
.....
- (ii) How many types of food ingredients are artificial? [1]  
.....
- (iii) Which diets have been taken by 25% or more of those surveyed? [2]  
.....
- (iv) What is the lowest percentage of Singaporeans following a particular diet? [1]  
.....
- (v) Suggest a reason for Singaporeans to be concerned about their diet. [1]  
.....  
.....



(b) Fig.8.2 shows the human digestive system.

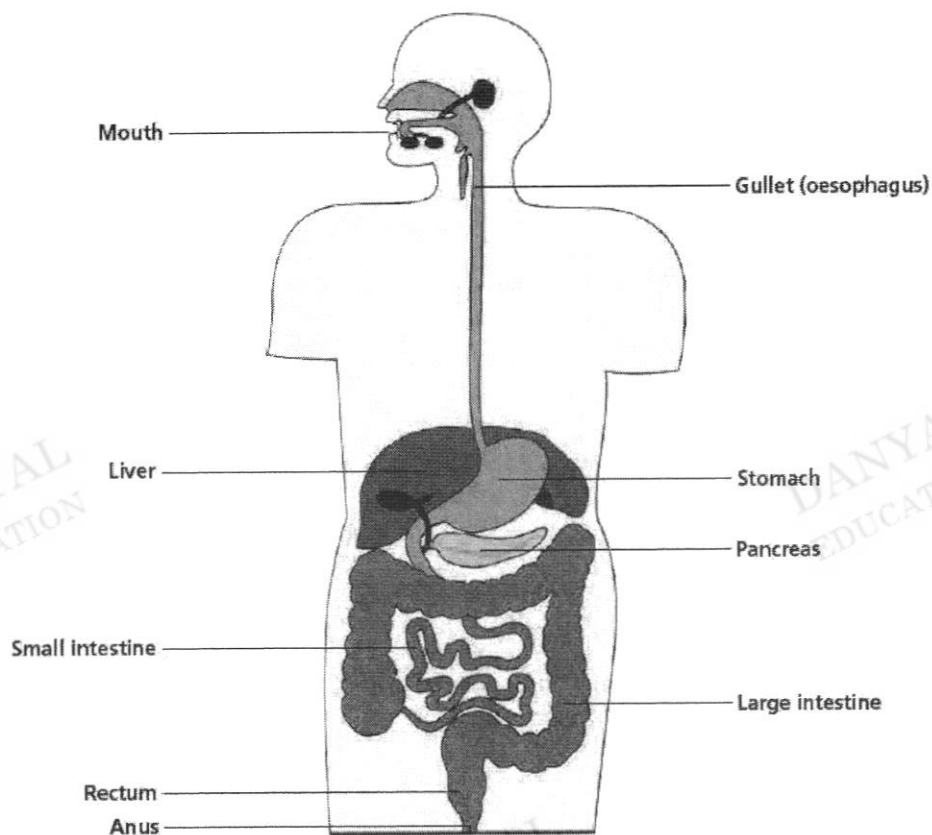


Fig. 8.2

(i) Name two organs in Fig. 8.2 that contain enzymes.

..... and ..... [2]

(ii) A person suffers from a disease in which his small intestine is not functioning well.

Should the person adopt a **low fat diet** or **low protein diet**?

Give an explanation for your choice.

.....  
..... [2]

(iii) A person swallows a piece of bread.

Which two organs in the digestive system, as shown in Fig. 8.2, would the bread **not** pass through?

..... and ..... [2]

(End of paper)



**FUCHUN SECONDARY SCHOOL  
END OF YEAR EXAMINATION 2019  
SECONDARY 2 NORMAL TECHNICAL**

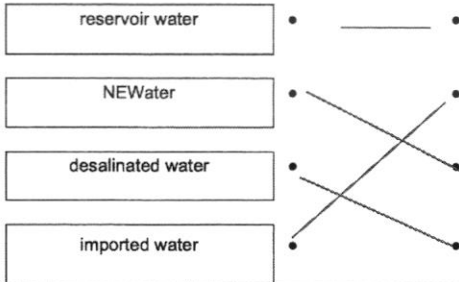
**Section A**

1	A	11	B	21	A	31	A
2	B	12	C	22	C	32	B
3	C	13	D	23	A	33	C
4	C	14	A	24	B	34	B
5	A	15	B	25	D	35	A
6	B	16	C	26	C	36	A
7	B	17	B	27	D	37	C
8	B	18	D	28	B	38	A
9	D	19	D	29	B	39	D
10	A	20	B	30	B	40	A

**General notes**

- / alternatives
- ; separates marking points
- () contents of brackets are not required but should be implied
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- **Ig** ignore (for incorrect but irrelevant responses)
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point (where a greater than usual variety of responses is expected)
- **ORA** or reverse argument
- ref./refs.answer makes appropriate reference to
- ecf error carried forward
- **underline** actual word underlined must be used by candidate
- + statements on both sides of the + are needed for that mark

**Section B (60 marks)**

Qn	Answer	Marks	Guidance
1(a)(i)	less; more;	2	
(ii)	strip curving downwards;	1	
(iii)	metal 2 expands more than 3;	1	accept ecf
b(i)	allow the tracks to expand ;	1	
b(ii)	Bent/damaged/out of shape <b>AW</b>	1	
2(a)	series; parallel;	2	
(b)	A: other light bulbs not light up. B: other bulbs will light up.	2	
(c)	Circuit B, If one of the bulbs blows, the rest of the bulbs will continue to be lighted.	2	
(d)	reduce wastage of energy / saves cost; ref to electrical hazards;		
3(a)	X – cytoplasm; Y – cell membrane;	2	
(b)	lose control of substances entering and leaving the cell / cell death / <b>AW</b>	1	
3(c)	It controls all activities in the cell or it contains genes.	1	
(d)	Genes/chromosomes;	1	
4(a)	no + yes; soluble + insoluble; no + yes; clear + cloudy;	4	
4(b)		3 to 4 correct – 3m 2 correct – 2m 1 correct – 1m	
5 (a)	tar; nicotine;	2	<b>R if more than 2 are selected</b>
(b)	reduces / cut short <b>AW</b> ;	1	

<b>(c)</b>	Any 2 of: adopt healthy hobby / make a stand not to smoke / keep away from smokers / learn about effects of smoking ;;	2	
<b>d(i)</b>	1 to 14;	1	
<b>(ii)</b>	127;	1	
<b>(iii)</b>	10;	1	
<b>(iv)</b>	Increases / AW ;	1	

<b>6</b>	D; testes; C; urethra; E; penis; A; sperm duct;	8	
<b>7(a)</b>	chemical potential; heat;	2	
<b>(b)</b>	heat; kinetic;	2	
<b>(c)</b>	kinetic;	1	
<b>(d)</b>	electrical;	1	
<b>8(a)(i)</b>	MSG;	1	
<b>(ii)</b>	3;	1	
<b>(iii)</b>	low or no sugar; low or no fat;	1 1	
<b>(iv)</b>	11%;	1	
<b>(v)</b>	health awareness / culture of eating well / AW	1	
<b>8(b)(i)</b>	mouth/stomach/pancreas/small intestine;;	2	
<b>(ii)</b>	low fat; small intestine has enzymes to break down fats / stomach can still break down protein AW;	2	
<b>(iii)</b>	liver; pancreas;	2	