Name: .... (   )   **Class:** ....

ASSUMPTION ENGLISH SCHOOL
END OF YEAR EXAMINATION 2017

LOWER SECONDARY SCIENCE
BOOKLET A

LEVEL:	Sec 1 Express	**DATE:**	12 October 2017
CLASSES:	Sec 1/1, 1/2	**DURATION:**	2 hours (For Booklets **A** and **B**)

Additional Materials provided: 1 sheet of OAS paper

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

Write your NAME, INDEX NUMBER and CLASS at the top of this page and on the OAS paper. **Shade your index number on the OAS paper.**

This paper consists of three sections.

Booklet **A**: Section A - Multiple Choice Questions
Booklet **B**: Section B - Short Structured Questions
Section C - Long Structured Questions

SECTION A (30 marks)
Multiple Choice Questions
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 correct answer and record your choice in soft or 2B pencil on the OAS paper provided. DO NOT fold or bend the OAS paper.**

At the end of the examination, hand in your OAS paper, Booklets **A** and **B** separately.

Section A: Multiple Choice Questions (30 marks)

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 on the OAS paper in soft pencil.

1 In 2006, a former Russian spy was hospitalized and died three weeks later. Autopsy of his body revealed that he had died due to radioactive poisoning.

Which symbol did he most likely ignore during one of his missions?

A

B

C

D

2 Which part of the Bunsen burner is responsible for controlling the type of flame produced?

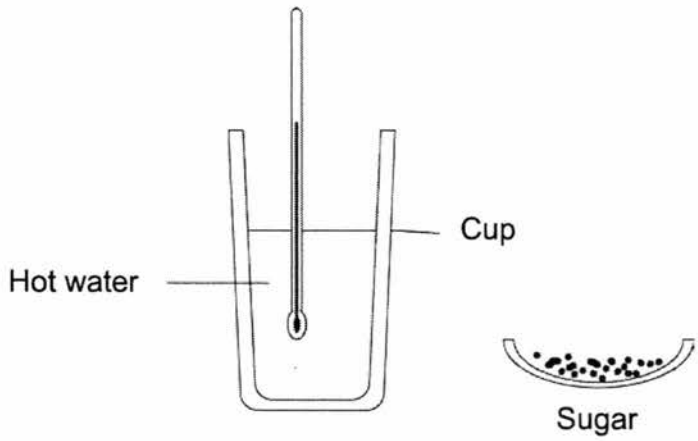
A barrel
B collar
C gas tap
D rubber tubing

3 Drills operated in mining fields are used to remove rock formation blocking access to the valuable ores beneath. The intense drilling also generates high amount of frictional heat.

Which combinations of physical properties is of highest concern when considering the material used to make the drill?

A hardness, electrical conductivity, boiling point
B hardness, strength, melting point
C strength, electrical conductivity, thermal conductivity
D strength, melting point, transparency

4 Mr Ng would like to perform an experiment to demonstrate how different temperatures affect the rate of dissolving sugar in water. He had to leave the hot water aside for 20 minutes while attending to questions from his pupils.



Which of following cup should he choose to contain the hot water considering its physical property?

	material	physical property
A	styrofoam	heat insulator
B	iron	high melting point
C	copper	heat conductor
D	plastic	low melting point

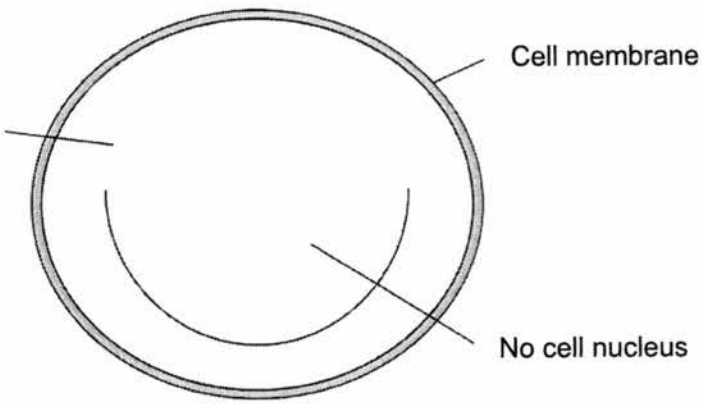
5 Which mixture can be separated using magnetic attraction?

A a mixture of salt and sesame seed
B a solution of chlorophyll in water
C colour pigments found within an ink
D plastic waste containing bits of steel

6 Which cell structure prevents a plant cell from bursting when soaked in pure water?

A cell membrane
B cell wall
C chloroplasts
D nucleus

7 Given below is the complete structure of a red blood cell.



Which of the following cellular activity cannot be performed by a red blood cell?

A allow chemical reaction to take place within it
B carry oxygen gas
C control substance entering and leaving the cell
D repair any damage done to red blood cell effectively

8 Arrange the following body structure in the order of increasing complexity.

I. red muscle tissue
II. muscle cells
III. circulatory system
IV. heart

A I, II, III, IV
B I, IV, II, III
C II, I, IV, III
D II, III, I, IV

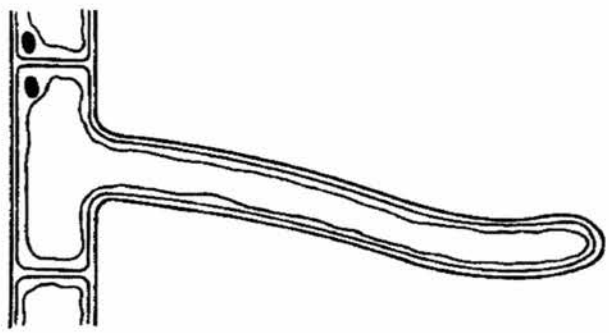
9 Which is the correct explanation as to why a plant wilts?

A Osmosis stops as the root hairs have low concentration of water.
B The cell wall of the leaves is broken down so the cell sap escapes.
C The roots are absorbing less water than the leaves are losing water.
D The roots stop absorbing water and the leaves stop losing water.

10 In a plant, water travels through the ..... in a / an ..... direction.

A phloem; upward
B phloem; downward
C xylem; upward
D xylem; downward

11 The diagram shows a specialized cell from a plant.



For which function is the cell modified?

A absorption of water
B fertilisation
C transport of food
D transport of oxygen

12 The rate of photosynthesis is dependent on certain conditions. Which of the following would reduce the rate?

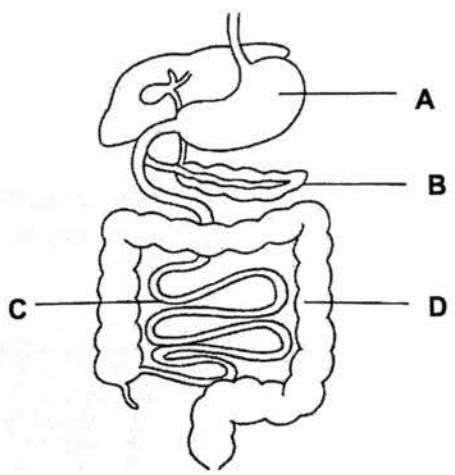
A an increase in atmospheric carbon dioxide content
B an increase in mass of cloud covering the sky
C an increase in amount of water
D an increase in the sunlight level

13 Which statement(s) are correct descriptions of the oesophagus?

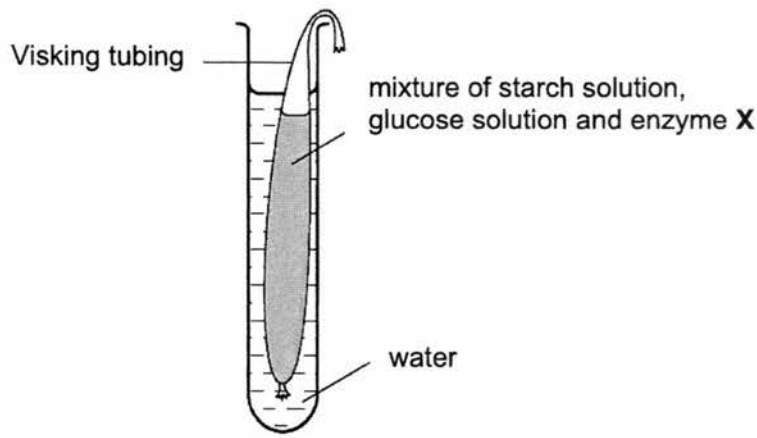
1 Digestive enzymes are present in the oesophagus.
2 Food moves along the oesophagus by peristalsis.
3 There is some digestion of food in the oesophagus.
4 There is no digestion of food in the oesophagus.

A 1 and 2 only
B 2 and 4 only
C 1, 2 and 4 only
D 1, 2 and 3 only

14 The diagram below shows a section of the human digestive system.
In which structure does the absorption of most food molecules occur?



15 The diagram shows an experimental set-up to investigate the effect of enzyme **X** on digestion.



After one hour, a few drops of iodine solution were added to the solution in the Visking tubing. The iodine solution remained brown. Which is enzyme **X**?

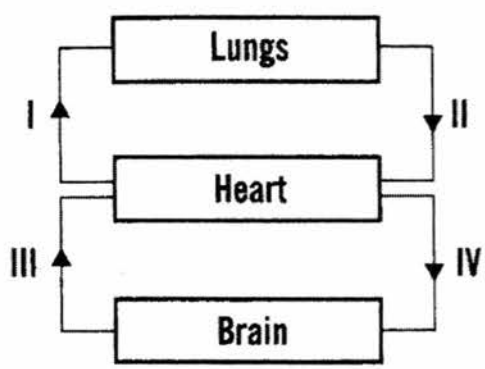
A amylase

B lipase

C maltase

D protease

16 The diagram below shows the simplified human circulatory system.



Which blood vessels carry deoxygenated blood?

A **I** and **II**

B **I** and **III**

C **II** and **IV**

D **III** and **IV**

17 Which statements are true?

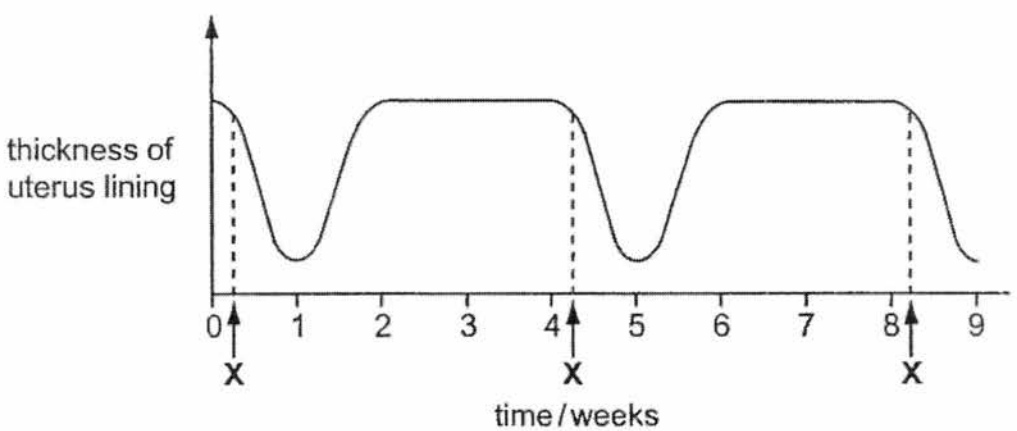
I	Plasma helps to carry dissolved substances.
II	Platelets help in the clotting of blood.
III	White blood cells help to transport oxygen.

A **I** and **II** only
B **I** and **III** only
C **II** and **III** only
D **I**, **II** and **III**

18 The human circulatory system is made up of .....

A arteries, veins and capillaries.
B heart, blood vessels and blood.
C heart, lungs and blood vessels.
D plasma, red blood cells and white blood cells.

19 The graph below shows changes in the thickness of the uterus lining of a lady over a period of 9 weeks.



What happened at **X**?

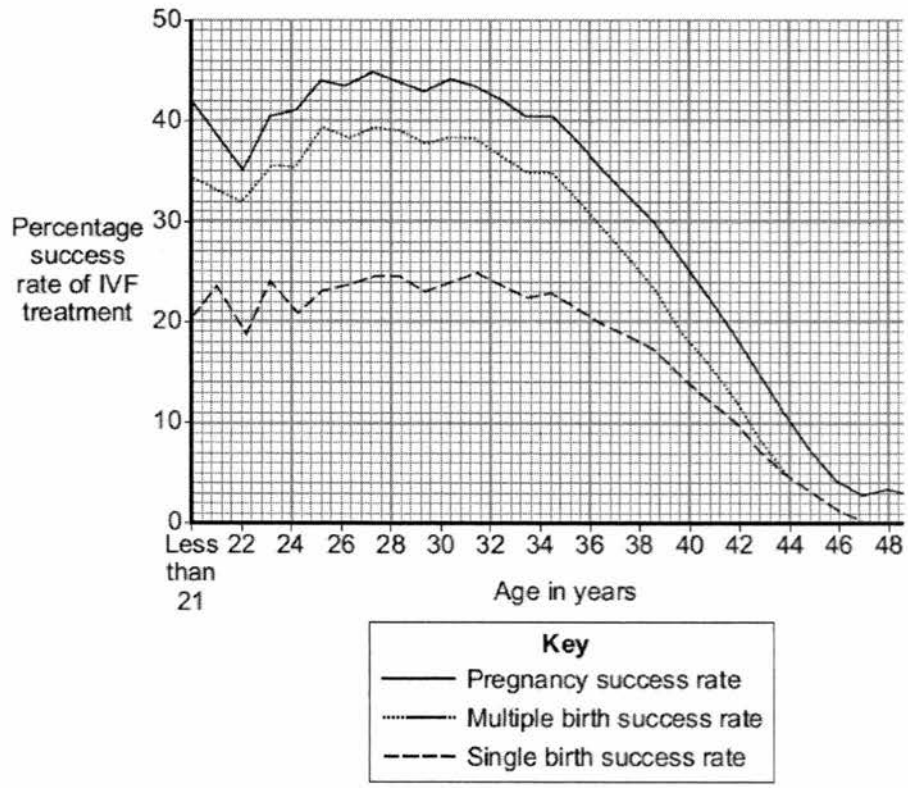
A fertilisation
B implantation
C menstruation
D ovulation

20 How can AIDS be spread?

A sharing of food with an infected person
B being sneezed on by an infected person
C sharing of medical needles with an infected person
D resting on the same bed previously used by an infected person

21 IVF (In-vitro fertilisation) is a method of fertilisation where the egg is fertilized by the sperm outside the body.

The graph shows the percentage success rates of IVF treatments for women of different ages.



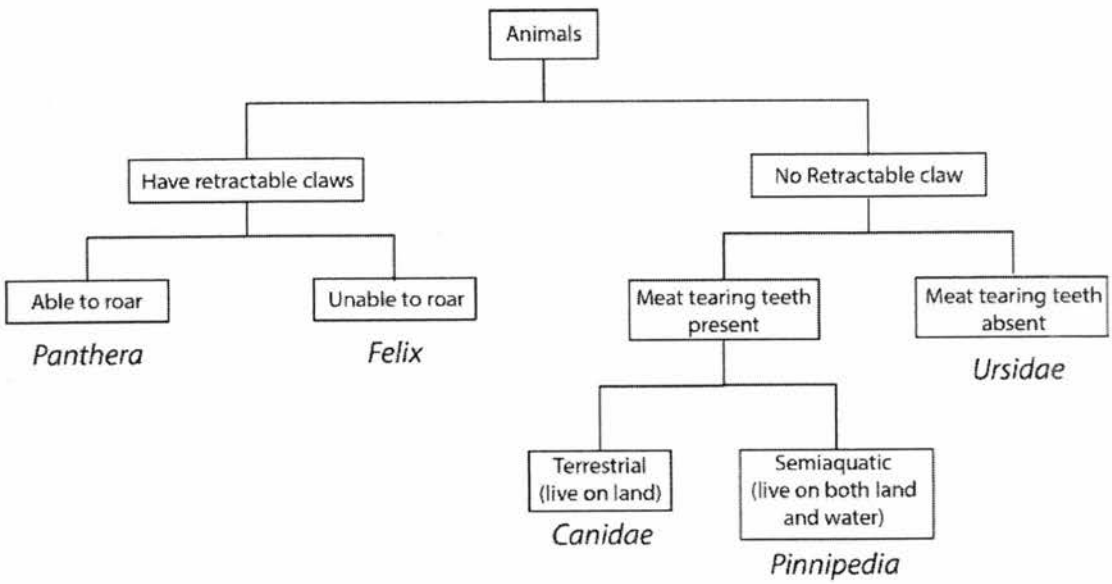
Which conclusion can be drawn from this data?

A Women above 45 have a pregnancy rate of 10%.
B Multiple and single births remained constant throughout a woman's life.
C The pregnancy success rate falls significantly after the age of 34.
D The pregnancy success rate is not affected by of the age of the woman.

22 Michael was tasked to group closely related animals together. Which pair has the two animals most distant and dissimilar from one another?

A lion and tiger
B shark and dolphin
C snake and monitor lizard
D rhinoceros and elephant

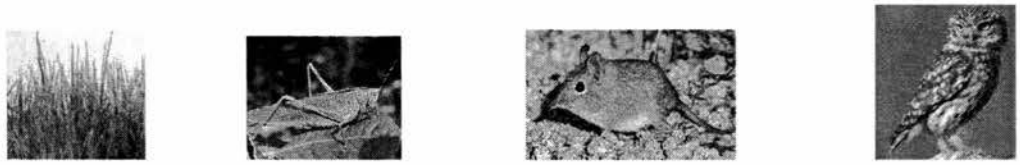
23 A dichotomous key of some animals is given below.



Domestic dogs do not have retractable claws and have meat tearing teeth. Which group of animals do they belong to?

A canidae
B felix
C panthera
D ursidae

For questions 24 – 25, refer to the diagram shown below.



grass → grasshopper → shrew → owl

24 Which is the primary consumer of this food chain?

A grass
B grasshopper
C owl
D shrew

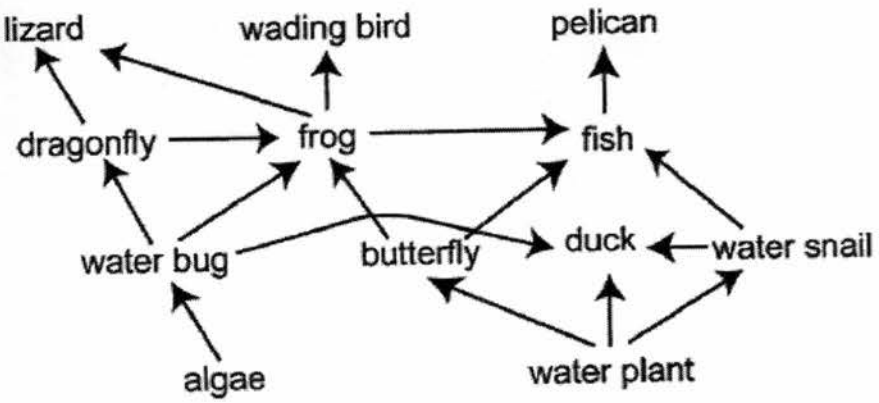
25 What would happen to the population of owls if the number of shrews decreased greatly?

A It will decrease in population size.
B It will expand greatly in population size.
C It will increase in population size.
D No change will be observed. It remains the same.

26 A couple of wild boars were recently found in Punggol HDB estates. Which is a possible cause of these incidents?

A The wild boars were overhunted.
B The wild boars lost their natural habitat.
C The wild boars were having an adventure.
D The wild boars were infected by a type of bacteria.

27 The diagram below shows a food web in a wetlands ecosystem.

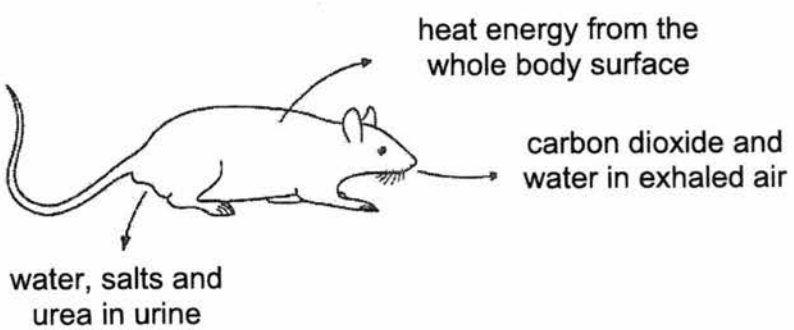


Which organism is both a primary and a secondary consumer?

A duck **B** frog

C lizard **D** water bug

28 The diagram shows losses from a rat to the environment.



What will **not** be returned to the ecosystem and recycled?

A carbon dioxide **B** heat energy

C salts **D** urea

29 Read the following paragraph to answer this question.

The ostrich always moves with a herd of zebras since it has a poor sense of hearing and smell, whereas zebras have very sharp senses. The ostrich has a keen sense of sight, which the zebra lacks. Hence, these two species depend on each other to warn one another of any nearby lurking dangers.

What is the relationship between the ostrich and zebras?

A commensalism
B mutualism
C parasitism
D predator-prey

30 Which statement best describes an ecosystem?

A A group of organisms of the same species that live in an area.

B Many groups of organisms of different species that live in an area.

C Many groups of organisms of different species interacting with each other and the environment in which they all live in.

D The study of the interactions between many groups of organisms of different species and the environment in which they all live in.

- END OF BOOKLET A -

BP-50

Name: .... (   )   **Class:** ....

ASSUMPTION ENGLISH SCHOOL
END OF YEAR EXAMINATION 2017

LOWER SECONDARY SCIENCE
BOOKLET B

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LEVEL:	Sec 1 Express	**DATE:**	12 October 2017
CLASS(ES):	Sec 1/1, 1/2	**DURATION:**	2 hours (For booklets **A** and **B**)

Additional Materials provided: NIL

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

Write your NAME, INDEX NUMBER and CLASS at the top of this page This paper consists of 2 sections.

SECTION B (40 marks)
Short Structured Questions
Answer **all** questions. Write your answers in the spaces provided on the question paper.

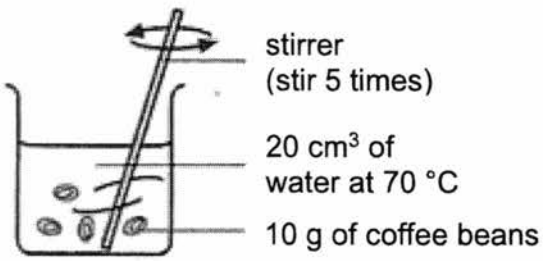
SECTION C (30 marks)
Long Structured Questions
Answer **all** questions. Write your answers in the spaces provided on the question paper.

For Examiner's use:		
Section A	/	30
Section B	/	40
Section C	/	30
Total	/	**100**

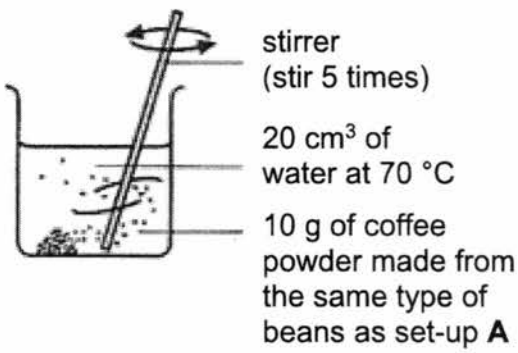
At the end of the examination, hand in your OAS paper, Booklets A and B separately.

Section B: Short Structured Questions (40 marks)
Answer **ALL** the questions and show all workings clearly in the spaces provided.

1 Lexi conducted an experiment using coffee beans and finely ground coffee powder in two separate beakers to see which coffee can dissolve faster. He measured the result of his experiment using a stopwatch. The experimental set-up is shown below.



Set-up **A**



Set-up **B**

(a) State the hypothesis of this experiment.

.....

..... [1]

(b) Identify 1 independent variable, 1 dependent variable and 2 controlled variables in the experiment.

independent (changed) variable : .....

dependent (measured) variable : .....

controlled variables : (1) .....

(2) ..... [4]

2 Moh's scale is used to compare the hardness of different materials. The Moh's values of some materials are listed in the table below, with 1 being the softest and 10 being the hardest.

Moh's value	materials
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase
7	Quartz
8	Topaz
9	Corundum
10	Diamond

An unknown material **Q** is rubbed with various materials to determine its Moh's value.

The observations are recorded in the table below.

	Observations
1	After rubbing with topaz, **Q** has many scratches.
2	After rubbing with fluorite, **Q** has no dents.
3	After rubbing with quartz, **Q** has less scratches than with topaz.

(a) Define *hardness*.

.....

[1]

(b) State one possible Moh's value of the unknown material **Q**. Explain your answer.

.....

.....

.....

[2]

3 **Fig. 3.1** shows a bacterial cell that is found in a pond. It has structures which are similar to a human sperm cell.

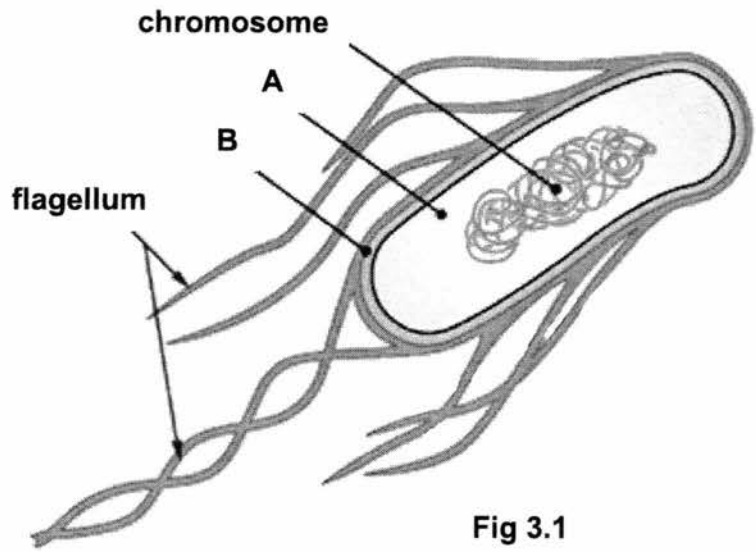


Fig 3.1

(a) Name the structures labelled **A** and **B** in **Fig. 3.1**.

A: .....

B: ..... [2]

(b) Identify two differences between the bacterial cell and a typical animal cell.

1. .....

.....

2. .....

..... [2]

(c) Suggest the function of flagellum in the bacterium cell.

..... [1]

4 Five discs of fresh potato (**A** – **E**), each weighing 10 grams were immersed in sugar solutions of different concentration for two hours, and then dried and reweighed. The change in the mass of each potato disc was recorded in a bar chart as shown in **Fig. 4.1**.

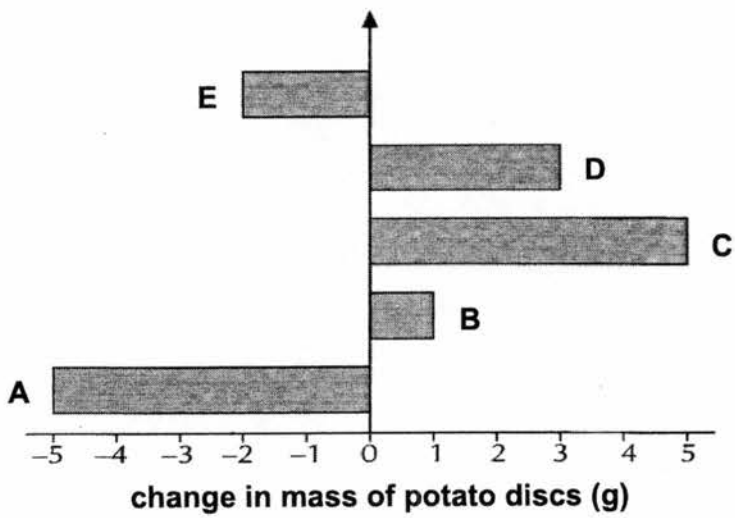


Fig 4.1

(a) Name the process that caused the change in mass of the potato discs.

..... [1]

(b) **(i)** Which potato was immersed in the solution with the highest and lowest sugar concentration? Give your answers using the letters **(A - E)**.

sugar solution	potato discs
highest concentration	
lowest concentration	

[2]

(ii) Describe and explain what caused the changes in potato disc **A**.

.....

.....

..... [3]

5 Nancy investigated the effect of temperature on the action of a human digestive enzyme, protease.

She placed 10 g of solid egg white into each of six test-tubes which all contained protease solution and a few drops of dilute hydrochloric acid. These test tubes were kept at different temperatures.

After 20 minutes, she filtered each solution and weighed the solid egg white which was left. Her results are shown in **Table 5.1**.

temperature / °C	10	20	30	40	50	60
mass of solid egg white left / g	7.6	4.5	3.1	2.7	4.8	9.4

Table 5.1

(a) Egg white contains protein. In each experiment, the mass of the egg white became lesser than the initial mass.

Explain what caused the mass of the egg white to decrease.

.....

.....

..... [2]

(b) Suggest the temperature at which the enzyme protease was the most active.

..... [1]

(c) Suggest what happened to the protease at 60 °C.

.....

.....

..... [2]

(d) Suggest a reason why dilute hydrochloric acid was added into all the test tubes with egg white and protease solution at the start of the investigation.

..... [1]

6 **Fig. 6.1** shows a plant with *variegated leaves.

The plant was left in the dark for 48 hours to remove all starch in the leaves.

Leaf **X** had a strip of black paper attached to both the upper and lower surfaces.

Leaf **Y** also had a strip of black paper attached to both the upper and lower surfaces.
It was then sealed in a flask containing a solution of sodium hydroxide, a substance that absorbs carbon dioxide.

The plant was then placed in the light for 24 hours. At the end of the experiment, a starch test was carried out on leaf **X** and leaf **Y**.

*(of a plant) consisting of leaves that are edged or patterned in a second colour, especially white as well as green.

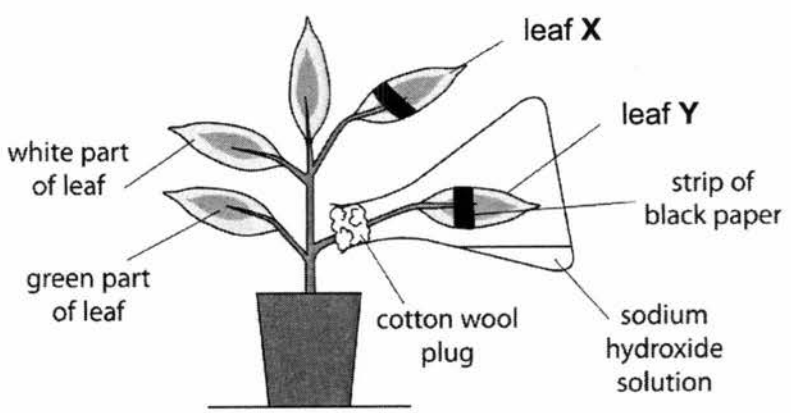
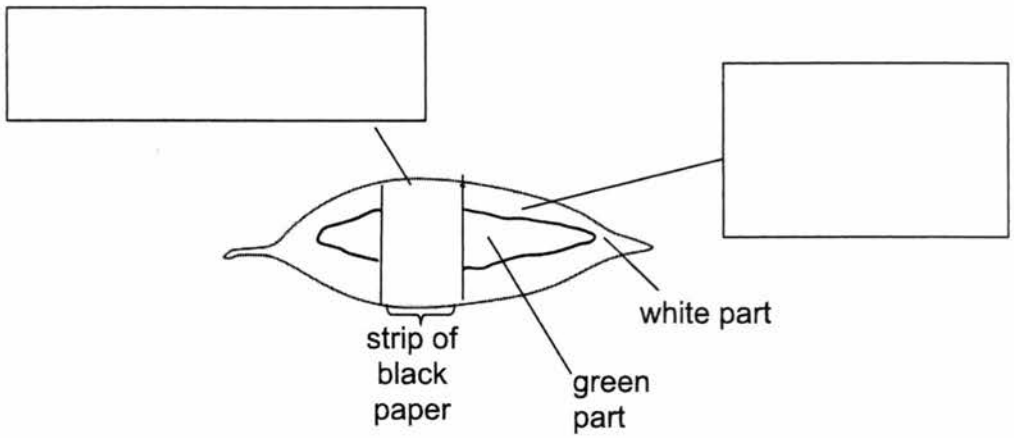


Fig. 6.1

(a) Write down the word equation for photosynthesis.

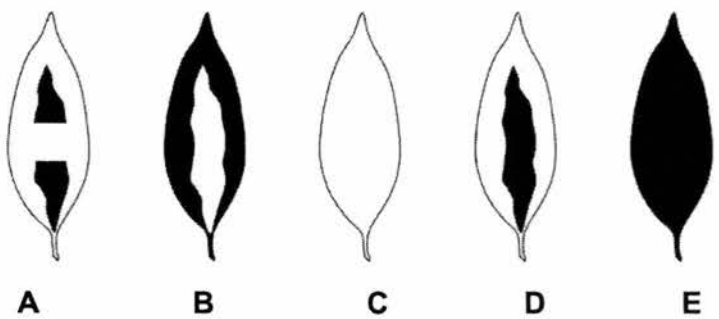
..... [2]

(b) Identify the **missing** factor / factors for photosynthesis at various parts of leaf **Y** by filling in the blanks below.



[3]

Five leaves, **A** to **E**, show the possible appearance of leaf **X** and leaf **Y** after the starch test.



□ = brown colour showing starch is absent

■ = blue-black colour showing starch is present

(c) Which of the leaves, **A** to **E**, matches the result you would obtain after testing leaf **X** and leaf **Y** for starch?

leaf **X** .....

leaf **Y** ..... [2]

7 A blood sample was spun under high-speed to analyse the contents of blood. Three distinct bands were obtained. **Fig. 7** shows the results.

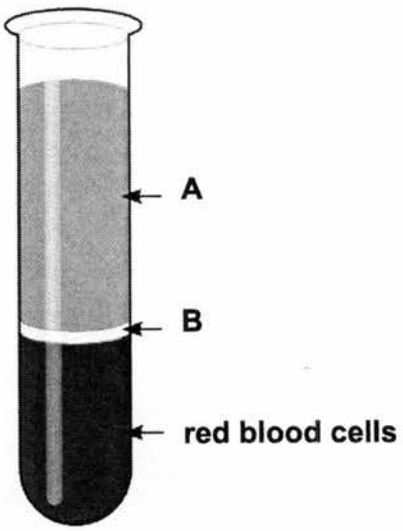


Fig. 7

(a) Identify which blood component(s) is/ are represented by

A .....

B ..... [2]

(b) Why are the red blood cells found in the bottom of the test tube as compared to the other blood components?

..... [1]

(c) Give one example of waste product found in band **A**.

..... [1]

(d) Describe **two** features of red blood cells that enable them to transport oxygen around the body efficiently.

.....

.....

.....

.....

Section C: Long Structured Questions (30 marks)
Answer **all** the questions and show all workings clearly in the spaces provided.

1 **Fig. 1** shows a graph that illustrates how the thickness of Mrs Filipe's uterine lining changes over the month of July. She noted that her menstruation started on 7th July.

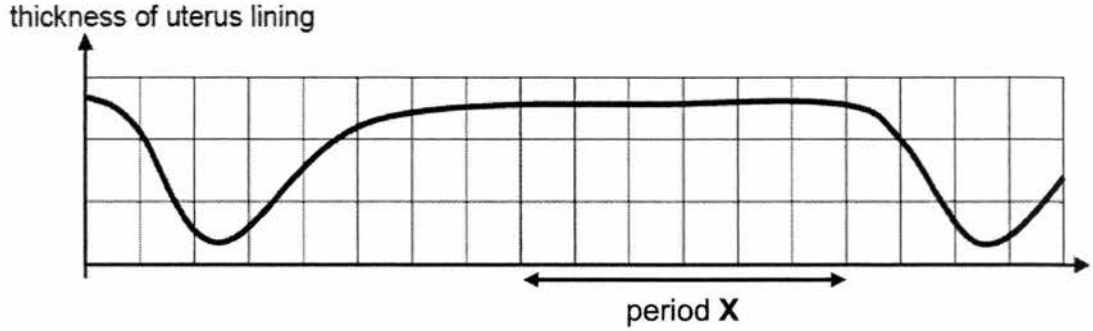


Fig. 1

(a) **(i)** Define 'ovulation'.

.....

..... [2]

(ii) State the date in July when ovulation is expected.

..... [1]

(iii) Name a birth control method that prevents ovulation.

..... [1]

(b) From **Fig. 1**, determine if Mrs Filipe is pregnant. Give an evidence to support your answer

.....

.....

..... [2]

(c) **Fig. 1.2** shows the front cross-section view of the female reproductive system.

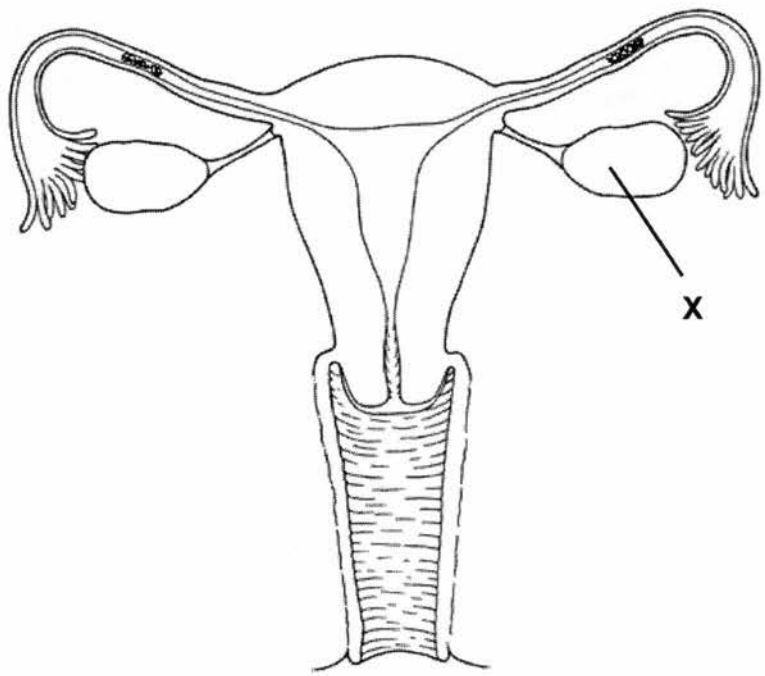


Fig. 1.2

(i) Describe the function of structure **X**.

..... [1]

(ii) On **Fig. 1.2**, label with a 'Y' where sperms is deposited. [1]

(iii) Using evidence from Fig. **1.2**, suggest why this woman is infertile.

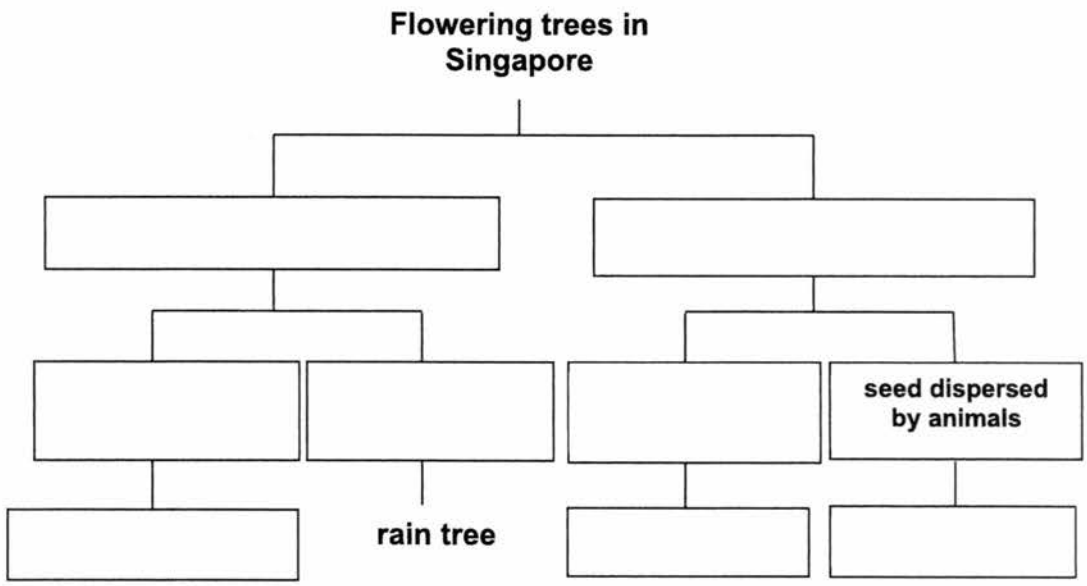
.....

..... [2]

2 (a) Varun was given the following information about four common trees found in Singapore and was asked to organise the plants using a dichotomous key.

The rain tree is a flowering tree with an umbrella-shaped crown and its seeds are dispersed by animals. The trumpet tree is a flowering tree with a conical crown and the seeds are dispersed by splitting. The tembusu tree is a flowering tree with a conical crown and the seeds are dispersed by animals. The saga tree is a flowering tree with an umbrella-shaped crown and its seeds are dispersed by splitting.

Using the information given, complete the dichotomous key to classify the trees correctly.



[4]

(b) What is a dichotomous key?

.....

..... [2]

(c) List two characteristics of amphibians.

.....

..... [2]

(d) What are the two similarities between a reptile and amphibian?

.....

..... [2]

3 **Fig. 3.1** shows an Arctic ecosystem.

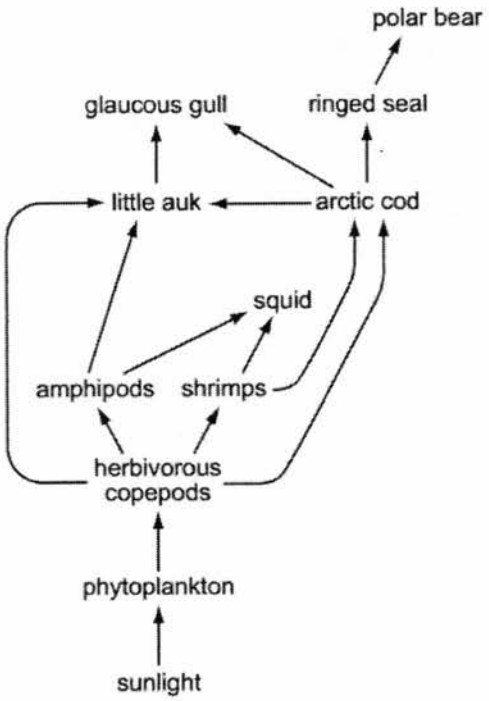


Fig. 3.1

(a) What is an ecosystem?

..... [2]

(b) Using information from **Fig. 3.1**, write down a food chain that ends with polar bear.

..... [1]

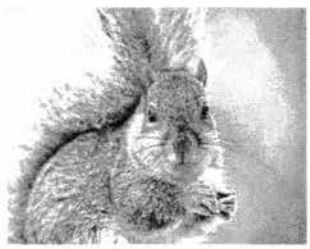
(c) The Arctic experiences 24-hour sunlight for six months and 24-hour darkness for another six months in a one-year cycle.
Explain why the polar bear goes into hibernation during the six months of darkness. Use food chain in **(b)** to support your explanation.

.....

.....

..... [2]

(d) Grey squirrels which feed on seeds and grass are introduced into the community. The introduction of the grey squirrels may cause problems for the existing wildlife.



Describe two ways in which an introduced species may harm the existing wildlife.

.....

.....

.....

..... [2]

(e) The photograph below shows an *Anolis carolinensis* lizard (anolis lizard). This lizard lives on a tiny island. Scientists studied how the length of leg of the anolis lizard affected their survival. At the start of the study, the *anolis* lizards had a large range of leg lengths.

The scientists placed six *Leiocephalus carinatus* lizards (curly-tailed lizard) as an *alien species*. After one year the population of *anolis* lizards decreased by half and nearly all the remaining *anolis* lizards had long legs.

(i) Suggest what is meant by the term *alien species*.

.....

..... [1]

(ii) State the relationship between the anolis lizard and the curly-tailed lizard.

..... [1]

(iii) Explain the decrease in population of anolis lizards.

.....

..... [1]

-END OF BOOKL

ASSUMPTION ENGLISH SCHOOL
Sec 1 Express Science
EOY 2017

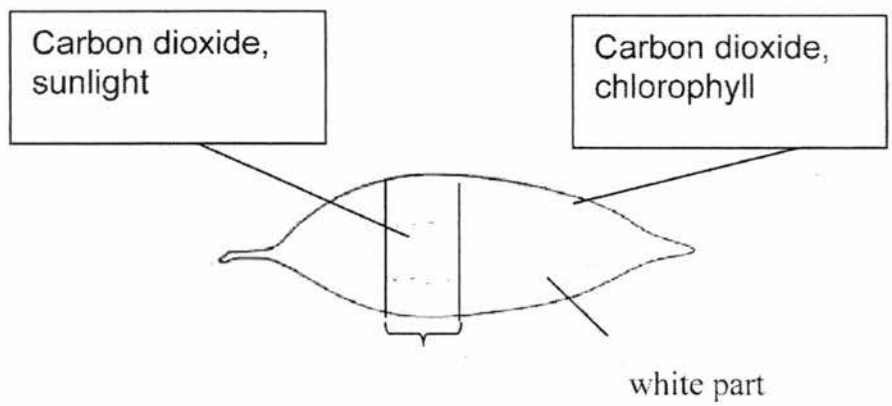
Section A (30 m)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
A	B	B	A	D	B	D	C	C	C
Q11	**Q12**	**Q13**	**Q14**	**Q15**	**Q16**	**Q17**	**Q18**	**Q19**	**Q20**
A	B	B	C	A	B	A	B	C	C
Q21	**Q22**	**Q23**	**Q24**	**Q25**	**Q26**	**Q27**	**Q28**	**Q29**	**Q30**
C	B	A	B	A	B	A	B	B	C

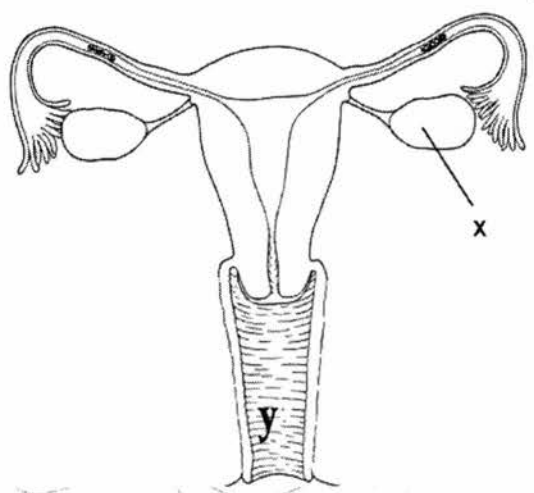
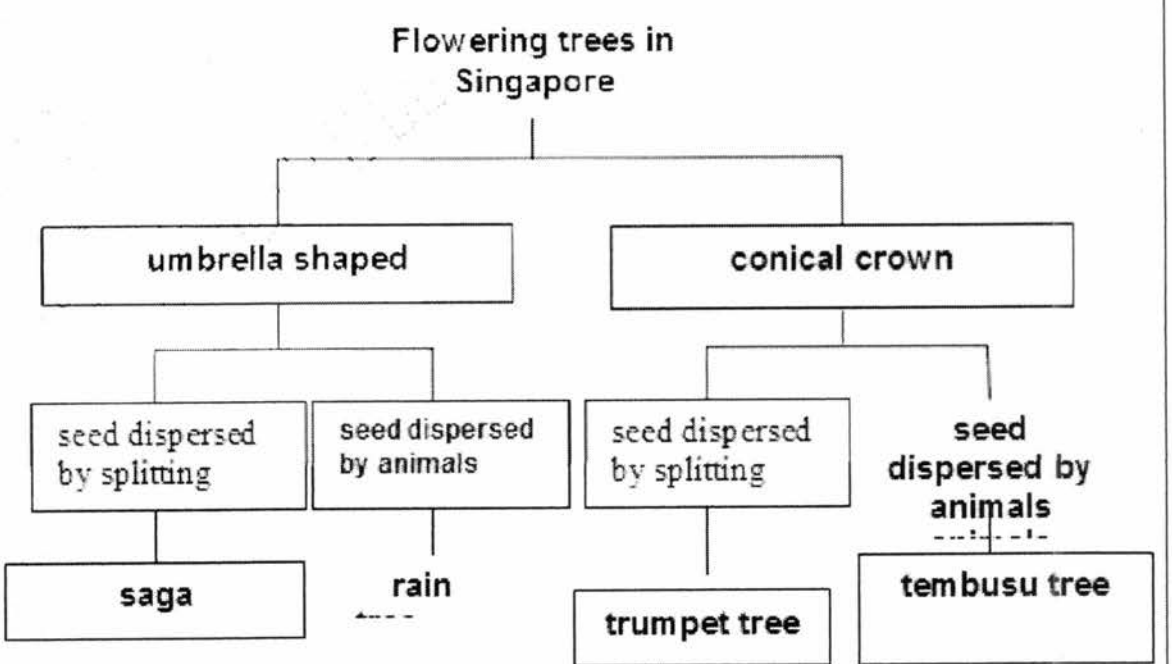
Section A

1	**a**	Coffee powder dissolves faster than coffee beans. Or Coffee of smaller size will dissolve faster. Or Coffee of larger surface area will dissolve faster.	1 Hypothesis is a smart guess of the results before doing the experiment
	b	Independent: Size of coffee beans Reject type Dependent: Time taken to dissolve completely Reject rate, speed Controlled: rate of stirring, temperature of water, volume of water, mass of coffee [any 2] Reject: amount	1 1 2
2	**a**	Hardness is the ability to scratch another material.	1
	b	5 or 6. [any 1] It is harder than fluorite but softer than quartz.	1 1
3	**a**	A : cytoplasm B : cell membrane / cell wall	1 1

	b	1. Typical animal cell has a nucleus which contains the chromosomes while the bacterial cell has chromosome in the cytoplasm (not in the nucleus) 2. Tiny vacuoles are present in a typical animal cell but absent in bacterial cell. 3. Flagellum is present in bacterial cell but absent in a typical animal cell. 4. Typical animal cell have no cell wall but the bacterial cell does. Any 2 correct	2
	c	To allow the bacterial cell to move from one place to another/swim/ be mobile	1
4	**a**	Osmosis	1
	bi	<table><tr><th>sugar solution</th><th>potato discs</th></tr><tr><td>highest concentration</td><td>**A**</td></tr><tr><td>lowest concentration</td><td>**C**</td></tr></table>	1 1
	bii	The water potential of cell sap of potato disc A is higher than the sugar solution in the surrounding. Hence water molecules move from the cell sap of potato disc A to the sugar solution by osmosis. The potato disc A becomes flaccid due to water loss and thus loss in mass.	1 1 1
5	**a**	enzyme protease digests / breaks down proteins in the egg white to simple proteins	1 1
	b	40 ° C	1
	c	Enzyme proteases were affected at higher temperature and lose its function	1 1
	d	Enzyme proteases work best in an acidic environment.	1

6	**a**	water + carbon dioxide $\xrightarrow[\text{chlorophyll}]{\text{light}}$ glucose + oxygen	1 m: correct raw materials & products; 1 m: correct conditions
	6b		3
	c	leaf X: A leaf Y: C	1 1
7	**a**	A: plasma B: white blood cells	1 1
	b	The red blood cells have <u>higher density</u> than the other blood components.	1
	c	carbon dioxide	1
	d	• <u>biconcave</u>[1]; to <u>increase surface area to volume ratio</u> [1] or • <u>absence of nucleus</u>; more space to pack more haemoglobin or • <u>contains haemoglobin</u>: to bind to oxygen molecules Any 2	2

Section C (30 m)

1	a i	Release (rej: discharge) of a mature egg; from ovary into oviduct	1 1
	a ii	20 July	1
	a iii	Contraceptive/ birth control pills	1
	b	No; The thickness of the uterine lining starts to decrease again/ menstruation happens after period X.	1 1
	c i	produces eggs	1
	c ii		1
	ciii	blockage in oviducts/ fallopian tube; sperm is unable to meet the egg to fertilise it.	1 1
2	a	 each correct cluster answered =1	4

	b	A dichotomous key shows how organisms are classified according to their similarities and differences	1 1
	d	- Lay eggs usually in jelly-like mass in water - breathe with Lungs, gills, and/or their skin - have four legs without claws or nails on toes - are cold-blooded Any 2 List features special for amphibians	2
	e	They both lay eggs, breathe with lungs and are cold- blooded. Any 2 Don't list features that include other mammals	2
3	a	An ecosystem consists of • different communities of organisms interacting with one another • and their physical / surrounding environment.	 1 1
	b	• phytoplankton → herbivorous copepods → arctic cod → ringed seal → polar bear OR • phytoplankton → herbivorous copepods → shrimp → arctic cod → ringed seal → polar bear	1
	c	In the absence of light, phytoplanktons cannot photosynthesize / make food Other consumers down the food chains decrease in population. The bears hibernate to conserve energy until sunlight returns to the Arctic. Reject: cannot find food because the polar bear cannot see	1 1
	d	Any 2: - Deplete and decrease the population of producers - Compete for source of food with other primary consumers, decreasing their population - Carry diseases that may kill other wildlife State effect on other populations	2
	ei	Non-native / invasive species being introduced to the island.	1
	eii	Predator-prey relationship	1
	eiii	Any of the following: - Long legs of Anolis lizards can run away from the Curly-tailed lizards. - Short legs of Anolis lizard failed to escape and is consumed by the Curly-tailed lizard.	1