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Geylang Methodist School (Secondary) End-of-Year Examination 2016

Candidate
Name

Class

Index Number

LOWER SECONDARY SCIENCE

Sec 2 Express

Additional materials : Optical Answer Sheet

2 hour

Setter : Miss Ng Sio Ying, Miss Yvonee Chew

10 October 2016

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

Write your name, class and register number on the answer sheet in the spaces provided.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A

There are **20** questions in this section. Answer **all** questions. For each question, there are four possible answers, **A, B, C** or **D**. Choose the one you consider to be correct and record your choice in **soft pencil** on the Optical Answer Sheet provided.

Section B

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

Section C

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

Question **29** is in the form of either/or and only **one** of the alternatives should be attempted.

At the end of the examination, hand in your answer sheet to Section **A** separately from the Question paper.

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

A copy of the Periodic Table is printed on page 27.

For Examiner's Use	
Section A	/20
Section B	/50
Section C	/30
Total	/100

This document consists of **26** printed pages and **2** blank pages.

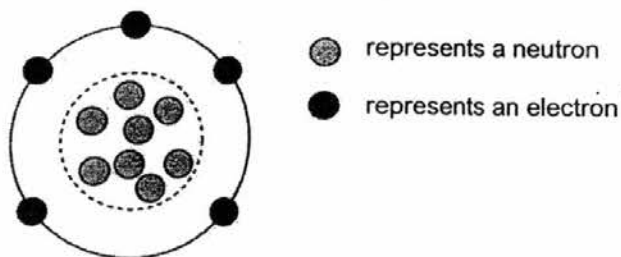
Section A

- 1 The table shows the electrical charge of electrons, protons and neutrons.

Which of the following charges is correct?

	electron	proton	neutron
A	positive	negative	neutral
B	negative	positive	positive
C	negative	positive	neutral
D	neutral	negative	positive

- 2 The diagram below shows an atom X. The symbol for X is _____.



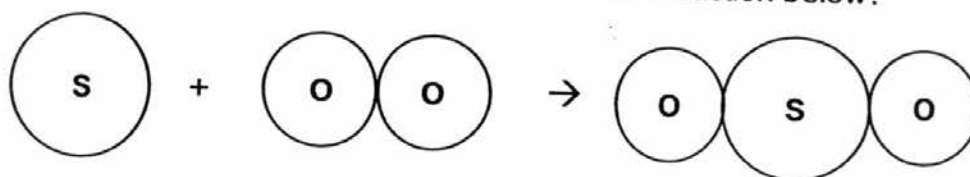
- A ${}^8_5\text{X}$
 B ${}^{13}_5\text{X}$
 C ${}^5_{13}\text{X}$
 D ${}^{13}_8\text{X}$

- 3 Calcium aspirin is a drug that is used to treat pain, and reduce fever and inflammation. The formula of calcium aspirin is $\text{Ca}(\text{OOCCH}_6\text{H}_4\text{OCOCH}_3)_2$. It can also be represented as $\text{C}_w\text{H}_x\text{Ca}_y\text{O}_z$.

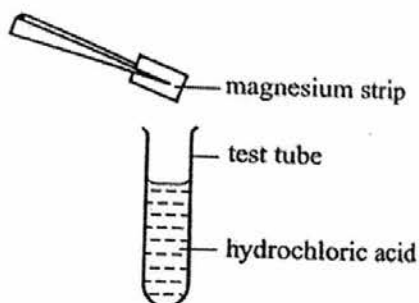
What are the values of w, x, y and z?

	w	x	y	z
A	9	7	0	4
B	9	7	1	4
C	18	14	2	8
D	18	14	1	8

- 4 Which of the statements best describe the chemical reaction below?



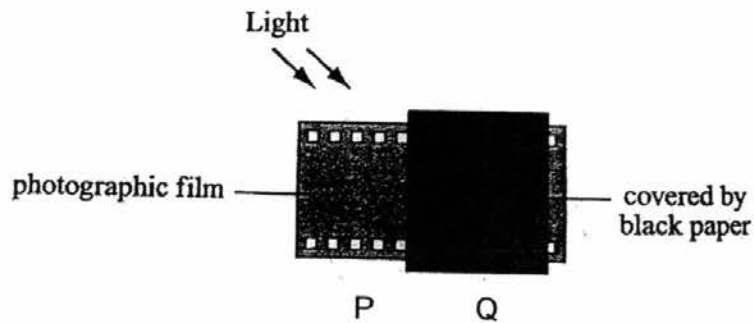
- I Sulfur burns in oxygen to form sulfur dioxide.
II Sulfur is a reactant and oxygen is the product.
III No atoms are created or destroyed in this reaction.
- A I and II only
B I and III only
C II and III only
D All of the above
- 5 The diagram below shows a magnesium strip being added into a test tube of hydrochloric acid. Effervescence is observed.



What is/are the characteristic(s) of the gas produced?

- (i) It can turn damp blue litmus paper red.
(ii) It can extinguish a lighted splint with a pop sound.
(iii) It can form white precipitate in limewater.
(iv) It tastes sour.
- A (ii) only
B (i) and (iii) only
C (iii) and (iv) only
D (i), (ii) and (iii) only

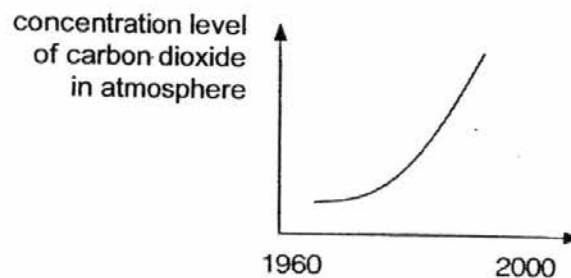
- 6 The diagram below shows a photographic film.



Light is shone on the photographic film for thirty minutes. Portion Q of the photographic film is covered by a piece of black paper.

Which of the following processes does portion P most likely undergo?

- A Sublimation
 - B Evaporation
 - C Combination
 - D Decomposition
- 7 The graph shows the concentration of carbon dioxide in the air over the past 40 years.



Which of the following does **not** contribute to the rise in the carbon dioxide concentration?

- A an increase in the number of vehicles on the road
- B an increase in the amount of activity in the power stations
- C an increase in the rate of deforestation
- D an increase in the usage of hydroelectric cars

- 8 Which of the following describes the possible effect(s) of introducing a new carnivorous species into the environment?

- (i) Increased competition for food.
- (ii) Decrease in population of prey.
- (iii) Decrease in rainfall.
- (iv) Introduction of new disease.

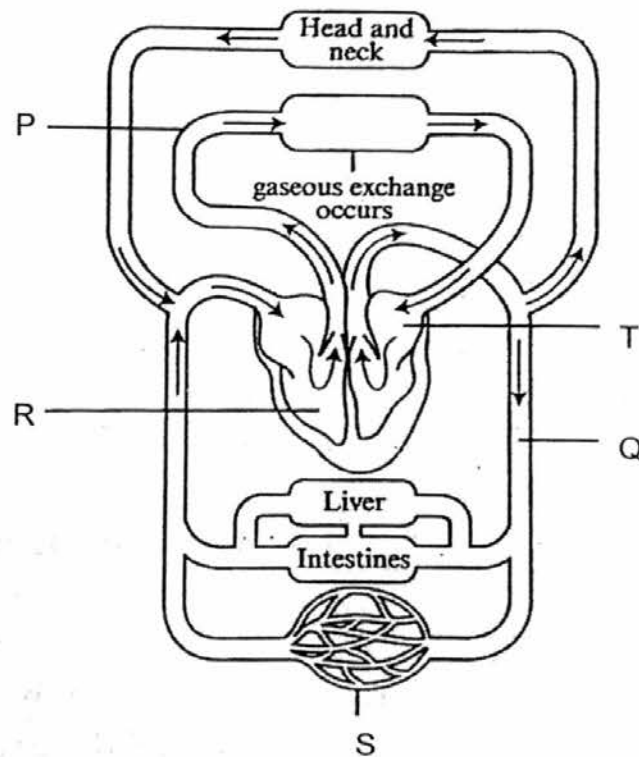
- A (i) only
- B (i) and (iii) only
- C (iii) and (iv) only
- D (i), (ii) and (iv) only

- 9 The organisms found in nature provide valuable resources to humans.

Which of the following incorrectly matches the type of resources provided by each organism?

	organism	resource
A	teak	wood
B	<i>Penicillin notatum</i>	antibiotics
C	cinnamon	spices
D	panda	medicine

The diagram below shows the circulatory system in humans.
Refer to the diagram and answer questions 10 and 11.



- 10 Which of the following shows the correct information about P, Q, R and S?

	P	Q	R	S
A	carries deoxygenated blood	carries oxygenated blood	carries deoxygenated blood	allows blood cells to pass through them easily
B	carries oxygenated blood	allows blood cells to pass through them easily	carries deoxygenated blood	carries deoxygenated blood
C	carries deoxygenated blood	carries deoxygenated blood	carries oxygenated blood	allows blood cells to pass through them easily
D	carries oxygenated blood	carries oxygenated blood	carries deoxygenated blood	allows blood cells to pass through them easily

- 11 Which of the following statement(s) is/are characteristic(s) of chamber T?
- (i) Oxygenated blood enters T through an artery.
 - (ii) T is situated on the right side of the heart.
 - (iii) The valve allows blood to flow from T to the atrium in only one direction.
 - (iv) The blood in T has a lower blood pressure than the blood in the left ventricle.

- A (i) and (iv) only
- B (i), (ii) and (iii) only
- C (i), (iii) and (iv) only
- D (iv) only

- 12 Generally, athletes have better blood circulation in their body systems.

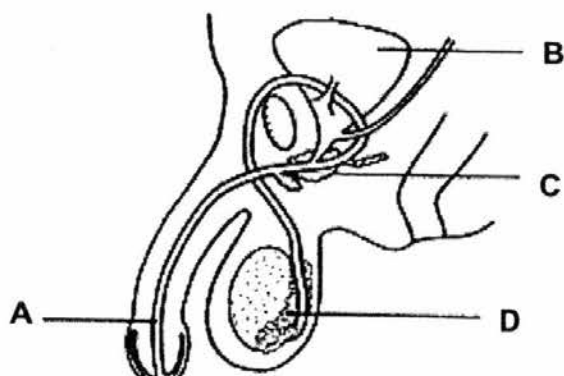
Which of the following statements best explains this?

- A Exercise makes their blood thinner and easier to circulate.
- B Exercise makes athletes breathe more, thus they produce more red blood cells.
- C Exercise makes the lumen wider, thus it is easier for the blood to circulate.
- D Exercise produces more muscles, which will help the vein to transport the blood back to the heart.

- 13 Which of the following is responsible for the physical and emotional changes experienced during puberty?

- A sex hormones produced by sex cells
- B sex hormones produced by sex organs
- C sex cells produced by sex organs
- D sex cells produced by sex hormones

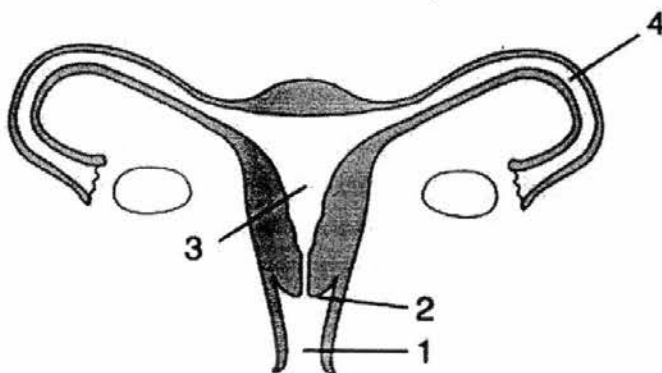
- 14 Which part of the male reproductive system is responsible for the storage and maturation of sperm cells?



- 15 If an organism has 38 chromosomes, how many chromosomes will there be in its sex cells and zygote?

	sperm	egg	zygote
A	38	38	38
B	19	19	38
C	38	19	19
D	19	38	19

- 16 The diagram shows a female reproductive system.



Which of the following has been matched to the descriptions correctly?

	site of sperm deposition	site of fertilization	site of foetus development
A	1	3	3
B	1	4	3
C	2	3	3
D	2	4	3

- 17 Method X is a contraceptive method which acts as physical barrier to prevent fertilization.

What is method X?

- A contraceptive pills
- B diaphragm
- C intrauterine device
- D spermicide

- 18 A minor surgery is required to perform vasectomy.

Which part of the reproductive system is cut and tied in this procedure?

- A oviduct
- B testes
- C sperm duct
- D urethra

- 19 A couple would like to have children only when they are more financially stable.

Which contraceptive method would be most suitable if the couple has decided that the male will use the birth control?

- A condom
- B contraceptive pills
- C diaphragm
- D vasectomy

- 20 What type of sexually transmitted infections can be treated with antibiotics?

- A bacterial infection
- B fungal infection
- C viral infection
- D yeast infection

End of Section A

Section BWrite **all** your answers in the spaces provided.

- 21** Table 21.1 contains some information of six atoms, **K**, **L**, **M**, **N**, **O** and **P**. These are not symbols of the elements.

(a) Complete Table 21.1.

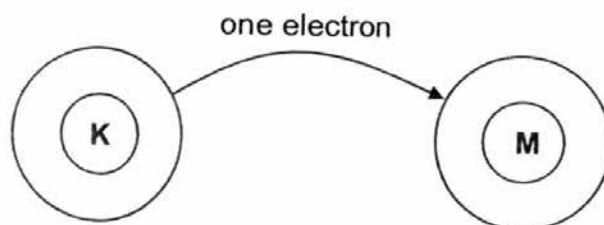
Table 21.1

atom	mass number	number of	
		protons	neutrons
K	23	11	
L	40	18	
M		9	10
N		6	7
O	14		8
P	16		8

(b) Which of the atom(s), **K – P**, [3]

- (i) is a metal atom?
- (ii) is an atom from Group 0 in the Periodic Table?
- (iii) exist as diatomic molecules? [3]

(c) During a chemical reaction, atom **K** loses one electron to atom **M** as shown in Fig. 21.2.

**Fig. 21.2**

Give the symbols of the ions formed by **K** and **M**.

ion formed by **K**

ion formed by **M** [2]

- 22 Fig. 22.1 shows an apparatus that is used to pass electricity through acidified water.

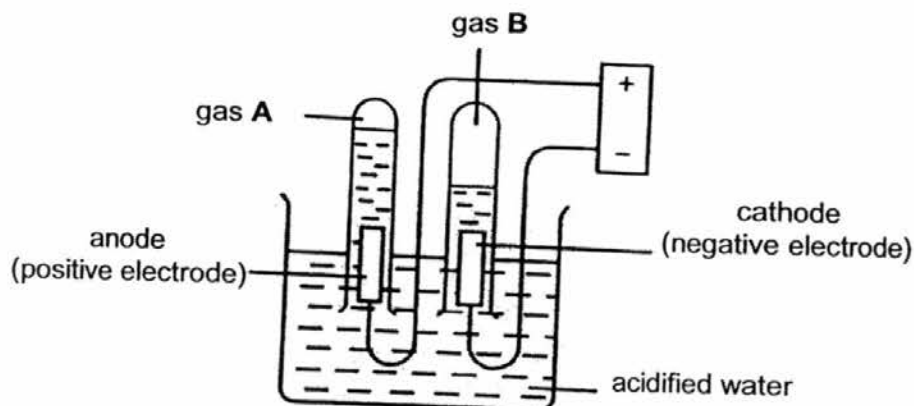


Fig. 22.1

- (a) Name gas A.
..... [1]
- (b) Name gas B.
..... [1]
- (c) What type of reaction does the above show? Give a reason for your answer.
.....
.....
.....
..... [2]
- (d) Write the word equation for the above reaction.
..... [1]

- 23 In Table 23.1, describe 3 differences between physical and chemical reactions.

Table 23.1

physical reactions	chemical reactions

[3]

- 24 Human activities often disturb the natural habitats of organisms and affect the survival of the natural population of organisms.

- (a) Describe two threats to biodiversity that are results of human activities.

.....

.....

.....

.....

.....

..... [2]

- (b) Conserving wildlife and their natural habitat helps to maintain biodiversity.
State two ways to help preserve biodiversity on earth.

.....

.....

.....

..... [2]

- 25 The amount of blood supplied to different parts of the body is dependent on the type of activities performed by the body. Fig. 25.1 shows the volume of blood pumped per minute to different parts of the body during different activities. Make use of the information and answer the following questions.

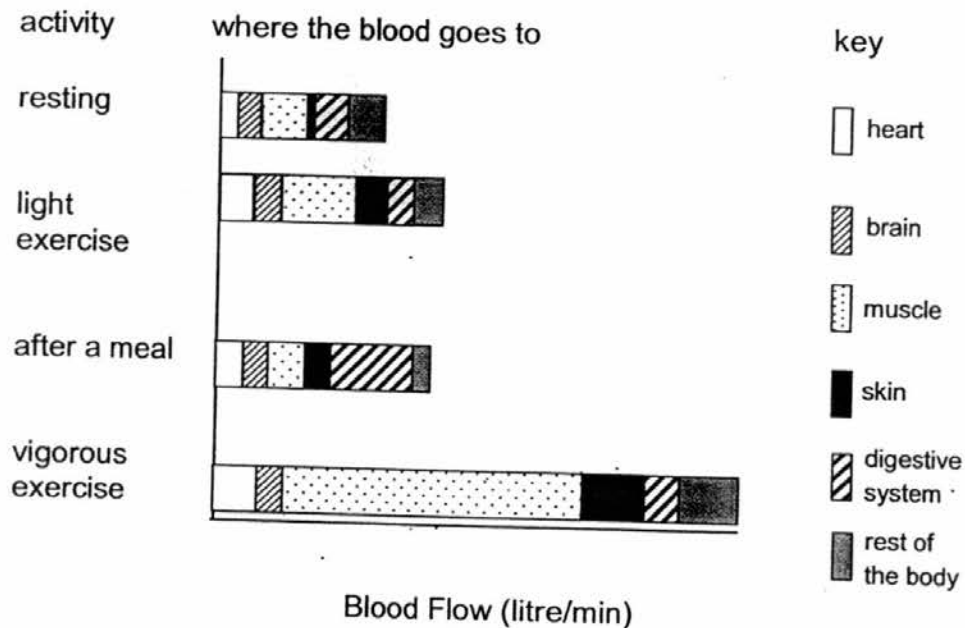


Fig. 25.1

- (a) Which part receive almost the same amount of blood all the time?
 [1]
- (b) When does the digestive system receive most blood? Why?

 [2]
- (c) Which part of the body receives the most blood during exercise? Why?

 [2]
- (d) Suggest a reason why our skin looks red after exercise?

 [1]

- (e) Fig. 25.2 shows a blood capillary and a tissue cell.

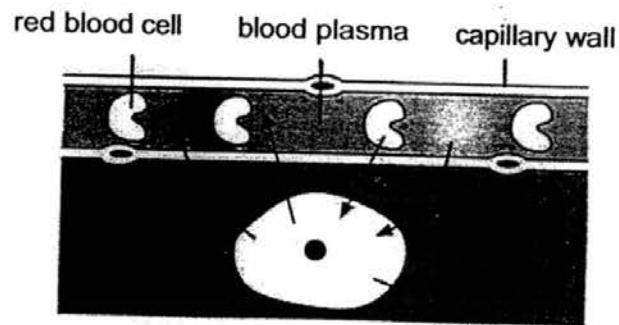


Fig. 25.2

- (i) Arrow **P** shows the movement of carbon dioxide. How is carbon dioxide formed by the cell?

.....
 [1]

- (ii) Name the substances that is represented by the arrows **Q**, **R** and **S**.

Q: [1]

R: [1]

S: [1]

- (iii) Describe and explain how blood protects our body.

.....

 [4]

- 26 Fig. 26.1 shows the calendar for the month of November.

November						
Mon	Tues	Wed	Thurs	Fri	Sat	Sun
	1	2	3	4	5*	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Fig. 26.1

A woman with a 28-day menstrual cycle is expected to ovulate on 5th November.

- (a) Describe what would take place in her reproductive system on the day of ovulation.
 [1]
- (b) Identify the fertile period of this woman.
 [1]
- (c) Explain why menstruation will cease if a woman is pregnant.

 [2]
- (d) If fertilization does not occur during this menstrual cycle, on which date would she expect to start menstruating again?
 [1]
- (e) Describe a method other than the rhythm method that can be used to prevent pregnancy naturally.

 [1]

- 27 Fig. 27.1 shows the male reproductive system.

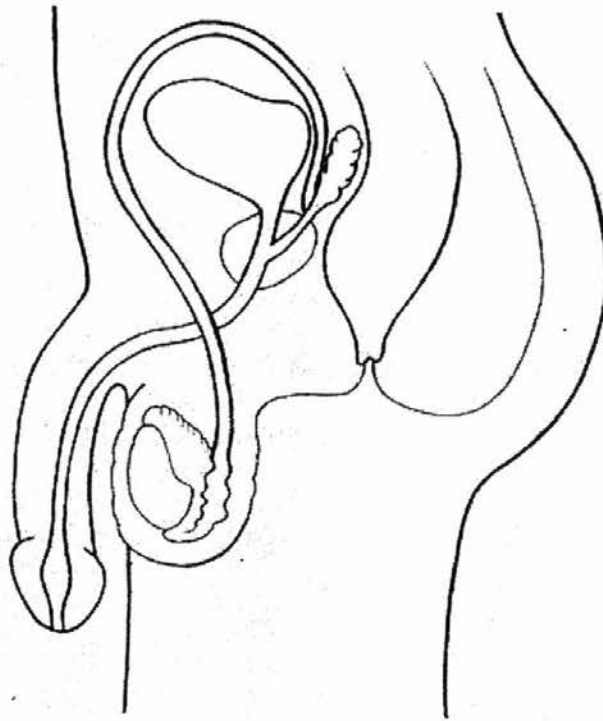


Fig. 27.1

- (a) Label the urethra, sperm duct and testis. [3]
- (b) State the function of the scrotum.

..... [1]

- (c) Suggest a reason why a man's sperm count may be affected when he uses his laptop on his lap for a prolonged period of time.

..... [1]

- 28 Fig. 28.1 shows a graph on the reported number of acquired immune deficiency syndrome (AIDS) cases in Singapore between 2000 and 2013.

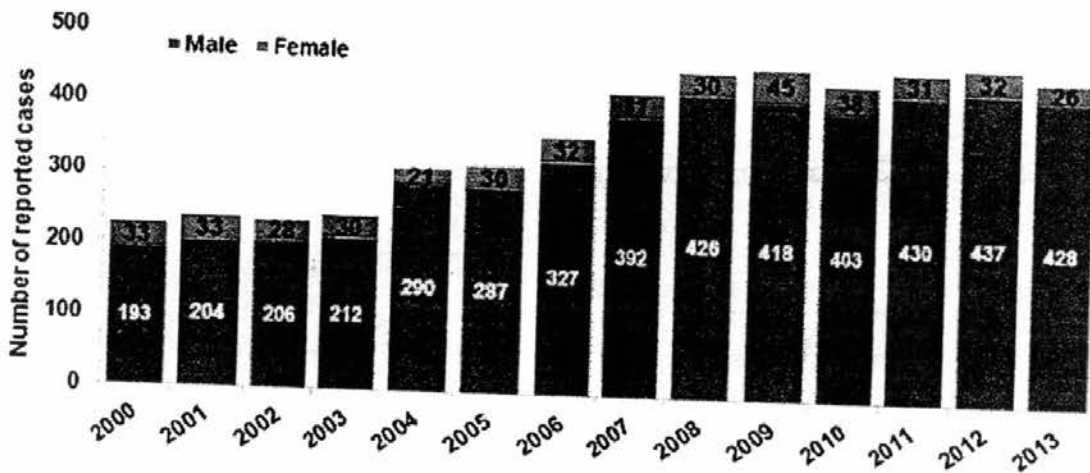


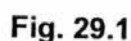
Fig. 28.1

- (a) Why is AIDS known as the most dangerous sexually transmitted infection?
-
-
-
- [2]
- (b) Suggest two reasons why there are more cases of AIDS reported in males than females.
-
-
-
-
-
- [2]
- (c) Why is it important for pregnant women who have been exposed to AIDS to get tested for the disease?
-
- [1]

End of Section B

Answer all **three** questions in the spaces provided.
Question **29** is in the form of either/or and only **one** of the alternatives should be attempted.

29 (a) Fig 29.1 shows the two different molecules **X** and **Y**.



- (i) Write down the chemical formula of the molecule Y.
- [1]
- (ii) From Fig. 29.1, which molecule is a molecule of a compound?
Explain your answer.
-
-
- [2]
- (iii) State the total number of protons in the molecule X.
- [1]
- (iv) In the space below, draw a diagram to represent a molecule of carbon monoxide.
- [1]

- (b) Fig. 29.2 shows a burning candle.

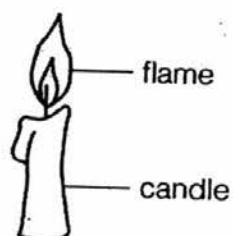


Fig. 29.2

- (i) State and describe the physical and chemical reactions that take place when a candle burns.

Physical:

.....

.....

..... [2]

Chemical:

.....

.....

..... [2]

- (ii) Complete the following word equation for the above reaction.

wax + $\rightarrow$ + [1]

[Total: 10 marks]

OR

- 29 (a) The chemical formula of butane and sulfur are given below.

C_2H_6
butane

S_8
sulfur

- (i) State one similarity and one difference between the molecules of the substances above.

Similarity

.....

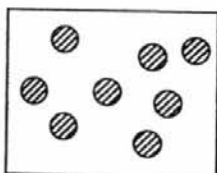
.....

Difference

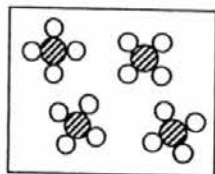
.....

..... [2]

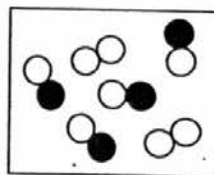
- (b) In the diagrams below, X: $\bigcirc$, Y: $\bullet$ and Z: $\otimes$ represent the different atoms of three different elements.



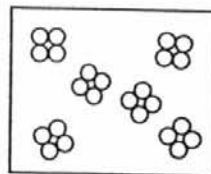
A



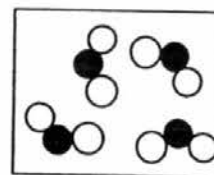
B



C



D



E

- (i) Choose the diagram (A to E) which best represents

an element made up of atoms

a compound made up of two elements

[2]

- (ii) Give the chemical formula of the compound in (i).

..... [1]

- (b) Three students **X**, **Y** and **Z** were each given two test tubes filled with colourless liquids. One test tube contained a mild acid and the other test tube contained a mild alkali. They were asked to find out which test tube contained the acid and which contained the alkali.

Student **X** decided to taste the liquids, student **Y** decided to feel the liquids using the tips of his fingertips and student **Z** decided to test the liquids using litmus paper.

- (i) How could the students differentiate between the acid and the alkali using the methods they chose?

Student **X**:
.....
..... [1]

Student **Y**:
.....
..... [1]

Student **Z**:
.....
..... [1]

- (ii) Name and describe one other method that can be used to differentiate between the acid and alkali.

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

[Total: 10 marks]

- 30 Fig. 30.1 below shows the blood samples of a healthy person X and a patient Y.

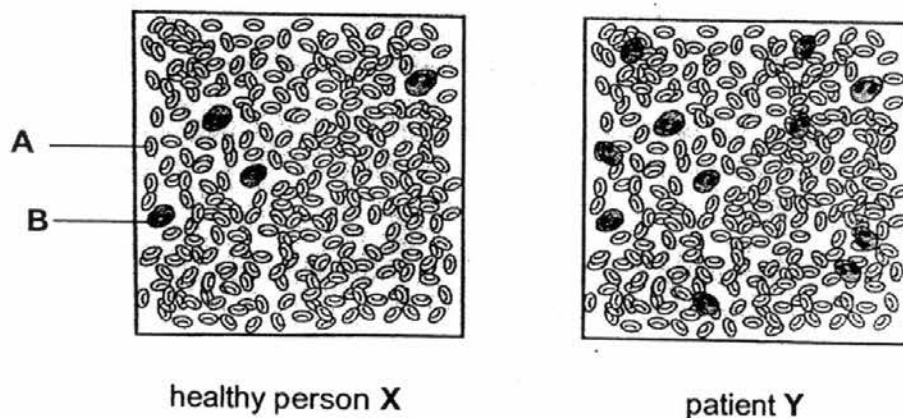


Fig. 30.1

- (a) Compare and contrast the blood samples of X and Y.

.....

.....

..... [2]

- (b) Suggest a possible cause for the difference in blood sample Y.

.....

..... [1]

- (c) Describe three structural differences between cell A and B.

Difference 1:

.....

.....

Difference 2:

.....

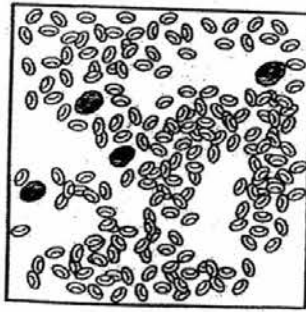
.....

Difference 3:

.....

..... [3]

- (d) Fig. 30.2 shows the blood sample of another patient Z.



patient Z

Fig. 30.2

- (i) State one difference between the blood samples of X and Z.

 [1]
- (ii) What symptom do you think patient Z will be having?

 [1]
- (iii) Explain your answer in (e)(ii).

 [2]

[Total: 10 marks]

[4]

..... [1]

..... [1]

- (ii) The girl stopped menstruating and began to take laxative pills, a type of medication that increases bowel movement, to remove her developing baby. However, her belly continues to grow.

Suggest why taking laxative pills was not effective in removing the developing baby.

.....

.....

.....

..... [1]

- (iii) The girl finally confided in her parents and a surgery was arranged. Part of the surgical procedure is shown in Fig. 31.1.

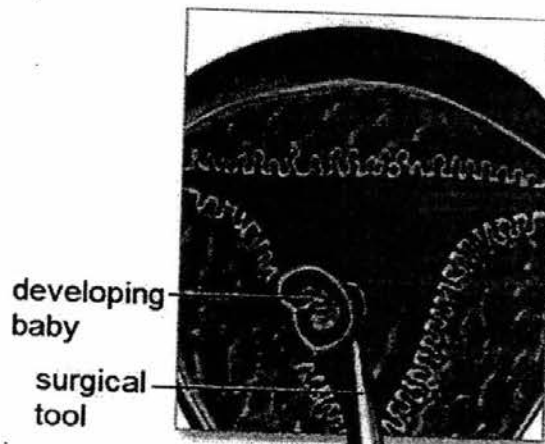


Fig. 31.1

Identify the procedure and suggest two possible medical risks associated with it.

.....

.....

.....

.....

.....

.....

..... [3]

End of Paper

[Total: 10 marks]

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Geylang Methodist School (Secondary) End-of-Year Examination 2016

Candidate
Name

ANSWERS

Class

Index Number

LOWER SECONDARY SCIENCE

Sec 2 Express

Additional materials : Optical Answer Sheet
Writing Paper

2 hour

Setter : Miss Ng Sio Ying, Miss Yvonee Chew

5 October 2016

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

Section C

Answer all **three** questions. The first question is in the form either/or.
Write your answers on the writing papers provided.
Start each question on a **new** page of writing paper.

At the end of the examination, hand in your answer sheet to Section **A** separately.
Tie the writing papers to Section **C** separately from the question paper.
Sections **B** and **C** will be handed in separately.

A copy of the Periodic Table is printed on page 27.

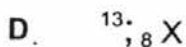
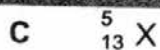
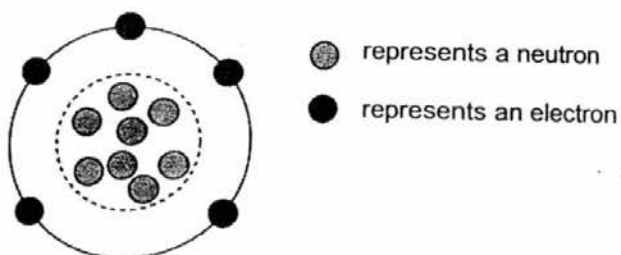
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Section A	/20
Section B	/50
Section C	/30
Total	/100

This document consists of **27** printed pages and **1** blank page.

- 1 The table shows the electrical charge of electrons, protons and neutrons. Which of the following charges is correct?

	electron	proton	neutron
A	positive	negative	neutral
B	negative	positive	positive
C	negative	positive	neutral
D	neutral	negative	positive

- 4 The diagram below shows an atom X. The symbol for X is _____.

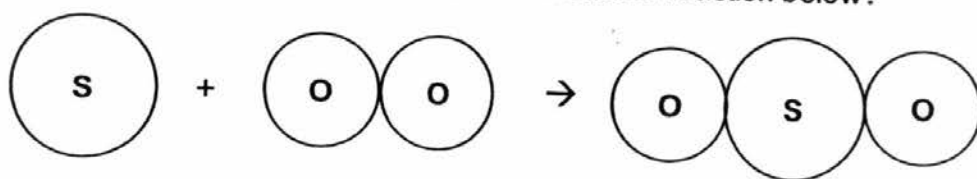


- 3 Calcium aspirin is a drug that is used to treat pain, and reduce fever of inflammation. The formula of calcium aspirin is $\text{Ca}(\text{OOC}_6\text{H}_4\text{OCOCH}_3)_2$. It can also be represented as $\text{C}_w\text{H}_x\text{Ca}_y\text{O}_z$.

What are the values of w, x, y and z?

	w	x	y	z
A	9	7	0	4
B	9	7	1	4
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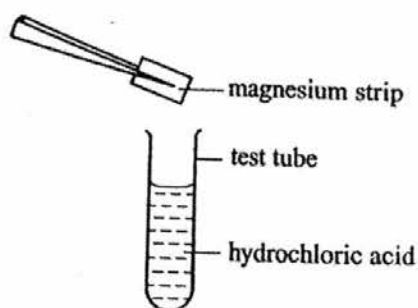
- 4 Which of the statements best describe the chemical reaction below?



- I Sulfur burns in oxygen to form sulfur dioxide.
- II Sulfur is a reactant and oxygen is the product.
- III No atoms are created or destroyed in this reaction.

- A I and II only
- B I and III only
- C II and III only
- D All of the above

- 5 The diagram below shows a magnesium strip being added into a test tube of hydrochloric acid. Effervescence is observed.

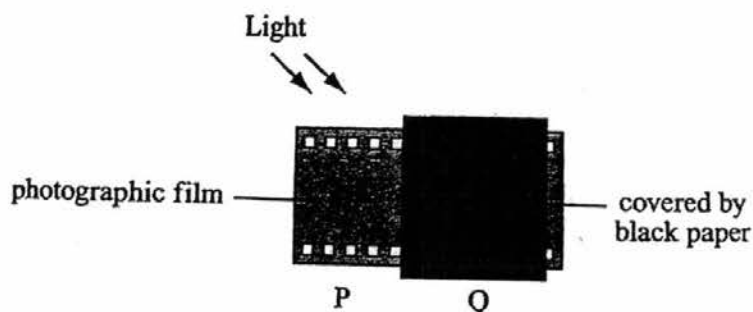


What is/are the characteristic(s) of the gas produced?

- (i) It can turn damp blue litmus paper red.
- (ii) It can extinguish a lighted splint with a pop sound.
- (iii) It can form white precipitate in limewater.
- (iv) It tastes sour.

- A (ii) only
- B (i) and (iii) only
- C (iii) and (iv) only
- D (i), (ii) and (iii) only

- 6 The diagram below shows a photographic film.

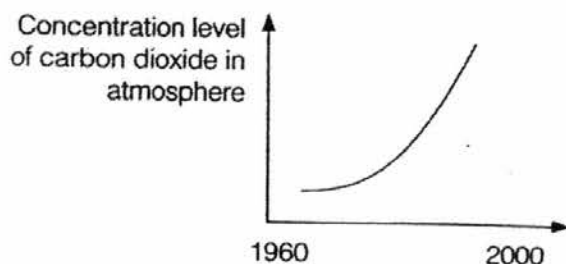


Light is shown on the photographic film for thirty minutes. Portion Q of the photographic film is covered by a piece of black paper.

Which of the following processes does portion P most likely undergo?

- A Sublimation
- B Evaporation
- C Combination
- D Decomposition

- 7 The graph shows the concentration of carbon dioxide in the air over the past 40 years.



Which of the following does **not** contribute to the rise in the carbon dioxide concentration?

- A an increase in the number of vehicles on the road
- B an increase in the amount of activity in the power stations
- C an increase in the rate of deforestation
- D an increase in the usage of hydroelectric cars

- 8 Which of the following describes the effect of introducing a new species into the environment?

- (i) Increased competition for food.
- (ii) Decrease in population of prey.
- (iii) Decrease in rainfall.
- (iv) Introduction of new disease.

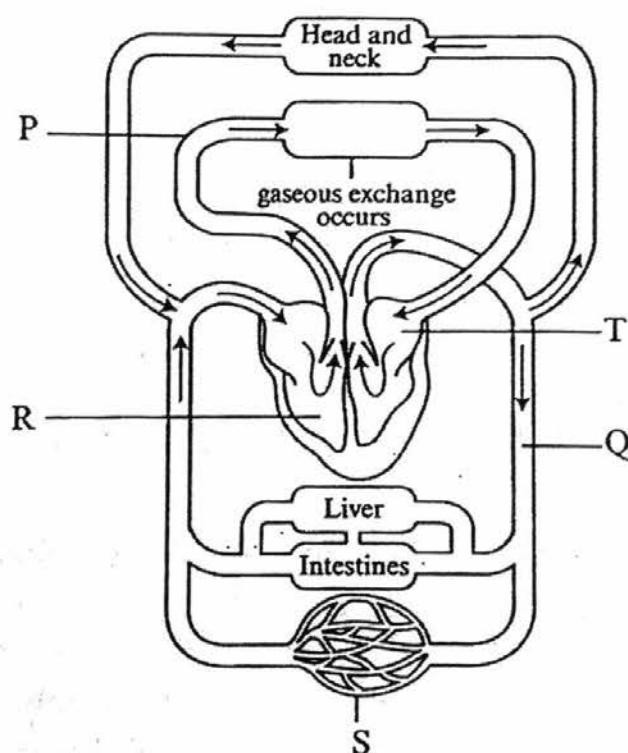
- A (i) only
- B (i) and (iii) only
- C (iii) and (iv) only
- D (i), (iii) and (iv) only

- 9 The organisms found in nature provide valuable resources to humans.

Which of the following correctly matches the type of resources provided by each organism?

	organism	resource
A	teak	wood
B	<i>Penicillin notatum</i>	antibiotics
C	cinnamon	spices
D	panda	medicine

The diagram below shows the circulatory system in humans. Refer to the diagram and answer questions 10 and 11.



- 10 Which of the following shows the correct information about P, Q, R and S?

	P	Q	R	S
A	carries deoxygenated blood	carries oxygenated blood	carries deoxygenated blood	allows blood cells to pass through them easily
B	carries oxygenated blood	allows blood cells to pass through them easily	carries deoxygenated blood	carries deoxygenated blood
C	carries deoxygenated blood	carries deoxygenated blood	carries oxygenated blood	allows blood cells to pass through them easily
D	carries oxygenated blood	carries oxygenated blood	carries deoxygenated blood	allows blood cells to pass through them easily

- 11 Which of the following statement(s) is/are characteristic(s) of chamber T?
- (i) oxygenated blood enters T through an artery.
 - (ii) T is situated on the right side of the heart.
 - (iii) The valve allows blood to flow from T to the atrium in only one direction.
 - (iv) The blood in T has a lower blood pressure than the blood in the left ventricle.

- A (i) and (iv) only
- B (i), (ii) and (iii) only
- C (i), (iii) and (iv) only
- D (iv) only

- 12 Generally, athletes have better blood circulation in their body systems.

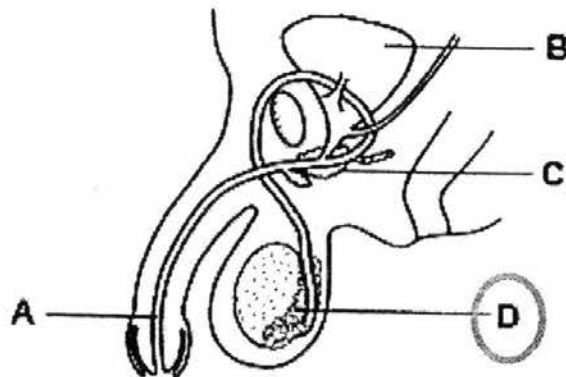
Which of the following statements best explains this?

- A Exercise makes their blood thinner and easier to circulate.
- B Exercise makes athletes breathe more, thus they produce more red blood cells.
- C Exercise makes the lumen wider, thus it is easier for the blood to circulate.
- D Exercise produces more muscles, which will help the vein to transport the blood back to the heart.

- 13 Which of the following is responsible for the physical and emotional changes experienced during puberty?

- A sex hormones produced by sex cells
- B sex hormones produced by sex organs
- C sex cells produced by sex organs
- D sex cells produced by sex hormones

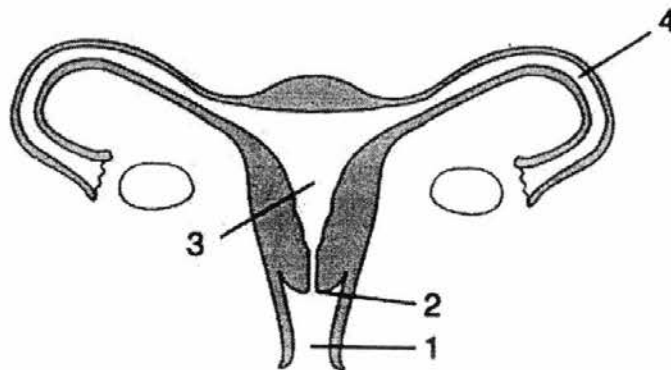
- 14 Which part of the male reproductive system is responsible for the storage and maturation of sperm cells?



- 15 If an organism has 38 chromosomes in most of its cells, how many chromosomes will there be in its sex cells and zygote?

	sperm	egg	zygote
A	38	38	38
B	19	19	38
C	38	19	19
D	19	38	19

- 16 The diagram shows a female reproductive system.



Which of the following has been matched to the descriptions correctly?

	site of sperm deposition	site of fertilization	site of foetus development
A	1	3	3
B	1	4	3
C	2	3	3
D	2	4	3

- 17 Method X is a contraceptive method which acts as physical barrier to prevent fertilization.

What is method X?

- A contraceptive pills
- B diaphragm**
- C intrauterine device
- D spermicide

- 18 A minor surgery is required to perform vasectomy.

Which part of the reproductive system is partially removed in this procedure?

- A oviduct
- B urethra
- C testes
- D sperm duct**

- 19 Which of the following is **not** a common sign of sexually transmitted infections?

- A burning pain during urination
- B discharge from the sex organs
- C rash around the whole body**
- D ulcers on the sex organs

- 20 What are the organisms known to cause sexually transmitted infections?

- 1 bacteria
- 2 mould
- 3 insects
- 4 viruses

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

Section B

Write all your answers in the spaces provided.

- 21 Table 21.1 contains some information of six atoms, K, L, M, N, O and P. These are not symbols of the elements.

(a) Complete Table 21.1.

Table 21.1

atom	mass number	number of	
		protons	neutrons
K	23	11	12
L	40	18	22
M	19	9	10
N	13	6	7
O	14	6	8
P	16	8	8

0-1 correct – 0 M; 2-3 correct – 1 M; 4-5 correct – 2 M; 6 correct – 3 M [3]

(b) Which of the atom(s), K – P,

(i) is a metal atom?

K

(ii) is an atom from Group 0 in the Periodic Table?

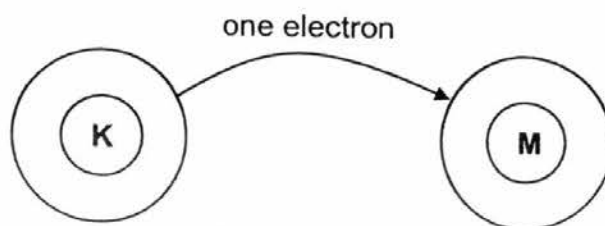
L

(iii) exist as diatomic molecules?

M or/and P

[3]

(c) During a chemical reaction, atom K loses one electron to atom M as shown in Fig. 21.2.

**Fig. 21.2**

Give the symbols of the ions formed by K and M.

ion formed by K **K⁺ / Na⁺ (reject K¹⁺)**

ion formed by M **M⁻ / F⁻ (reject M¹⁻)**

[2]

- 22 Fig. 22.1 shows an apparatus that is used to pass electricity through acidified water.

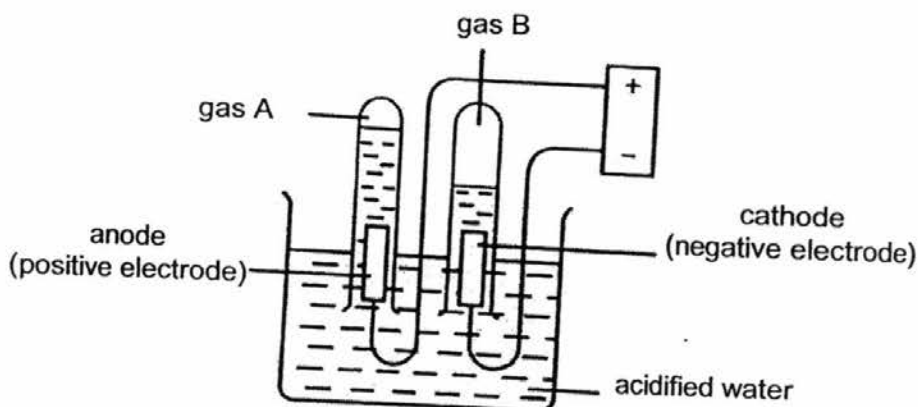


Fig. 22.1

- (a) Name gas A.
Oxygen gas [1]
- (b) Name gas B.
Hydrogen gas [1]
- (c) What type of reaction does the above show? Give a reason for your answer.
Decomposition/ Electrolysis. (REJECT chemical reaction)
Water is broken down into its elements / hydrogen and oxygen. [2]
(common answers not accepted: new substances formed / water is broken down into new substances / hydrogen and oxygen combines to form water)
- (d) Write the word equation for the above reaction.
Water → oxygen + hydrogen [1]
No marks for chemical equation

- 23 In Table 23.1, describe 3 differences between physical and chemical reactions.

Table 23.1

physical reactions	chemical reactions
Reactions are reversible (reject: temporary)	Reactions are (usually) irreversible (reject: permanent)
Do not involve formation of new substances	Involve formation of new substances
No heat or light taken in or given out	Heat or light <u>may</u> be taken in or given out. (reject heat and/or light will be taken in or given out)
Products formed have same properties/characteristics as reactants (reject: have same properties as reactants)	Products formed have different properties/characteristics as reactants (reject: have different properties as reactants)

[3]

- 24 Human activities often disturb the natural habitats of organisms and affect the survival of the natural population of organisation.

- (a) Describe two threats to biodiversity that are results of human activities.

- **Excessive hunting of animals for skin and meat cause them to become endangered.** (reject decrease in population)
- **Deforestation/clearing of land for industry, farming and housing cause habitats to be lost.**
- **Pollution causes changes in climates/ global warming and hence animals that cannot adapt will die.**
- **Introduction of new species into the environment causing spread of disease/competition of food**

Any two, accept other possible answers. No marks for simply stating the activity without further explanation (e.g. excessive hunting, deforestation)

[2]

- (b) Conserving wildlife and their natural habitat helps to main biodiversity. State two ways to help preserve biodiversity on earth.

- Volunteering with wildlife conservation organisations such as WWF
- Help to create awareness of importance of protect wildlife
- Stop introduction of non-native species into environment
- Stop releasing unwanted pets into the wild
- Limit usage of natural resources by recycling and reusing materials
- Reforestation to restore lost habitats/areas of deforestation

Any two, accept other possible answers. NO marks for point form answers that do not answer the question

e.g. reforestation, reduce reuse recycle, educate people

[2]

- 25 The amount of blood supplied to different parts of the body is dependent on the type of activities performed by the body. Fig. 25.1 shows the volume of blood pumped per minute to different parts of the body during different activities. Make use of the information and answer the following questions.

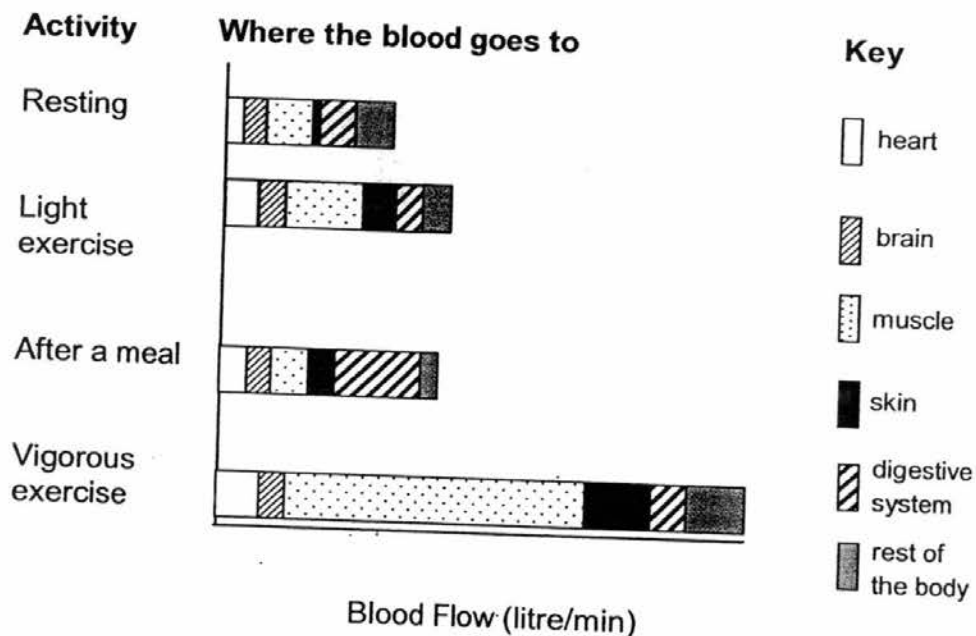
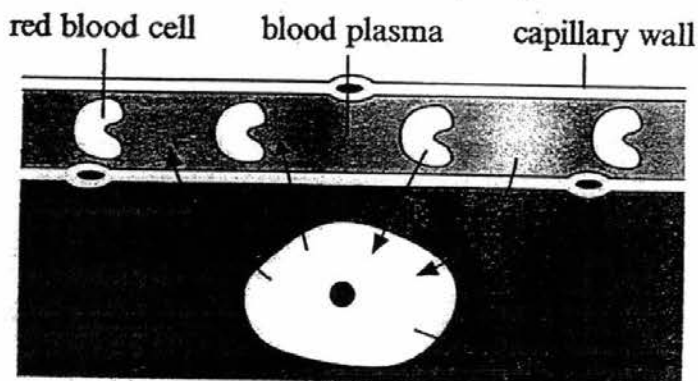


Fig. 25.1

- (a) Which part receive almost the same amount of blood all the time?
 brain [1]
- (b) When does the digestive system receive most blood? Why?
 After a meal
 For peristalsis to occur / for digestion of food / for transporting away digested nutrients
 (reject: needs blood to digest food) [2]
- (c) Which part of the body receives the most blood during exercise? Why?
 Muscles
 The muscles need oxygen to undergo respiration and produce energy. [2]
- (d) Suggest a reason as to why our skin looks red after exercise?
 There is increased/more/a lot of blood flow to our skin and blood is red in colour [1]

- (e) The diagram below shows a blood capillary and a tissue cell.



- (i) Arrow P shows the movement of carbon dioxide. How is carbon dioxide formed by the cell?

Cell undergoes respiration to which produce carbon dioxide [1]

- (ii) Name the substances that is represented by the arrows Q, R and S.

Q: waste substances/products, urea [1]

R: oxygen [1]

S: dissolved nutrients / glucose / amino acids
(Reject minerals) [1]

- (iii) Describe and explain how blood protects our body. [4]

Platelets are involved in blood clotting.

(reject platelets clot the blood.)

To reduce excessive loss of blood and prevent entry of microorganisms. (owtte)

**White blood cells engulf and digest foreign particles/bacteria
And produce antibodies which will kill foreign particles/bacteria**

(students not penalised if confused between phagocytes and lymphocytes or spelt wrongly)

- 26 Fig. 26.1 shows the calendar for the month of November.

November						
Mon	Tues	Wed	Thurs	Fri	Sat	Sun
	1	2	3	4	5 *	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Fig. 26.1

A woman with a 28-days menstrual cycle is expected to ovulate on 5th November.

- (a) Describe what would take place in her reproductive system on the day of ovulation.

A mature/ripe egg/ovum would be released from an ovary. [1]

(No mark if these words are missing:

- 'mature/ripe' egg
- 'released from an ovary (not ovaries)

- (b) Identify the fertile period of this woman.

2nd November to 8th November

(Reject: day 11 to day 17)

[1]

- (c) Explain why menstruation will cease if a woman is pregnant. [2]

If a woman is pregnant the fertilized egg or embryo would have implanted into the thick uterine lining. [1]

The uterine lining will not break down as it serves to support and nourish the growth and development of the embryo. [1]

- (d) If fertilization does not occur during this menstrual cycle, on which date would she expect to start menstruating again? [1]

20th November

- (e) Describe a method other than the rhythm method that can be used to prevent pregnancy naturally.

Abstinence from sex - not having sexual intercourse at all.

(Reject: one word answer - "Abstinence" without short description)

OR Withdrawal Method - During sexual intercourse, the male withdraws his penis from the vagina of the female before he ejaculates.

(Reject: Pull-out Method or Removal Method if no description given or not correctly described)

27 Fig. 27.1 shows the male reproductive system.

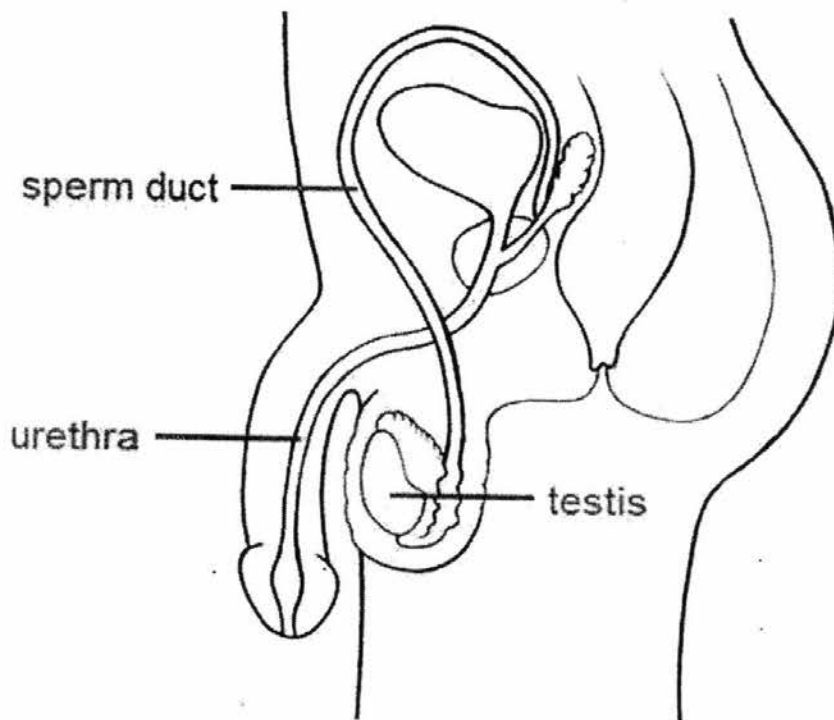


Fig. 27.1

(a) Label the urethra, sperm duct and testis. [3]

(b) State the function of the scrotum. [1]

A protective bag/sac which holds the testes outside the body to keep them cooler / at lower temperature than the body temperature.

(c) Suggest a reason why sperm count may be affected when laptops are used on their laps for prolonged period of time. [1]

Prolonged use of the laptop on the lap produces heat which can raise the temperature of the testes, affecting the normal production of sperms by the testes.

(Reject: heat kill the sperms)

- 28 Fig. 28.1 shows a graph on the reported number of acquired immune deficiency syndrome (AIDS) cases in Singapore between 2000 and 2013.

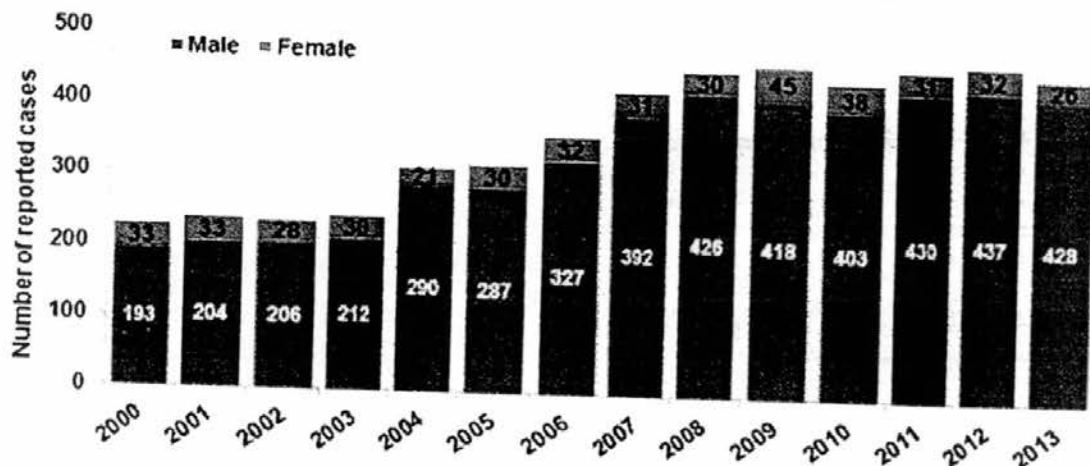


Fig. 28.1

- (a) Why is AIDS known as the most dangerous sexually transmitted infection? [2]
- AIDS has no known cure / is incurable [1]
- The virus which causes AIDS weakens the person's immune system such that he / she becomes susceptible/vulnerable to other diseases. [1]
- (b) Suggest two reasons why there are more cases of AIDS reported in males than females. [2]
- Any 2 of the following:
- Males may be more promiscuous than females and thus have multiple sexual partners, thus increasing the risk of being infected with the AIDS virus.
- Males may be more likely to get tattoos or piercings and get infected from using contaminated needles.
- Males may be more likely to abuse drugs and share contaminated needles, thus increasing the risk of being infected by the AIDS virus.
- (c) Why is it important for pregnant women who have been exposed to AIDS to get tested for the disease? [1]
- Babies can get AIDS from their mothers during the pregnancy / delivery / breastfeeding.

End of Section B

Answer all **three** questions on the writing papers provided.
Question **29** is in the form of either/or and only **one** of the alternatives should be attempted.

29 (a) Fig 29.1 shows the two different molecules X and Y.



- C₂H₆O / C₂H₅OH / CH₃CH₂OH (accept elements in any order as long as number of each element is correct)

It contains more than one type of element / atom OR
It contains different types of element/atom
It contains 3 elements

$17 \times 2 = 34$ (working not required) [1]

-
- $$\text{C} \equiv \text{O}:$$

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- (b) Fig. 29.2 shows a burning candle.

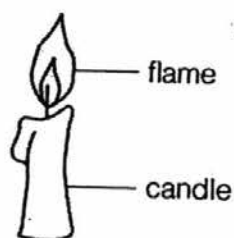


Fig. 29.2

- (i) State and describe the physical and chemical reactions that take place when a candle burns. [2]

Physical: **The melting of wax/candle.** [1]

Solid wax is converted to a liquid. [1]

Chemical: **The burning of wax / combustion of wax** [1]

Carbon in wax undergoes combustion to produce carbon dioxide.

OR Heat and light are given off in the reaction. [1]

(word combustion must be mentioned at least once)

- (ii) Complete the following word equation for the above reaction.

wax + oxygen → carbon dioxide + water [1]

[Total: 10 marks]

OR

- 29 (a) The chemical formula of butane and sulfur are given below.

C_2H_6
butane

S_8
sulfur

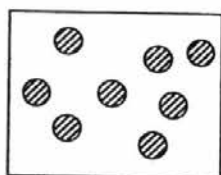
- (i) State one similarity and one difference between the molecules of the substances above. [2]

Similarity **both molecules contain eight atoms** [1]

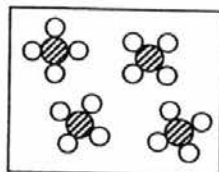
Difference **butane molecule contains different/two type of atoms/elements while sulfur molecule only contain one type of atoms** [1]

(reject: butane is molecule of compound and sulfur is molecule of element – answer is not specific enough)

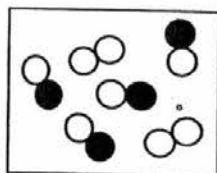
- (b) In the diagrams below, X: ○, Y: ● and Z: ⊗ represent the different atoms of three different elements.



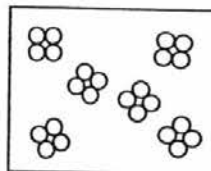
A



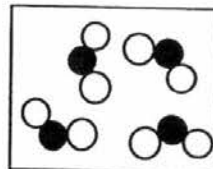
B



C



D



E

- (i) Choose the diagram (A to E) which best represents
an element made up of atoms **A**

a compound made up of two elements **B or E**
(only first answer marked if two letters are given) [2]

- (ii) Give the chemical formula of the compound in (i).

B: ZX_4 or X_4Z E: YX_2 or X_2Y
(based on first letter given in (i))

[1]

- (b) Three students X, Y and Z were each given two test tubes filled with colourless liquids. One test tube contained a mild acid and the other test tube contained a mild alkali. They were asked to find out which test tube contained the acid and which contained the alkali.

Student X decided to taste the liquids, student Y decided to feel the liquids using the tips of his fingertips and student Z decided to test the liquids using litmus paper.

- (a) How could the students differentiate between the acid and the alkali using the methods they chose?

Student X: acid tastes sour while alkali tastes bitter [1]

Student Y: alkali will have a soapy/slippery feel but acid does not. [1]

Student Z: acid will turn blue litmus paper red while alkali will turn red litmus paper blue [1]

(reject: red litmus turns blue in alkali but remains red in acid OR Blue litmus turns red in acid but remains blue in alkali.

Not that only the change in colour of litmus paper can be used to identify acid or alkali. The litmus paper remaining unchanged can be due to a neutral solution)

(no marks if corresponding observation of acid and alkali are not given)

- (b) Name and describe one other method that can be used to differentiate between the acid and alkali.

Add a reactive metal/magnesium/zinc [1] (reject copper)
Acid will react with metal to produce hydrogen gas but alkali will not [1]

OR

Add a carbonate (or any named carbonate) [1]
Acid will react with carbonate to produce carbon dioxide, salt and water but alkali will not [1]

OR

Add a few drops of Universal Indicator (reject pH Indicator)
Mild acid will turn Universal Indicator orange/yellow (reject red) and mild alkali will turn Universal Indicator blue (reject purple)
(Reject pH less than 7 for acid and pH more than 7 for alkali) [2]

OR

Use a pH Meter.
Mild acid will have pH less than 7 while mild alkali will have pH more than 7.

[Total: 10 marks]

30 Fig. 30.1 below shows the blood samples of a healthy person X and a patient Y.

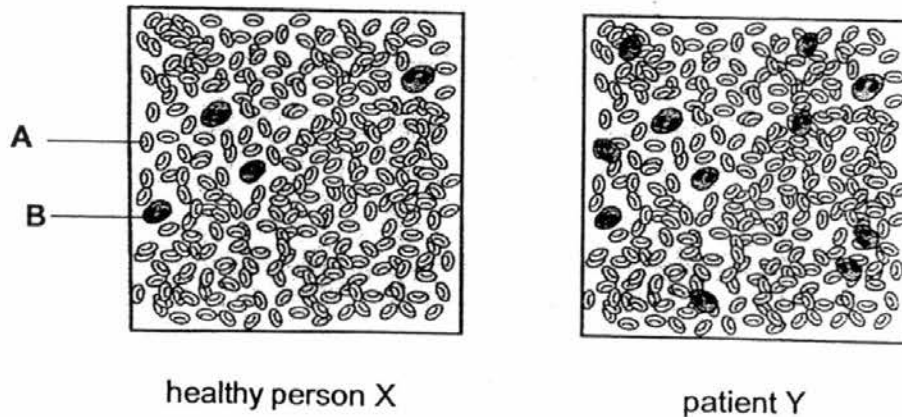


Fig. 30.1

- (a) Compare and contrast the blood samples of X and Y. [2]

Both samples contain red blood cells and white blood cells [1]
Patient Y has more white blood cells than patient X. [1]

- (b) Suggest a possible cause for the difference in blood sample Y.

Patient Y has leukemia / an infection [1]

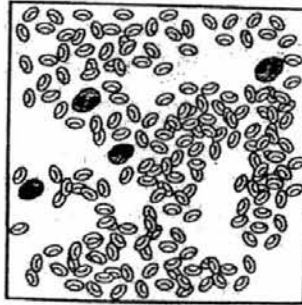
OR: Patient Y has a sickness/disease, hence her body produces more white blood cells to fight the bacteria/viruses/germs

- (c) Describe three structural differences between cell A and B. [2]

Any three of the following:

1. Cell A has no nucleus but cell B has a nucleus.
2. Cell A has a circular biconcave shape but cell B has an irregular shape. (Reject: - regular /fixed shape for cell A;
- not regular /no fixed /circular shape for cell B)
3. Cell A is smaller in size than cell B.
4. Cell A contains haemoglobin but cell B does not.
(Reject: cell A has haemoglobin which gives it a red colour whereas cell does not have haemoglobin which makes it white or colourless)

- (d) The diagram below shows the blood sample of another patient Z.



patient Z

Fig. 30.2

- (i) State one difference between the blood samples of X and Z. [1]

Z has lesser red blood cells than X.

- (ii) What symptom do you think patient Z will be having? [1]

Breathlessness /fainting /giddiness /fatigue
 (Reject: difficulty in breathing /tired /weak

- (iii) Explain your answer in (e)(ii). [2]

The patient does not have enough red blood cells and hence does not have enough haemoglobin [1] to carry oxygen around the body [1].

[Total: 10 marks]

- 31 (a) Compare how physical changes differ in boys and girls during puberty.[4]

Any 4 of the following:

(Answer must be compared like for like to be awarded a mark)

Boys	Girls
Produce sperm in testes	Release eggs from ovaries
Develop facial hair and chest hair	NA
NA	Menstruation begins
Develop broader shoulders	Develop rounder/wider hips
Develop a <u>more</u> muscular body	Develop a rounder body contour / <u>More</u> fats deposited under skin
Penis and testes increase in size	Breasts and uterus enlarge
Voice box enlarges and thickens so voice breaks / voice deepens	No enlargement of voice box and deepening of voice

- (b) State when does puberty begin in boys and in girls. [1]

For girls: 10 – 12 years old

For boys: 12 – 14 years old

(Half mark will not be awarded for partial answers)

- (c) A girl had sexual intercourse with her boyfriend. Her parents filed a police report against the boy for underage sex.

- (i) What can you infer about the age of the girl? [1]

She is below the age of 16.

(Reject: 'young', 'still a child', or any arbitrary age)

- (ii) The girl stopped menstruating and began to eat laxative pills, a type of medication that increases bowel movement, to remove her developing baby. However, her belly continues to grow.

Suggest why taking laxative pills was not effective in removing the developing baby. [1]

Laxatives affect the digestive system, not the reproductive system where the developing baby is growing in.

- (iii) When the girl finally confided in her parents and a surgery was arranged. Part of the surgical procedure is shown in Fig. 32.1.

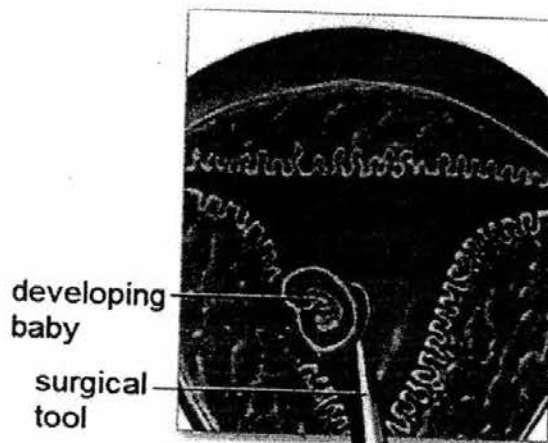


Fig. 32.1

Identify the procedure and suggest two possible medical risks associated with it. [3]

(Induced) Abortion / or correct definition of it. [1]

The uterus could become infected, leading to infertility. [1]

The uterus could also be punctured, leading to prolonged bleeding which could be life-threatening. [1]

[Total: 10 marks]

End of Paper