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YISHUN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024
SECONDARY 4 EXPRESS

CANDIDATE NAME							
CLASS					INDEX NUMBER		

SCIENCE (CHEMISTRY, BIOLOGY) **5088/01**

Paper 1 Multiple Choice **28 August 2024**

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

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

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

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Data Sheet is printed on page 19.
A copy of the Periodic Table is printed on page 20.
The use of an approved scientific calculator is expected, where appropriate.

1 Which piece of apparatus would be most suitable to measure accurately 25.60 cm^3 of acid?

A beaker
B burette
C measuring cylinder
D pipette

2 Four bottled drinks were analysed using paper chromatography to determine if they contained banned food colourings.

Which drinks contain **both** the banned food colourings?

A drink A and B
B drink A and C
C drink B and D
D drink C and D

3 The results of three tests on a solution of compound X are shown.

test	result
aqueous sodium hydroxide added	white precipitate formed, soluble in excess
aqueous ammonia added	white precipitate formed, soluble in excess
aluminium and aqueous sodium hydroxide added, then warmed	colourless gas, which turns damp red litmus paper blue

What is X?

A aluminium carbonate

B calcium nitrate

C zinc carbonate

D zinc nitrate

4 In which substance do the particles vibrate about fixed positions at room temperature?

	melting point / °C	boiling point / °C
A	120	445
B	0	100
C	− 57	18
D	− 114	− 80

5 A cation Y^{2+} has 18 electrons and a nucleon number of 41.

How many protons and neutrons are there in the nucleus of an atom of Y?

	protons	neutrons
A	16	25
B	18	23
C	20	21
D	20	41

6 The table shows the number of neutrons and protons in unknown atoms P, Q, R and S.

atom	number of neutrons	number of protons
P	8	8
Q	8	10
R	10	8
S	10	10

Which particles are isotopes of the same element?

A P and Q
B P and S
C Q and S
D R and S

7 Two elements react to form a compound with the chemical formula XY_2.
This compound is able to conduct electricity when dissolved in water.
Which pair is most likely to be elements X and Y?

	X	Y
A	barium	fluorine
B	carbon	oxygen
C	oxygen	nitrogen
D	sodium	sulfur

8 The equation for the reaction between dilute sulfuric acid and aqueous potassium hydroxide is shown.

$$H_2SO_4 + 2KOH \rightarrow K_2SO_4 + 2H_2O$$

What is the volume of 0.250 mol/dm^3 sulfuric acid that is required to neutralise 20.00 cm^3 of 0.100 mol/dm^3 aqueous potassium hydroxide?

A 4 cm^3
B 8 cm^3
C 16 cm^3
D 25 cm^3

9 Dilute sulfuric acid reacts with copper(II) oxide and with copper(II) carbonate.
In what way are these two reactions similar?

A An acid is neutralised by an alkali.
B A gas is produced.
C The pH of the resulting mixture will increase beyond 7.
D Water is a product.

10 Magnesium metal (Mg) reacts with copper(II) oxide (CuO) according to the following equation.

$$Mg\ (s) + CuO\ (s) \rightarrow MgO\ (s) + Cu\ (s)$$

Which statement is correct?

A CuO is oxidised.
B Mg is reduced.
C CuO is the reducing agent.
D Mg is the reducing agent.

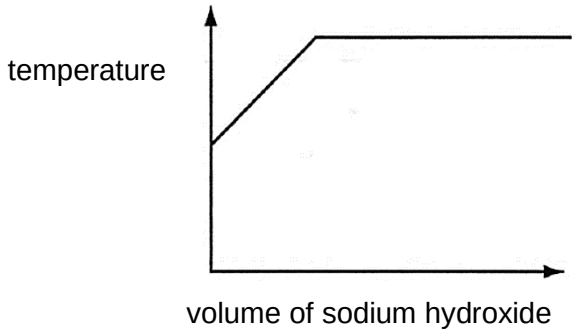
11 Aqueous sodium hydroxide and dilute hydrochloric acid are reacted together.

The reaction is exothermic.

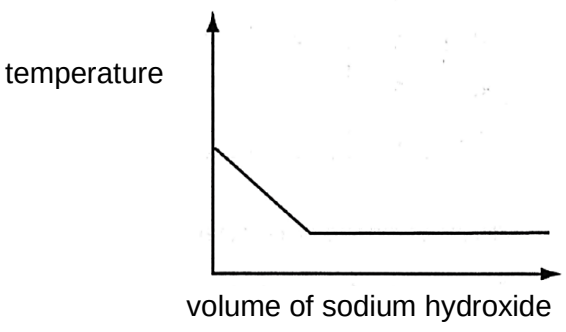
Both the sodium hydroxide and the hydrochloric acid are initially at room temperature.

Which graph shows how the temperature changes when aqueous sodium hydroxide is added to the hydrochloric acid until the alkali is present in excess?

A



B



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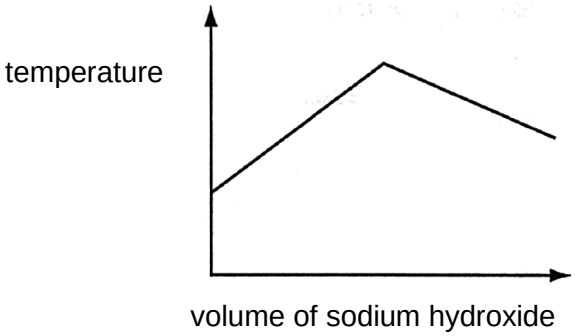
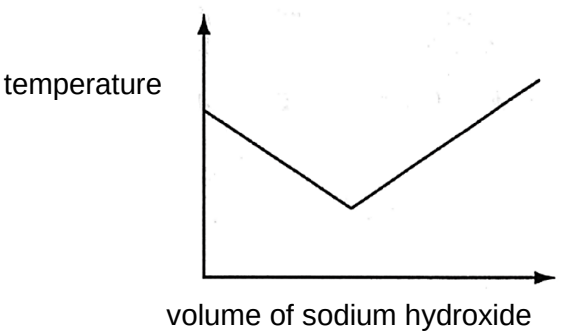


D



12 Methanol is manufactured by reacting carbon monoxide with hydrogen.

The equation for the reaction is shown.

$$CO_2\ (g) + 2H_2\ (g) \rightarrow CH_3OH\ (g)$$

Which changes in pressure and temperature increase the rate of reaction?

	pressure	temperature
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

13 Which statement about the elements in the Periodic Table is correct?

A Elements are arranged in order of their nucleon number.

B Elements are arranged in order of their proton number.

C The period number is related to the number of electrons in the outer shell.

D The reactivity of Group 1 elements decreases down the group.

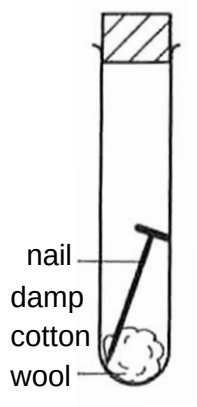
14 Chlorine is an element in Group 17 of the Periodic Table.

Which row describes the properties of chlorine?

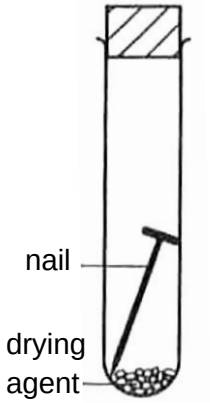
	colour	state at room temperature	reaction with aqueous potassium bromide
A	yellow-green	gas	turns red-brown
B	yellow-green	gas	turns colourless
C	red-brown	liquid	turns colourless
D	red-brown	liquid	turns yellow-green

15 In which setup will the iron nail rust most quickly?

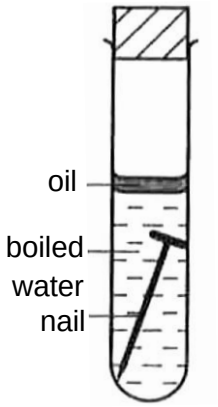
A



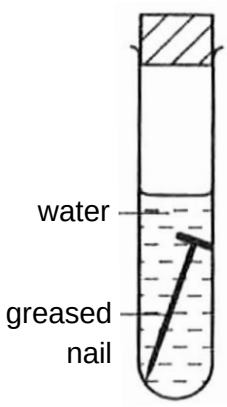
B



C



D



16 Which is the main source of biofuel?

A crude oil

B natural gas

C plastic

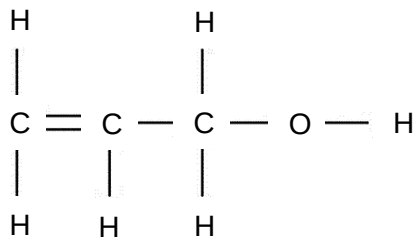
D sugarcane

17 The results of two tests on compound Z are shown.

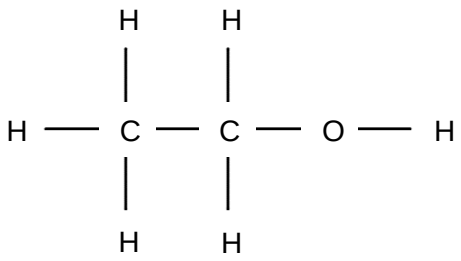
test	observation
add aqueous bromine	remains red-brown
add acidified potassium manganate(VII)	turns colourless

What is the structure of compound Z?

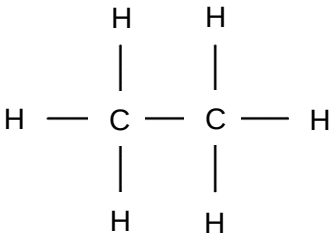
A



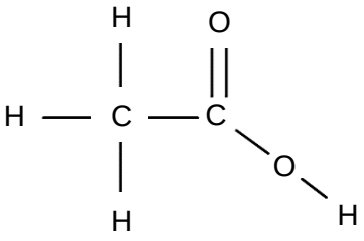
B



C



D



18 A hydrocarbon, $C_{17}H_{36}$, is decomposed during the process of cracking to produce ethene, propene, another hydrocarbon, X, and hydrogen.
The equation for the reaction is shown.

$$C_{17}H_{36} \rightarrow 2C_2H_4 + C_3H_6 + 2X + H_2$$

Which row describes X?

	formula of X	X belongs to the homologous series
A	$C_{10}H_{20}$	alkene
B	$C_{10}H_{20}$	alkane
C	C_5H_{10}	alkene
D	C_5H_{10}	alkane

19 Four statements about the recycling of plastics are listed.

1 Recycling plastic can help to conserve limited resource.
2 Plastic made by recycling is less pure than plastic made from polymerisation.
3 More energy is needed to recycle plastic than making plastic from polymerisation.
4 Recycling plastic helps to reduce damage to the environment when plastic is burnt.

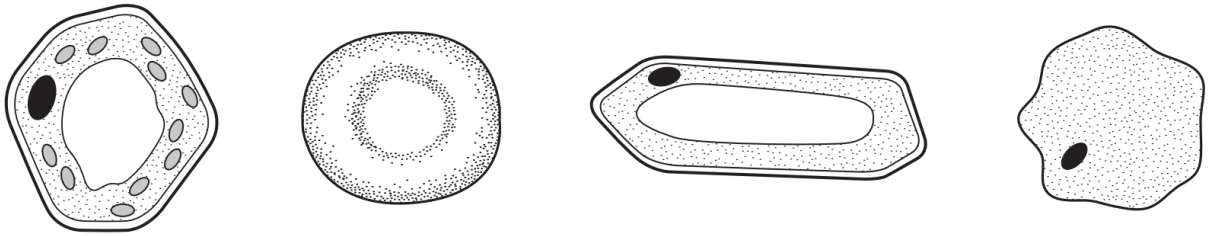
Which statements give valid reasons in favour of recycling plastics?

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

20 Which atmospheric pollutant is responsible for damage to buildings?

A carbon monoxide
B ozone
C nitrogen dioxide
D methane

21 The diagram shows different types of cells.



Which structure do all these cells have?

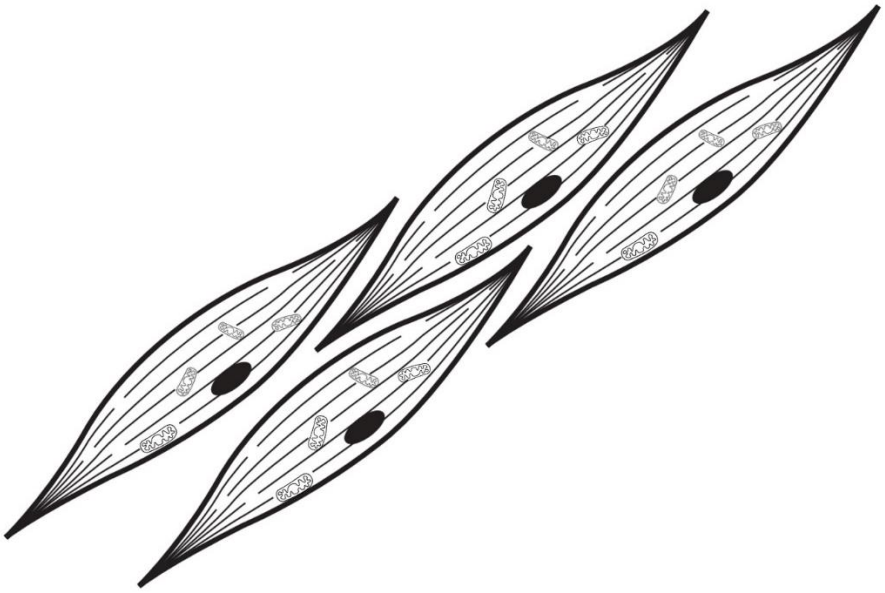
A nucleus

B cell wall

C cell membrane

D chloroplast

22 The diagram shows some specialised animal cells.



Which statement is correct about the structural adaptation of these cells?

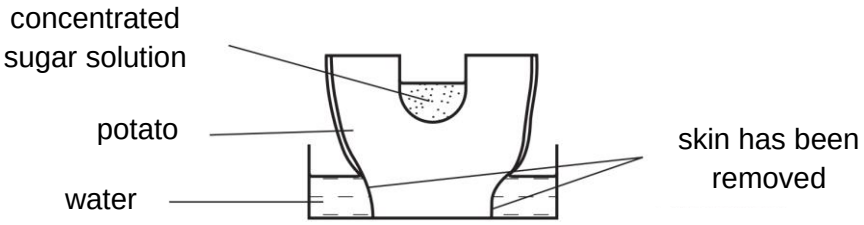
A They contain many mitochondria to release more energy.

B They lack nuclei to carry more oxygen to other body cells.

C They are elongated to increase surface area to volume ratio.

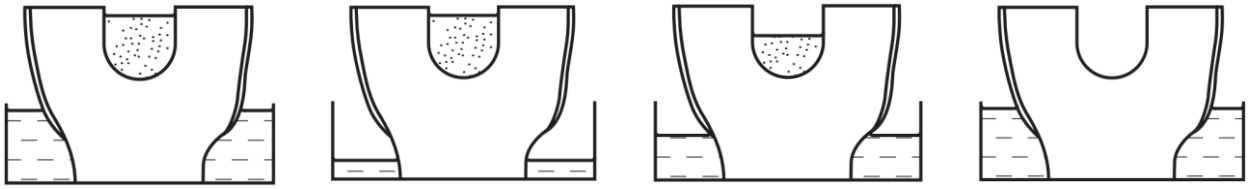
D They are flexible to squeeze through narrow blood capillaries.

23 The diagram shows an experiment using an uncooked potato. The skin of the potato was removed as shown.

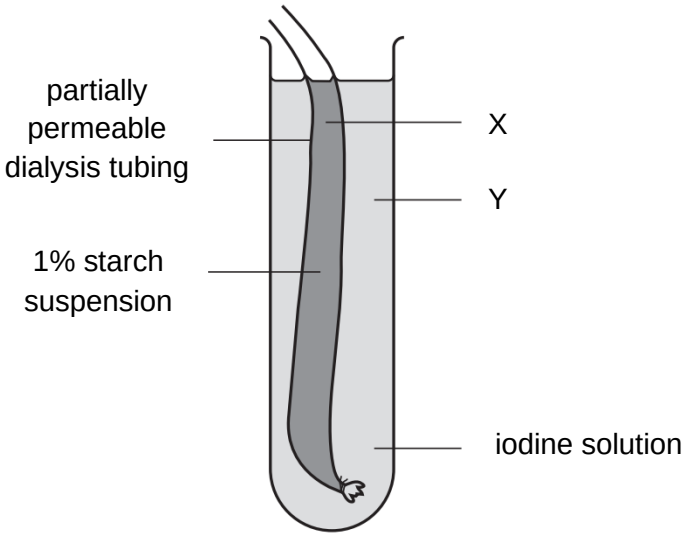


Which diagram shows the result of the experiment after 24 hours?

A **B** **C** **D**



24 The diagram shows a partially permeable dialysis tubing filled with a starch suspension placed in a tube of iodine solution. Iodine is a small molecule.



What will the colour at X and Y be after an hour?

	X	Y
A	yellowish-brown	yellowish-brown
B	yellowish-brown	blue-black
C	blue-black	blue-black
D	blue-black	yellowish-brown

25 The table shows the results of food tests carried out on a fruit.

test	result
iodine	yellowish-brown
Benedict's	brick-red precipitate
ethanol emulsion	clear
biuret	violet

Which nutrients are present in the fruit?

A fat and starch

B protein and starch

C reducing sugar and fat

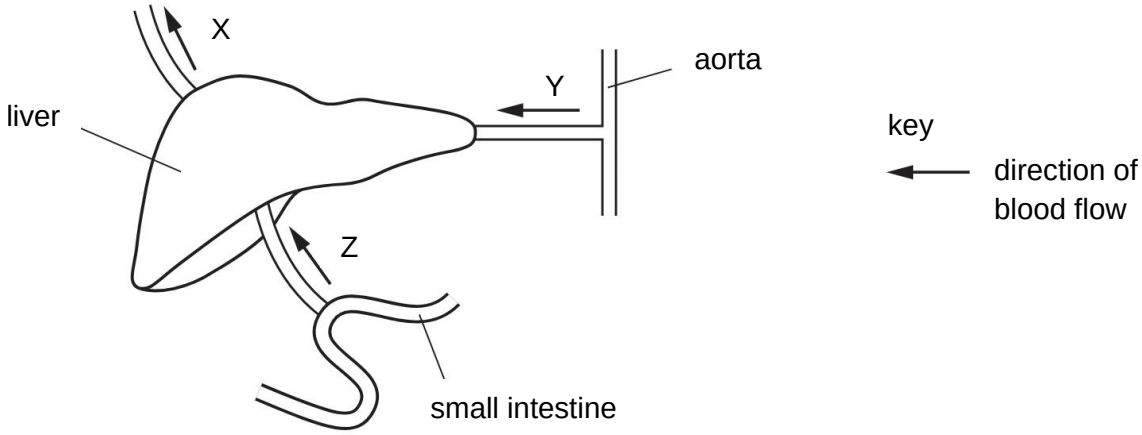
D reducing sugar and protein

26 Protease breaks down proteins into amino acids.

Based on the 'lock and key' hypothesis, what is represented by the lock and the key?

	lock	key
A	amino acid	protease
B	protease	amino acid
C	protease	protein
D	protein	protease

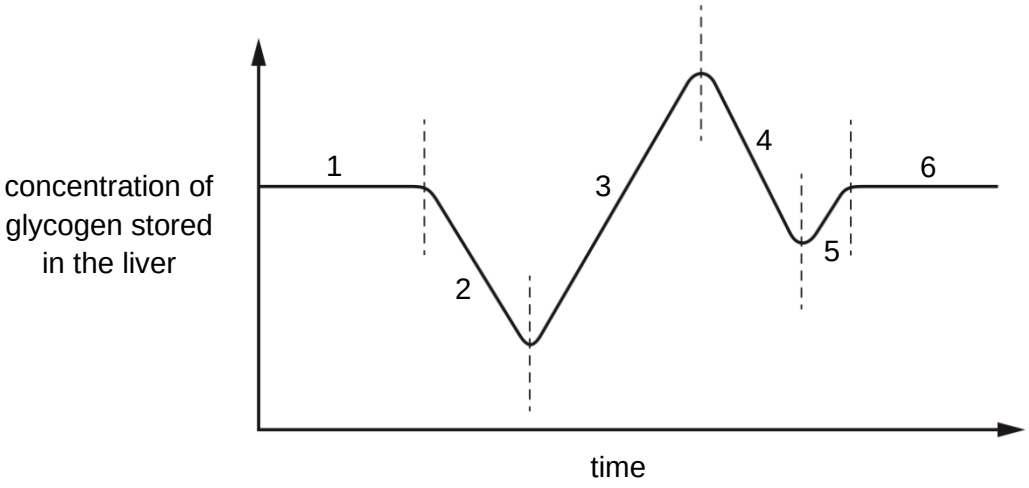
27 The diagram shows the blood vessels associated with the liver.



What are the blood vessels labelled X, Y and Z?

	X	Y	Z
A	hepatic artery	hepatic vein	hepatic portal vein
B	hepatic portal vein	hepatic artery	hepatic vein
C	hepatic vein	hepatic artery	hepatic portal vein
D	hepatic vein	hepatic portal vein	hepatic artery

28 The graph shows how the concentration of glycogen stored in the liver of a human changes over time.



During which periods is the concentration of **glucose** in the blood above average?

A 1 and 6 **B** 2 and 4 **C** 3 and 4 **D** 3 and 5

29 A hormone is a chemical substance produced in the body.

Which is **not** a property of a hormone?

A It is broken down by the kidney.

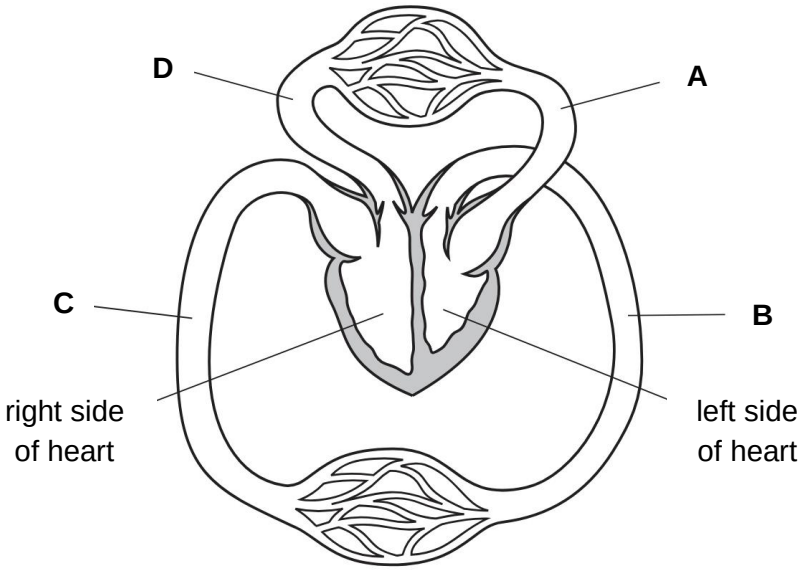
B It is carried in the blood plasma.

C It is produced by an endocrine gland.

D It alters the activity of one or more target organs.

30 The diagram represents part of the human circulatory system.

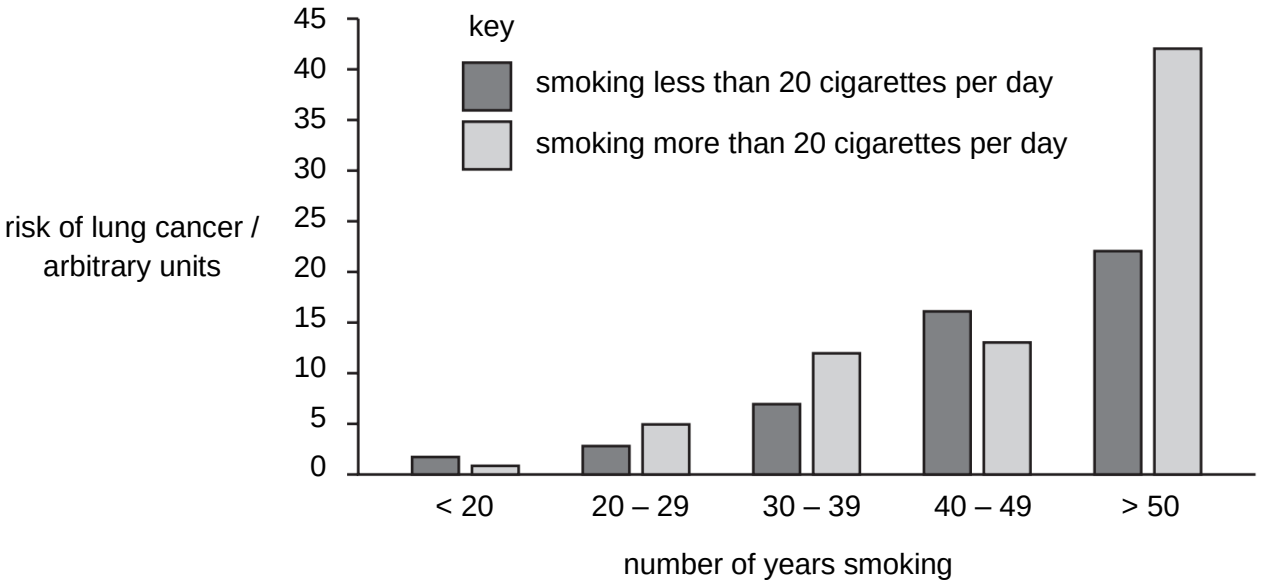
Where is the blood pressure highest?



31 Which route does an oxygen molecule take as it diffuses from the air in the lungs to haemoglobin in the blood?

	first → last
A	wall of alveolus → thin film of moisture → red blood cell membrane → plasma
B	wall of alveolus → thin film of moisture → plasma → red blood cell membrane
C	thin film of moisture → wall of alveolus → red blood cell membrane → plasma
D	thin film of moisture → wall of alveolus → plasma → red blood cell membrane

32 The graph shows how smoking different numbers of cigarettes for different lengths of time affects the risk of lung cancer.



Which conclusions are supported by the data in the graph?

1 Smoking cigarettes for more years increases the risk of lung cancer.

2 Smoking more than 20 cigarettes per day for more than 50 years has the highest risk of lung cancer.

3 Smoking more than 20 cigarettes per day always increases the risk of lung cancer more than smoking less than 20 cigarettes per day.

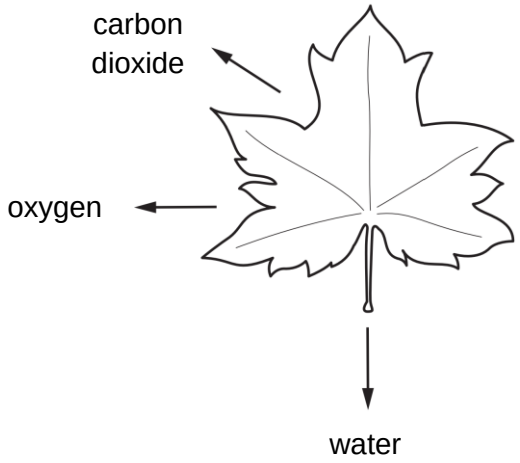
A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

33 What is the pathogen, method of spread and method of control for influenza?

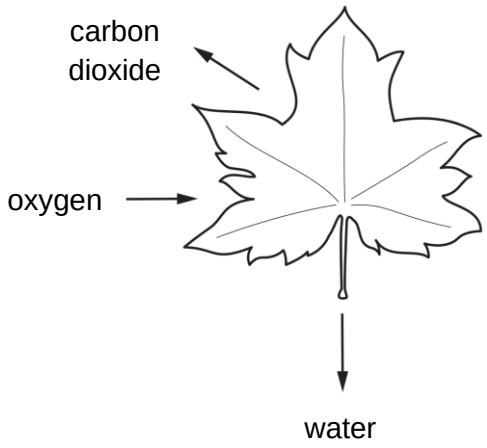
	pathogen	spread	control
A	bacteria	droplets	antibiotics
B	bacteria	insect bite	vaccination
C	virus	droplets	vaccination
D	virus	shared needles	isolate patients

34 Which diagram shows substances going into and out of a leaf when glucose is being formed?

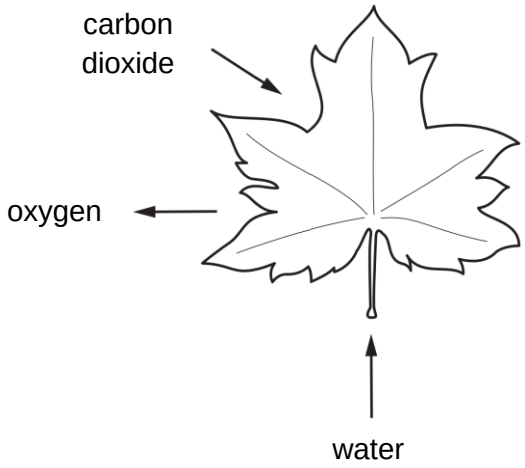
A



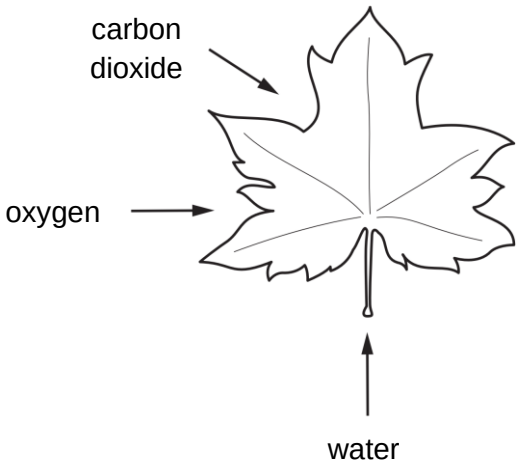
B



C



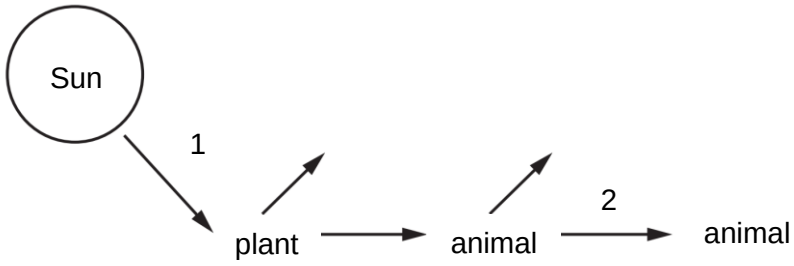
D



35 Which row shows the most likely number of chloroplasts in three types of cell in a leaf?

	vascular bundle cell	mesophyll	epidermis
A	17	6	0
B	0	17	0
C	0	6	17
D	6	0	17

36 The diagram shows energy flow from the Sun, through a food chain and into the environment.



What is the form of energy for each numbered arrow?

	stage 1	stage 2
A	light	chemical
B	light	kinetic
C	heat	chemical
D	heat	kinetic

37 Which row describes the genetic code in DNA?

	what forms the genetic code	what the DNA codes for
A	sequence of amino acids	sequence of bases
B	sequence of amino acids	sequence of proteins
C	sequence of bases	sequence of amino acids
D	sequence of bases	sequence of proteins

38 Which statement about chromosomes is correct?

A Genes are divided into sections called chromosomes.

B Genes include long DNA molecules called chromosomes.

C Chromosomes include a long molecule of DNA divided into sections called genes.

D Chromosomes are long DNA molecules called genes which are divided into sections.

39 A couple has three children. The table shows some of the children's characteristics.

child	sex	type of red blood cell	type of earlobe
1	male	sickle-cell	attached
2	female	normal	attached
3	male	normal	detached

What do the characteristics show?

A continuous variation only

B discontinuous variation only

C both continuous and discontinuous variation

D neither continuous nor discontinuous variation

40 Two fruit flies with normal wings mated with each other.

For every three offspring with normal wings, there is one with short wings.

What are the genotypes of the parents?

	female	male
A	Nn	Nn
B	Nn	NN
C	NN	Nn
D	Nn	nn

key

N = allele for normal wings

n = allele for short wings

Data Sheet

Colours of Some Common Metal Hydroxides

aluminium hydroxide	white
calcium hydroxide	white
copper(II) hydroxide	light blue
iron(II) hydroxide	green
iron(III) hydroxide	red-brown
zinc hydroxide	white

The Periodic Table of Elements

Group																	
1	2											13	14	15	16	17	18
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9		**Key** proton (atomic) number atomic symbol name relative atomic mass									5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24	3	4	5	6	7	8	9	10	11	12	13 Aℓ aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cℓ chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tℓ thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –	113 Nh nihonium –	114 Fℓ flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).
The Avogadro constant, L = 6.02 x 10^{23} mol^{-1}

YISHUN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024
SECONDARY 4 EXPRESS

CANDIDATE NAME							
CLASS				INDEX NUMBER			

SCIENCE (CHEMISTRY, BIOLOGY) **5088/04**

Paper 4 Biology **23 August 2024**

1 hour 15 minutes

Candidates answer on Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on the work you hand in.
You may use an HB pencil for any diagrams, graphs, tables or rough working.
Write in blue or black pen.
Do not use staples, paper clips, glue or correction fluid.

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 appropriate units.

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

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

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

65

Section A

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

1 Some students investigated the effect of immersing samples of red blood cells in different concentrations of salt solution. They measured the initial diameters of red blood cells and calculated the mean for each sample.

They then immersed each red blood cell sample in a different concentration of salt solution.
After five minutes, they measured the diameters of red blood cells and calculated the mean again for each sample.

Table 1.1 shows the results.

Table 1.1

concentration of the salt solution / %	mean initial diameter of the red blood cells /µm	mean diameter of the red blood cells after five minutes /µm
0.0	7.5	cells burst
0.4	7.5	8.2
0.9	7.5	
1.8	7.5	6.0

(a) State why red blood cells burst when immersed in 0.0% salt solution but plant cells do not.

……

…… [1]

(b) Explain the results for the red blood cells that were immersed in the 1.8 % salt solution.

……

……

……

……

…… [3]

(c) The concentration of the cytoplasm in red blood cells is the same as that of the 0.9% salt solution. Predict the mean diameter of the red blood cells after immersing them in the 0.9% salt solution for five minutes.

Complete Table 1.1 by writing your answer in the blank. [1]

[Total: 5]

2 Fig 2.1. shows the action of enzymes on two different food substances in the small intestine.

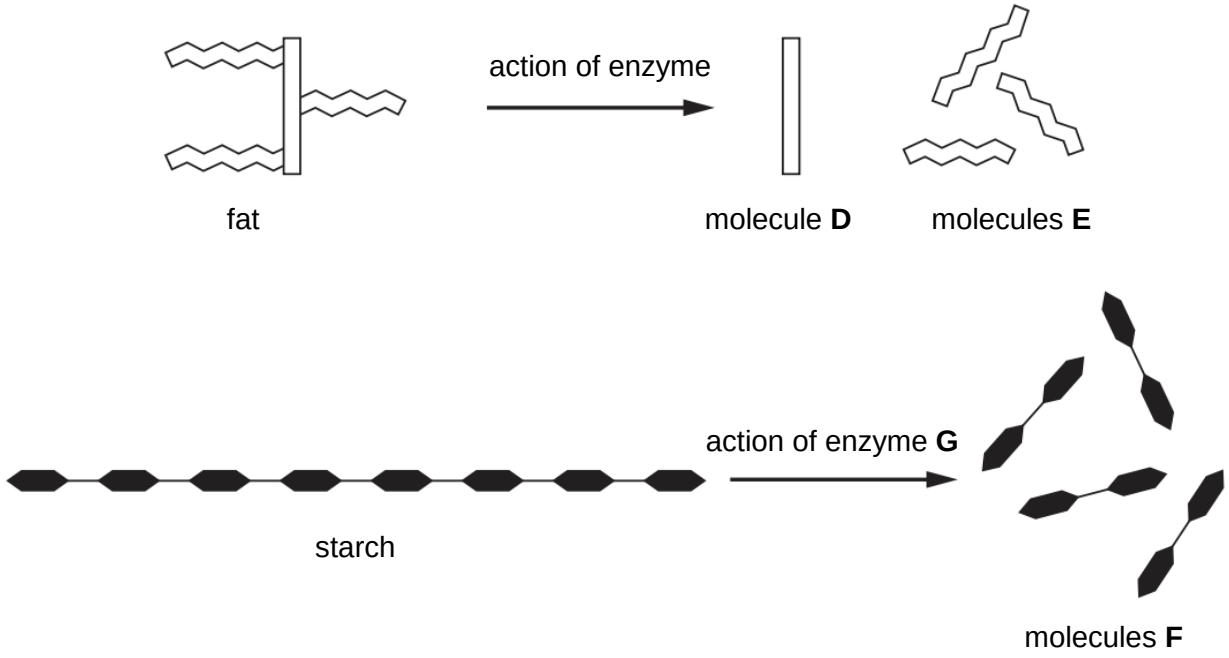


Fig. 2.1

(a) **(i)** Identify the molecules shown in Fig. 2.1.

D ……

E ……

F ……

[2]

(ii) Enzyme **G** also acts in another organ in the alimentary canal.

State the name of this organ.

…… [1]

(b) Fig. 2.2 shows some of the main regions of the alimentary canal in a person.

Cystic fibrosis is a genetic condition in humans that results in excessive production of mucus.

One effect of cystic fibrosis is that the bile and pancreatic duct becomes blocked with mucus.

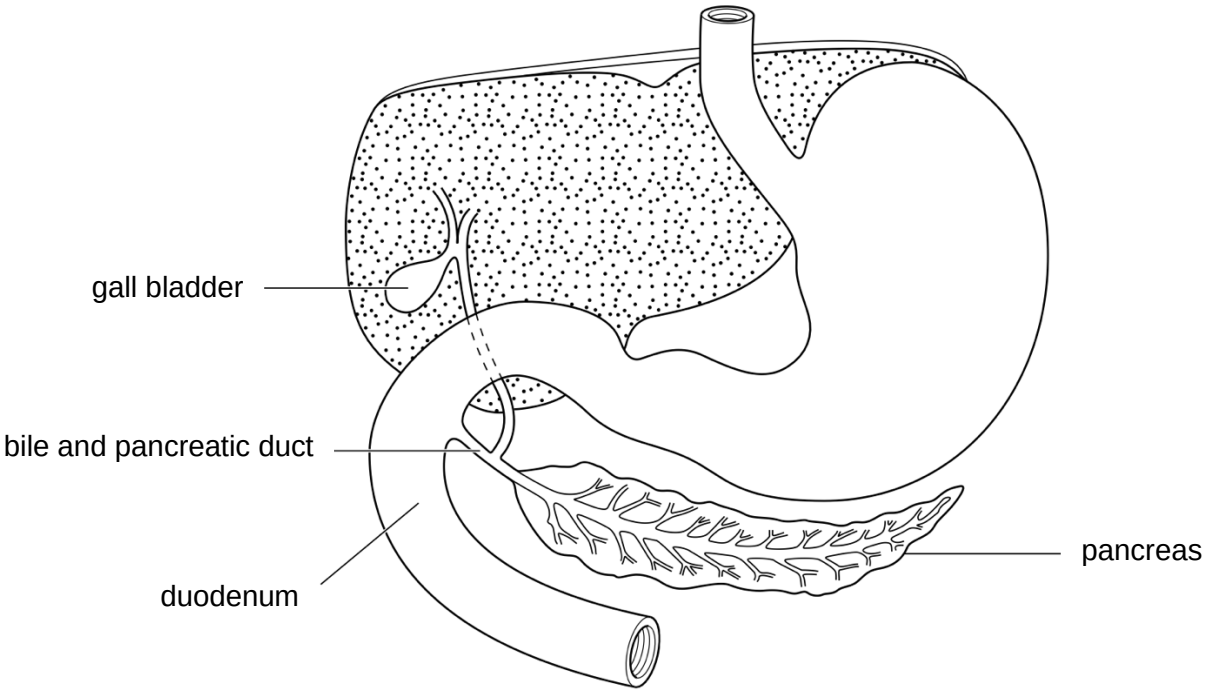


Fig. 2.2

Suggest why a person whose bile and pancreatic duct is blocked may find it difficult to gain weight despite having a balanced diet.

……

……

……

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……

……

…… [4]

[Total: 7]

[Turn over

3 Fig. 3.1 shows the events that follow fertilisation in structure **X** of a female.

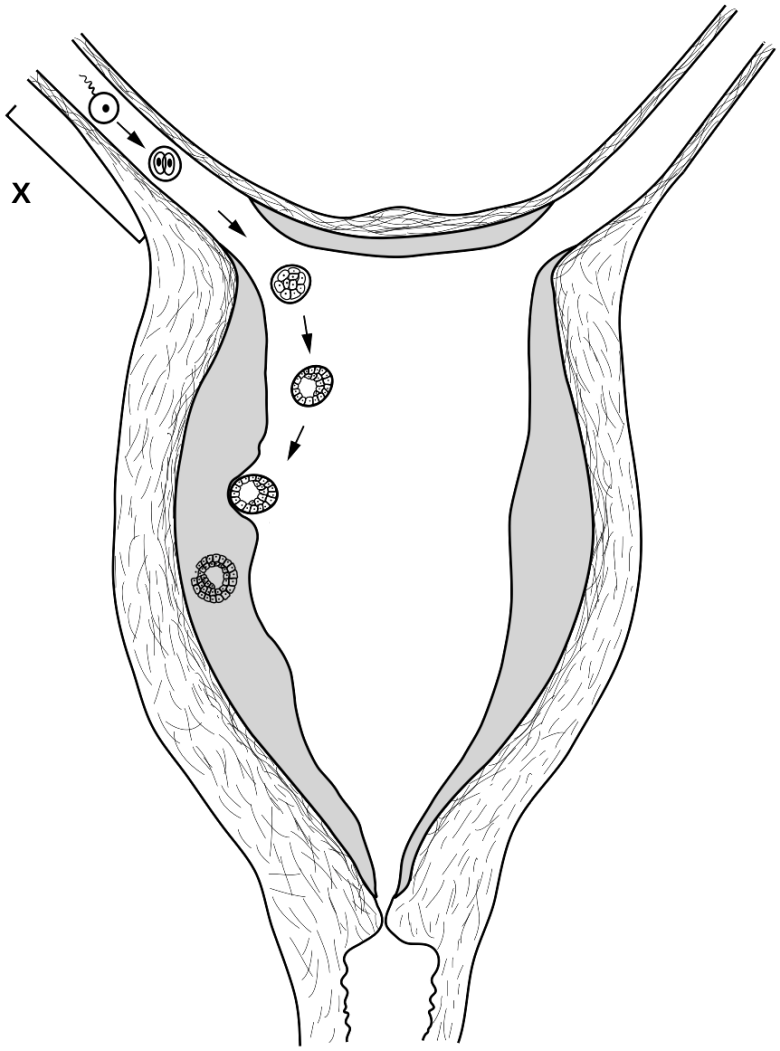


Fig. 3.1

(a) State the name of structure **X**.

…… [1]

(b) With reference to Fig. 3.1 only, describe the events that occur after fertilisation.

……

……

……

…… [3]

(c) The levels of progesterone in the female remains high after fertilisation.

Explain why.

……

…… [1]

[Total: 5]

4 Respiration occurs in all living organisms.

(a) A student investigated aerobic respiration in an insect.

Fig. 4.1 shows the apparatus the student used.

The potassium hydroxide solution removed any carbon dioxide produced by the insect.

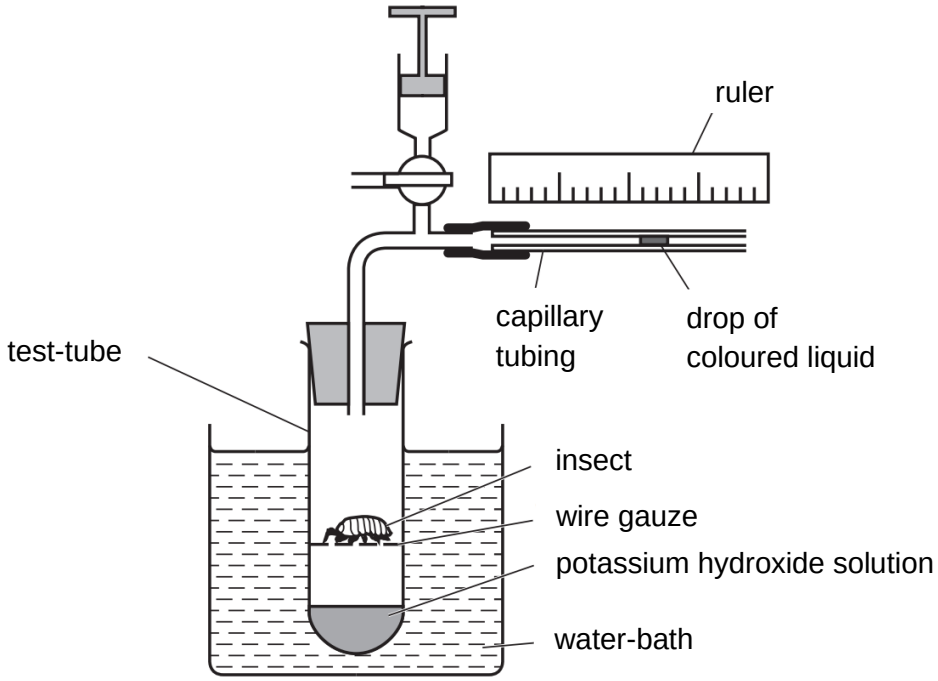


Fig. 4.1

(i) Carbon dioxide is produced during aerobic respiration.

State the name of the other product of aerobic respiration.

……..…. [1]

(ii) Predict and explain the direction of the movement of the coloured liquid in the capillary tubing.

……..……..

……..…. [1]

(iii) The coloured liquid moved 9 mm in 30 seconds.

Calculate the rate of movement of the coloured liquid.

Show your working.

…….. mm per s [1]

(b) Fig. 4.2 shows the percentage of energy provided by anaerobic respiration when athletes run in races of different distances.

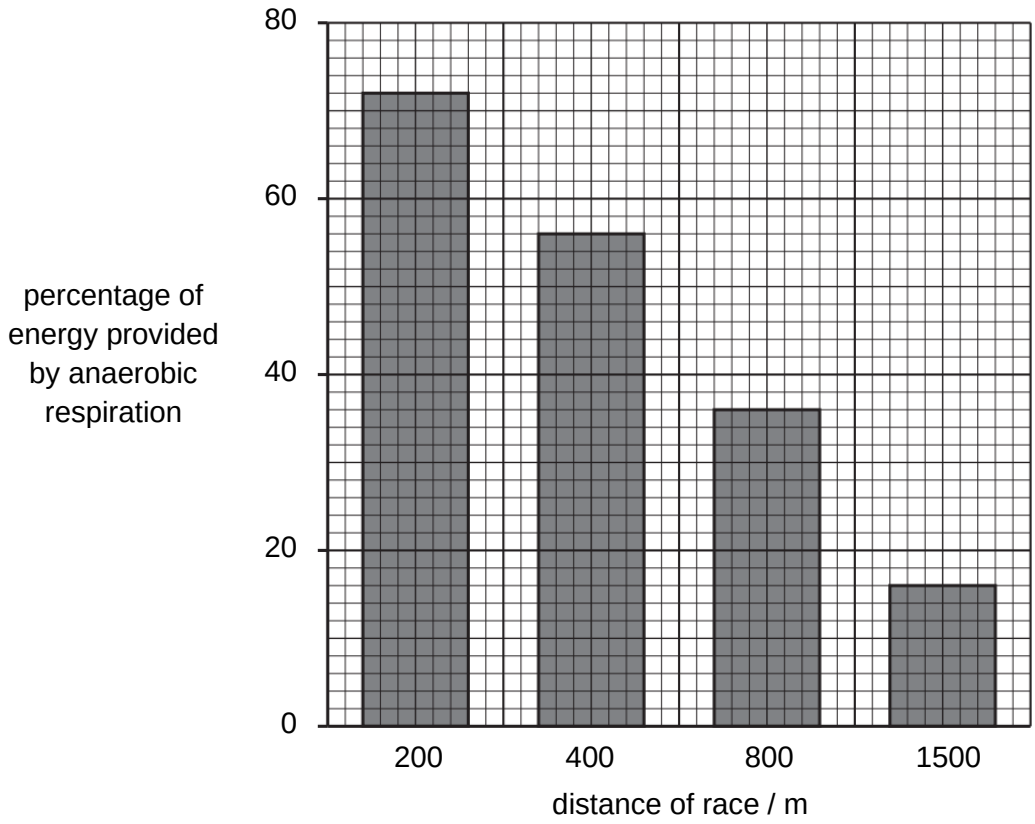


Fig. 4.2.

(i) Describe the relationship shown in Fig. 4.2.

……..……..

……..….. [1]

(ii) Suggest an explanation for the relationship described in **(b)(i)**.

……

……

…… [2]

(iii) Explain why athletes are advised to take rapid, deep breathing after completing a vigorous exercise.

……

…… [1]

[Total: 7]

5 Antibiotics are used to control the spread of disease.

Fig. 5.1 shows the quantity of an antibiotic used in a hospital to treat a particular disease over an eleven-year period. It also shows the number of organisms responsible for this disease that survive the treatment.

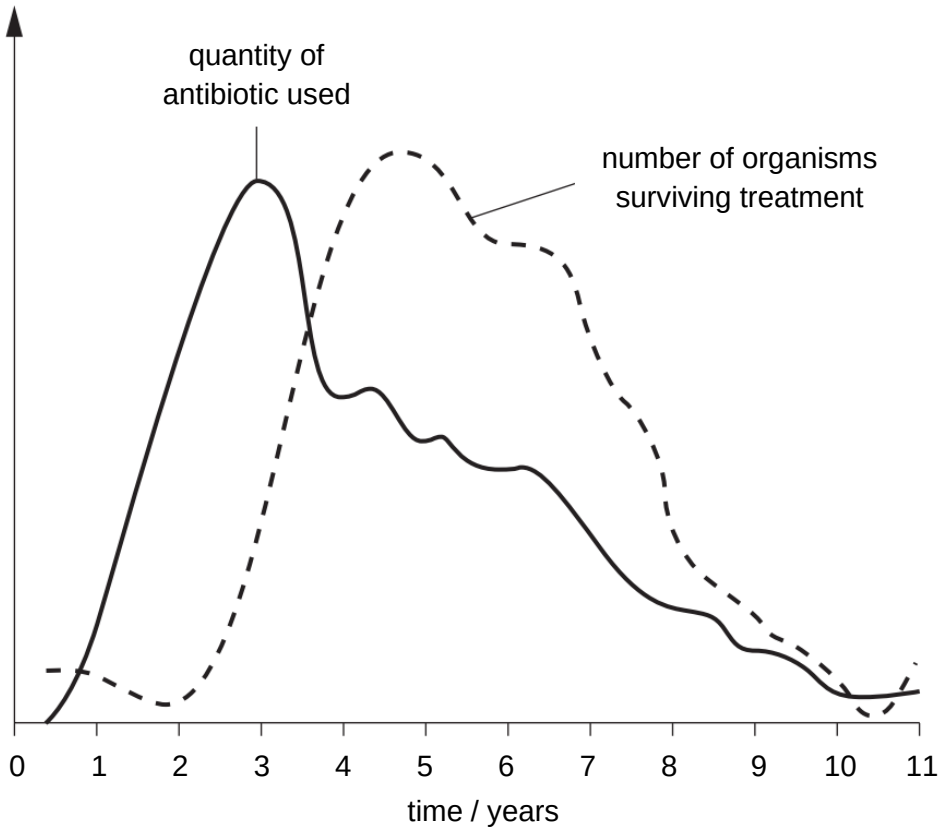


Fig. 5.1

(a) Suggest a possible disease and name the type of organism likely to be responsible for the disease that was being treated.

disease ……

type of organism responsible ……..... [1]

(b) **(i)** Describe the data shown in Fig. 5.1 between the third and fourth year of use of the antibiotic.

……

…… [1]

(ii) Suggest why the overuse of antibiotics for treating minor infections can have dangerous consequences for people who are treated for very serious infections in the future.

……

……

……

……

…… [3]

(c) Suggest a way that the disease might be treated after year 11.

…… [1]

[Total: 6]

6 **(a)** Define the term *transpiration*.

……

…… [2]

(b) A student investigated the volume of water lost in one hour by different species of plants at different temperatures.

Fig. 6.1 shows the results.

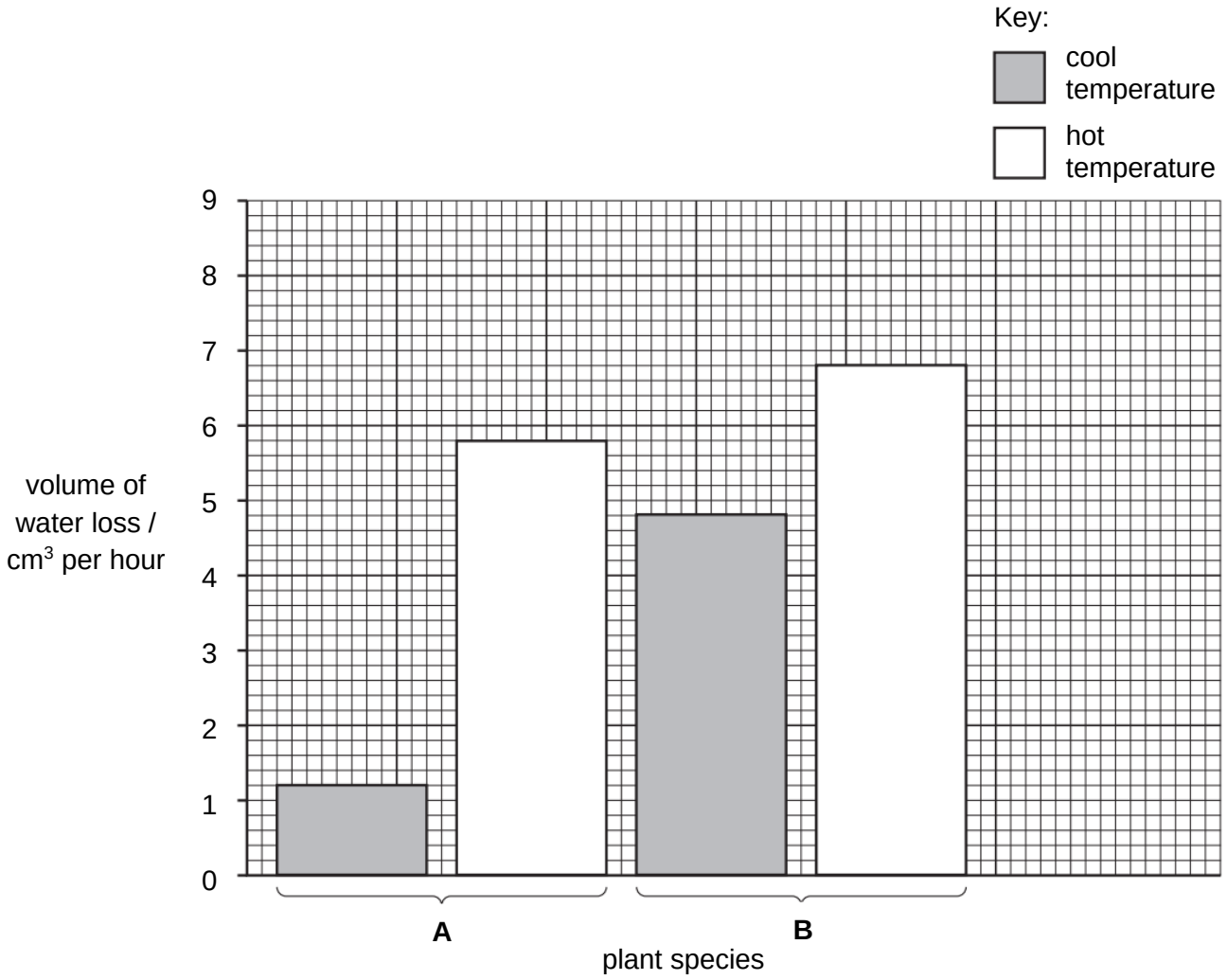


Fig. 6.1

(i) With reference to Fig. 6.1, compare the volume of water loss in species **A** and species **B**.

……

……

……

……

……

……

…… [3]

(ii) The investigation was repeated with increased humidity at a cool temperature.

Draw **one** additional bar **on Fig. 6.1**, for species **B** only, to show the expected result. [1]

(c) State the name of the vessels that transport water through a plant.

…… [1]

[Total: 7]

7 PTC is a bitter tasting chemical that some humans can taste while others cannot. This is controlled by a single gene with a pair of alleles.

Fig. 7.1 shows the inheritance of the ability to taste PTC in a family.

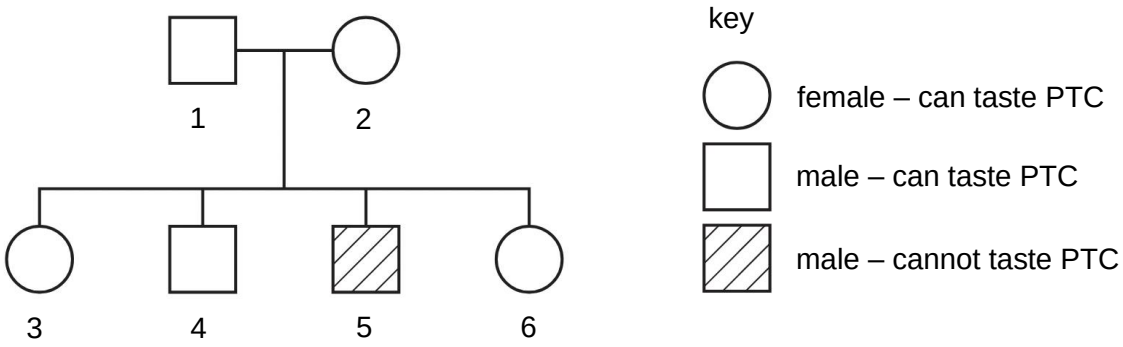


Fig. 7.1

(a) **(i)** The allele for being able to taste PTC is dominant.

Using the symbols **T** for the dominant allele and **t** for the recessive allele, state the two possible genotypes for individuals who can taste PTC.

…….. and …….. [1]

(ii) Which evidence, from Fig. 7.1, shows that the allele is dominant?

Explain your answer.

……

……

……

……

…… [3]

(b) Fig. 7.2 represents four genes on a part of the sex chromosomes from a body cell of a woman.

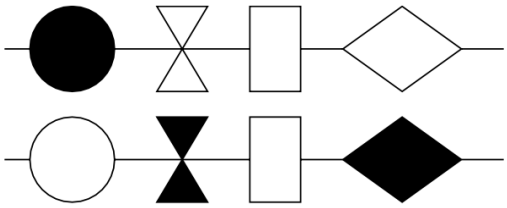


Fig. 7.2

(i) In the space below, draw **one** allele shown in Fig. 7.2.

[1]

(ii) In the space below, draw the genes in Fig. 7.2 as they would appear in one of her ova.

[1]

(c) Fig. 7.3 shows the same section of an X chromosome in another cell of the same person in which the structure of one of the genes has changed.

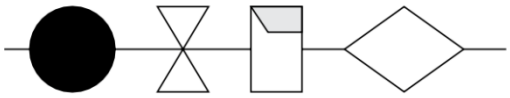


Fig. 7.3

(i) State the name given to such a change in a gene.

…… [1]

(ii) Suggest a possible cause of such changes in genes.

…… [1]

[Total: 8]

8 Catalase is an enzyme which breaks down hydrogen peroxide into water and oxygen.

hydrogen peroxide ⟶ water + oxygen

By using small pieces of filter paper soaked in a solution of catalase, it is possible to measure the rate of enzyme activity.

The pieces are placed in a solution of diluted hydrogen peroxide in a test-tube. The filter paper rises to the surface as oxygen bubbles are produced.

The time taken for these pieces of filter paper to rise to the surface indicates the rate of catalase activity.

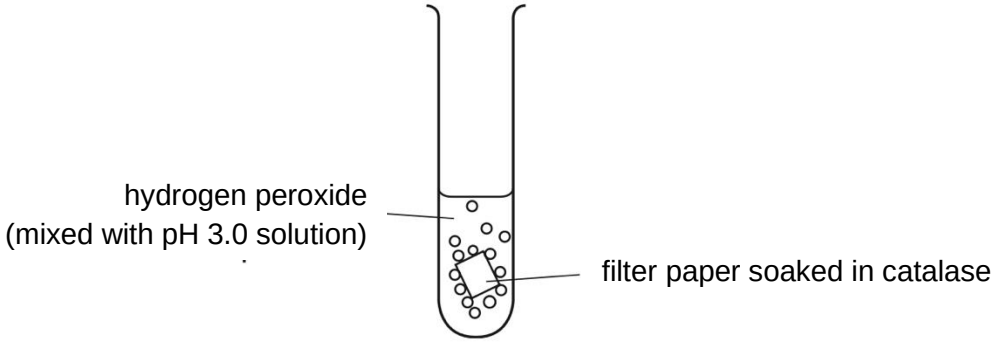


Fig. 8.1

An experiment was carried out to find out the effect of pH on the rate of catalase activity. Six test-tubes were set up, each containing hydrogen peroxide mixed with a different pH solution.

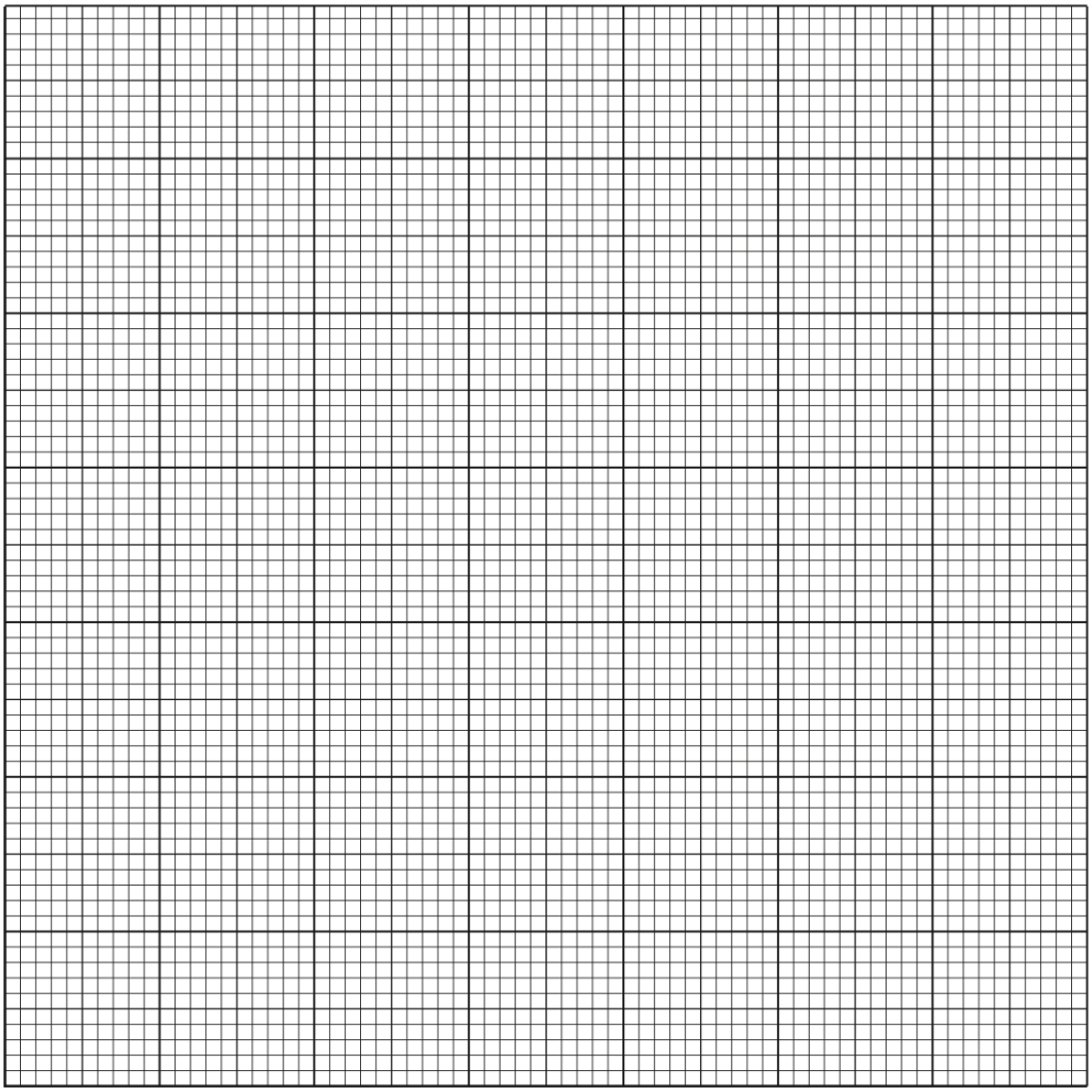
Fig. 8.1 shows the set-up for one of the test-tubes containing hydrogen peroxide mixed with pH 3.0 solution.

Table 8.1 shows the results obtained for the experiment as described.

Table 8.1

pH	time taken for filter paper to rise to the surface / s
3.0	62
4.0	45
5.0	35
6.0	25
7.0	20
8.0	50

(a) **(i)** Use the data in Table 8.1 to draw a best fit line on the grid below.



[4]

(ii) Based on the graph drawn in **(a)(i)**, describe and explain the relationship between pH and the time taken for the filter paper to rise to the surface.

……..

……..

……..

……..

……..

……..

……..

…… [4]

(b) State two variables which must be kept controlled in this experiment.

1 ……..

2 …….. [2]

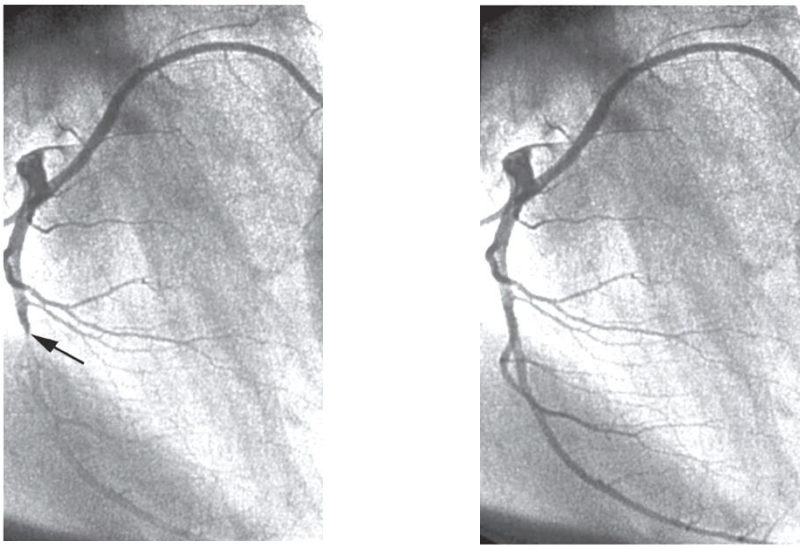
[Total: 10]

Section B

Answer **one** question from this section.

9 Fig. 9.1 shows an angiogram of a heart before and after treatment for coronary heart disease (CHD).

An angiogram is an image of the blood flow through the blood vessels of the heart.



before treatment after treatment

Fig. 9.1

(a) The arrow on Fig. 9.1 shows the position of a blockage in a blood vessel.

(i) State the name of the blocked blood vessel.

……..……...…… [1]

(ii) Suggest and explain how a person might be affected by CHD.

……..……

……...…

……..……

……..……

……..……..…… [3]

(b) Many health specialists think that the risk of CHD can be reduced by doing regular exercise.

A long-term study of a large group of women was used to test this hypothesis. The women were between 35 and 45 years old at the start of the study. Every two years the same group of women were asked how much they were exercising.

After 28 years, the researchers analysed their data:

- They calculated the average time spent exercising per week by each woman.
- They put the women into categories determined by how much exercise they had done.
- For each category, they calculated the number of women who died from CHD.

The results are shown in Fig. 9.2.

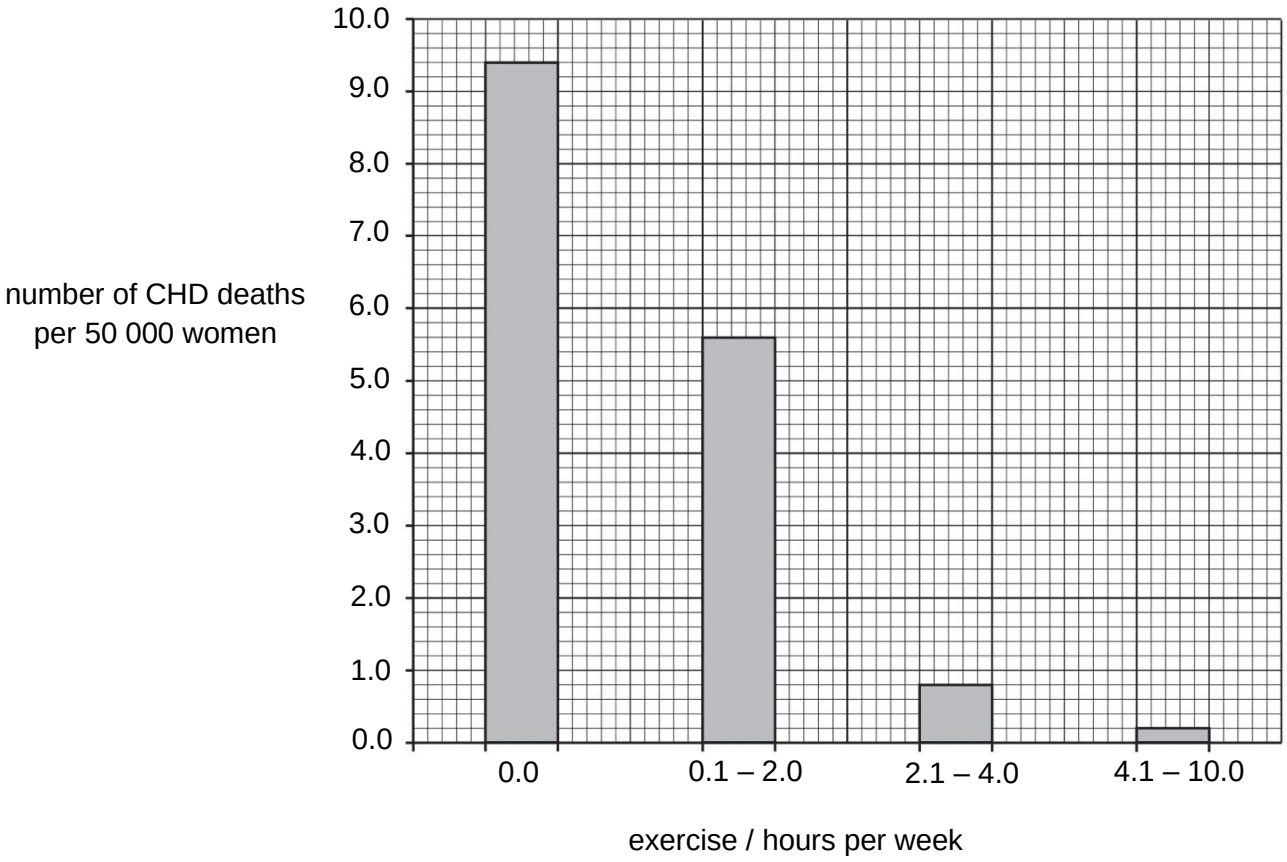


Fig. 9.2

Using the information about how the study was designed and the results in Fig. 9.2, suggest why it is **unfair** for the health specialists to use this study to encourage the **whole population** to exercise more.

……

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…… [6]

[Total: 10]

10 A species of caterpillar, the holly looper, feeds on the leaves of the holly plant.

Holly plants produce red berries that are eaten by a species of bird, the song thrush.

Song thrushes also eat caterpillars and are eaten by snakes.

(a) (i) Use the information above to construct a food web containing all the organisms.

[2]

(ii) Explain why there are only a few snakes although there are large numbers of holly looper and song thrush in this area.

……

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…… [4]

(b) Explain how energy originally supplied by the Sun is eventually used to power the muscles in the snake as it moves.

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……

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……

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……

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…… [4]

[Total: 10]

End of Paper

For Answer please email :

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to share with you.