Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

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9225987961

BIOLOGY **9700/21**

Paper 2 AS Level Structured Questions **May/June 2020**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].

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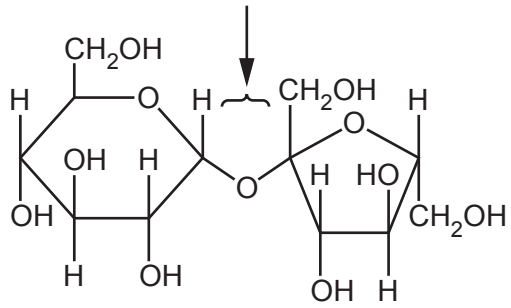
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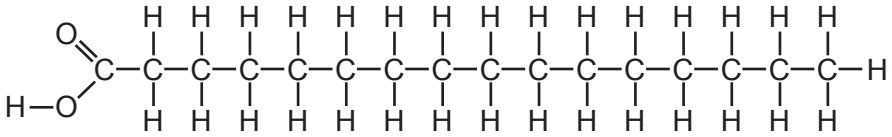
Answer **all** questions.

1 Fig. 1.1 shows five biological molecules.

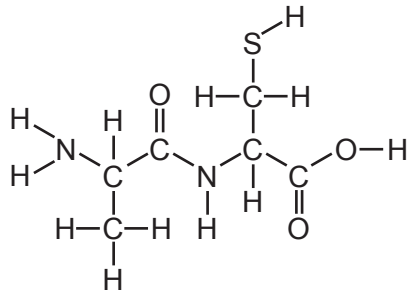
A



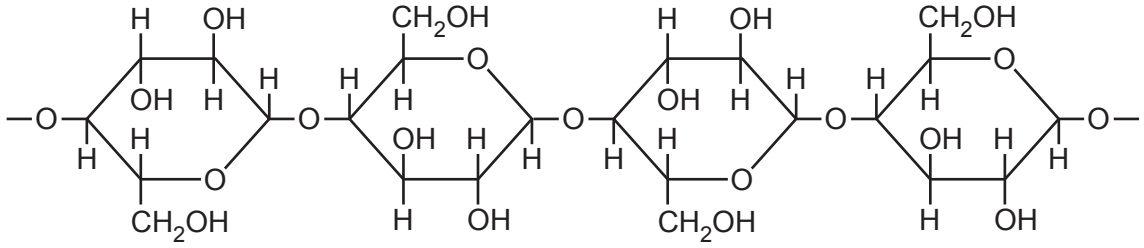
B



C



D



E

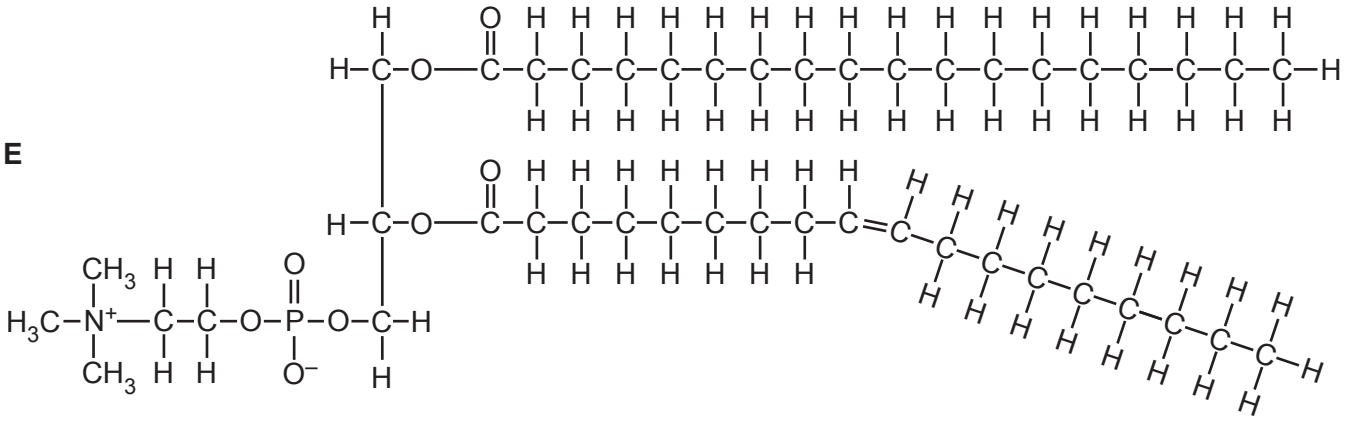


Fig. 1.1

(a) State the name of the bond in molecule **A** indicated by the arrow.

..... [1]

(b) Molecule **B** is described as a saturated fatty acid.

State why molecule **B** is described as a saturated fatty acid.

.....

..... [1]

(c) Molecule **D** is a polymer.

State the name of the monomer that is used to synthesise this polymer.

..... [1]

(d) State the letter of the molecule that could be formed during the hydrolysis of a polypeptide.

..... [1]

(e) State the letter of the molecule that forms part of the cell surface membranes of eukaryotic cells.

..... [1]

(f) Molecule **A** and molecule **C** dissolve in water. Molecule **B** does **not** dissolve in water.

Explain why molecule **A** and molecule **C** dissolve in water, but molecule **B** does **not** dissolve in water.

.....

.....

..... [1]

[Total: 6]

2 Fig. 2.1 shows some stages of the cell cycle in the meristematic tissue in the root tip of a plant. Three of these stages, **P**, **Q** and **R**, are identified in Table 2.1.

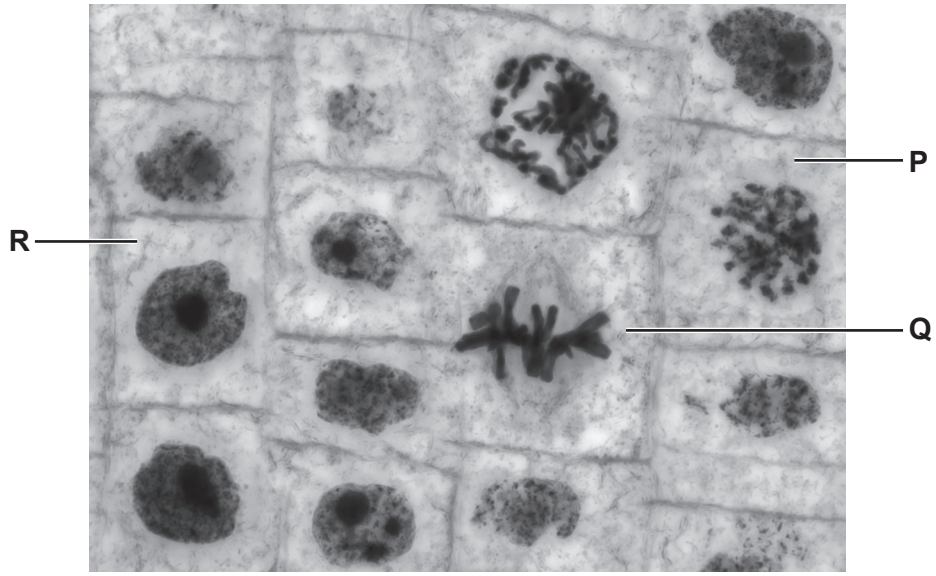


Fig. 2.1

(a) Complete Table 2.1 by stating **one** feature, **visible in Fig. 2.1**, that is used to identify each stage.

Table 2.1

cell	stage of cell cycle	reason
P	prophase of mitosis	
Q	metaphase of mitosis	
R	interphase	

[3]

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(b) (i) Draw a labelled diagram to show **one** chromosome at metaphase of mitosis.

On the chromosome you have drawn add labels to show:

- the position of a telomere
- a chromatid
- the centromere.

[4]

(ii) State the type of protein that is associated with DNA in chromosomes.

..... [1]

(iii) Describe how the spindle is involved during the process of mitosis.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 11]

3 The enzyme glucose 6-phosphate dehydrogenase (G6PD) is composed of two identical polypeptide chains.

(a) Students investigated the activity of two forms of G6PD, **J** and **K**, at different concentrations of substrate. **K** is a form of the enzyme that results from a mutation that changes one amino acid in the polypeptide.

The results are shown in Fig. 3.1.

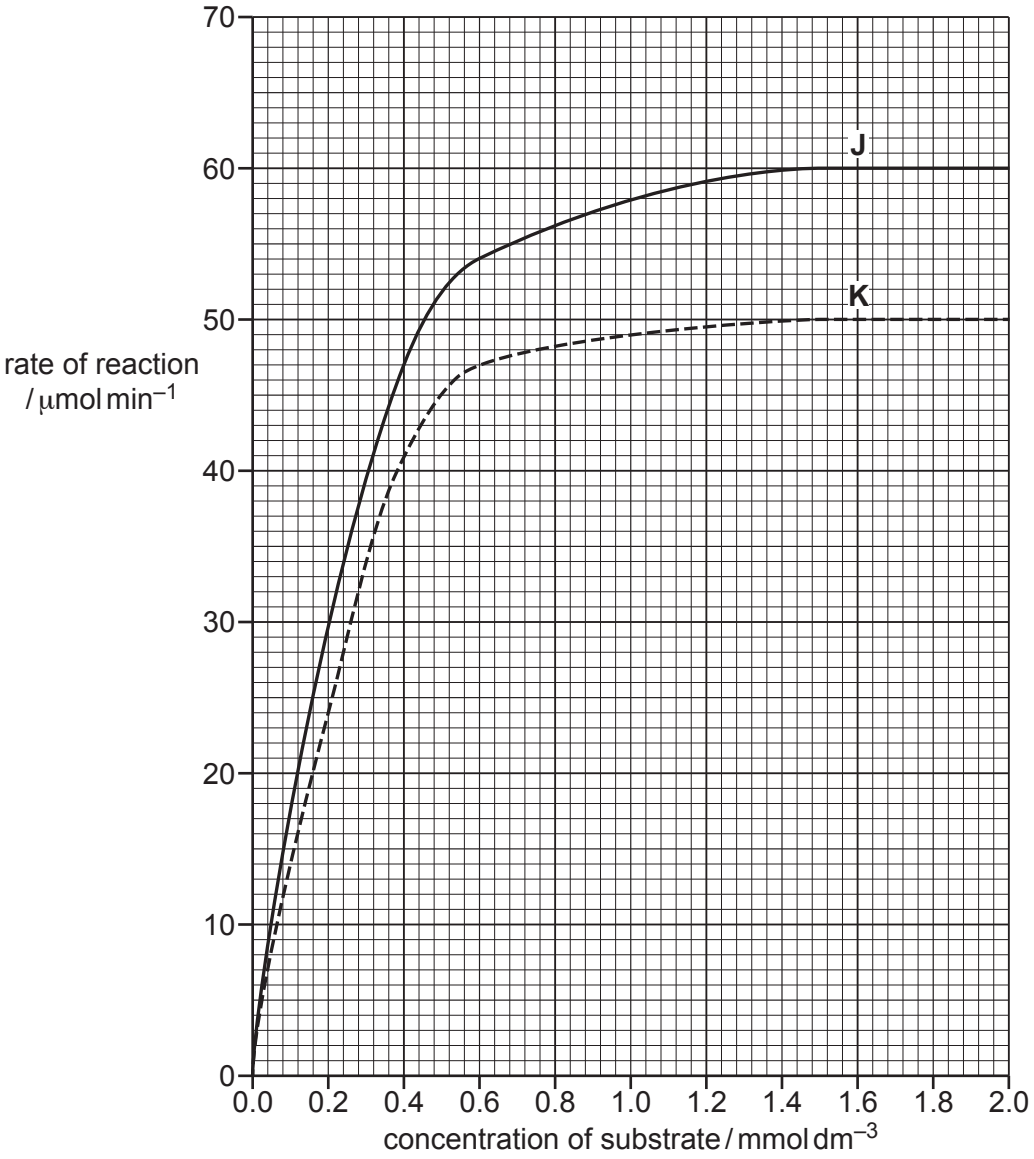


Fig. 3.1

(i) Use Fig. 3.1 to complete Table 3.1 by stating:

- the V_{max} and the K_m for enzymes **J** and **K**
- the units for V_{max} and K_m.

Table 3.1

	V_{max} /	K_m /
J		
K		

[3]

(ii) With reference to Fig. 3.1 and Table 3.1, describe the effect of the mutation on the activity of G6PD **and** suggest an explanation for this effect.

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..... [4]

(b) In certain conditions, G6PD may also exist as four identical polypeptide chains rather than two identical polypeptide chains.

Explain why both of these types of G6PD have all four levels of protein structure.

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..... [2]

[Total: 9]

4 Fig. 4.1 shows the site of gas exchange in the mammalian lung.

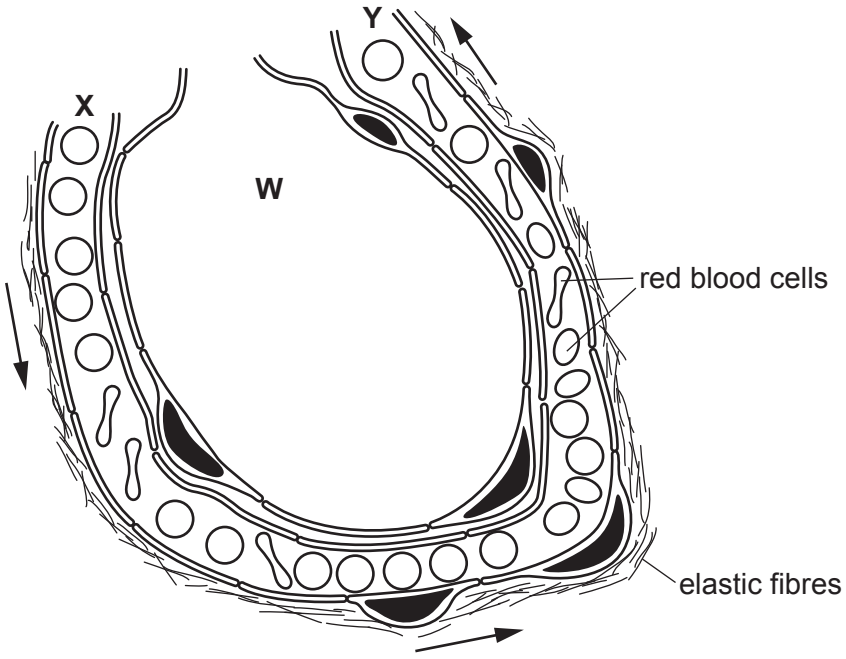


Fig. 4.1

(a) State **two** ways in which carbon dioxide is transported in the blood.

1 .....

2 .....
[2]

(b) Table 4.1 shows the partial pressures of oxygen (pO_2) and carbon dioxide (pCO_2) at locations **W**, **X** and **Y** in Fig. 4.1.

Table 4.1

partial pressure	locations within tissue		
	W	**X**	**Y**
pO_2 / kPa	13.87	5.33	13.87
pCO_2 / kPa	5.33	6.00	5.55

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With reference to Fig. 4.1 and Table 4.1, describe the exchanges that occur as blood flows from **X** to **Y**.

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.....

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..... [4]

(c) Elastic fibres are present in tissues at the site of gas exchange in the lungs.

Describe the roles of elastic fibres in the gas exchange system **and** in the cardiovascular system.

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..... [4]

(d) Scientists in Peru investigated the effect of moving from sea level to high altitude on the composition of blood. The scientists studied 10 students. Each student had lived at sea level since birth and then moved to live in the Andes at a height of 4500 metres above sea level.

The scientists took samples of blood from each student before they moved to live at high altitude. The scientists took further blood samples at intervals after the students had moved to high altitude.

The relative proportions of red blood cells and plasma in each sample were determined.

The total volume of blood for each student was also determined at each sampling time. As the students were all of different body mass, the total volumes were converted to a volume per kg of body mass ($cm^3\,kg^{-1}$).

Fig. 4.2 shows for each sampling time:

- the mean volume of blood per kg of body mass
- the proportions of red blood cells and plasma.

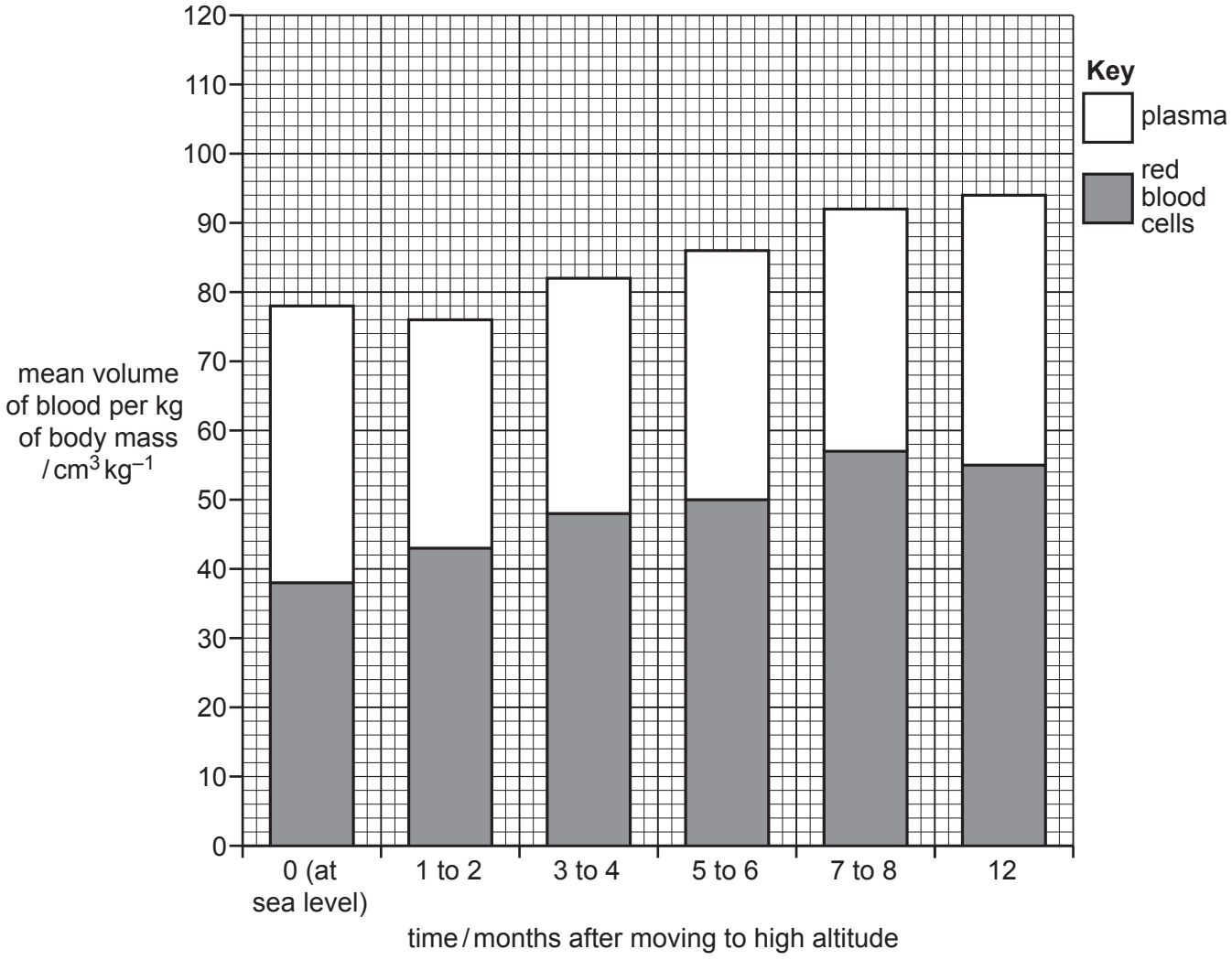


Fig. 4.2

(i) The percentage of mean blood volume that is represented by red blood cells for the samples taken at sea level is 48%.

Calculate the percentage of mean blood volume that is represented by red blood cells at 5 to 6 months after living at high altitude.

Show your working and give your answer to the nearest whole number.

answer = ...% [2]

(ii) Describe **and** explain the results in Fig. 4.2.

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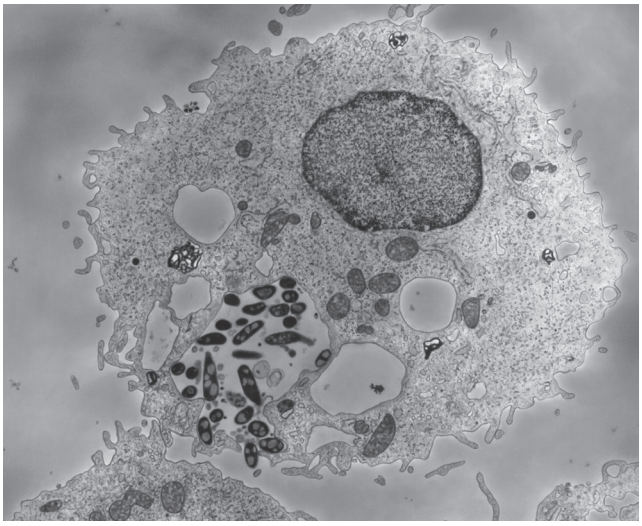
.....

..... [4]

[Total: 16]

5 The vaccine used to control tuberculosis (TB) is known as Bacillus Calmette-Guérin (BCG). The vaccine contains live bacteria that have been selected so that they do not cause disease in humans.

Fig. 5.1 shows a macrophage that is in the process of engulfing the bacteria in the vaccine.



magnification ×4400

Fig. 5.1

(a) (i) Name the pathogen that causes TB.

..... [1]

(ii) Describe how this pathogen is transmitted.

.....

.....

.....

.....

..... [2]

(b) Describe the events that occur in the body after the macrophage has engulfed the bacteria until the production of antibodies in response to the BCG vaccine.

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..... [5]

(c) Vaccines, such as BCG, stimulate the formation of memory cells.

Explain the role of memory cells in the body's defence against the TB pathogen.

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..... [3]

(d) Suggest why vaccination with BCG has not yet eradicated TB.

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..... [3]

[Total: 14]

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6 Fig. 6.1 shows the formation of a polypeptide during translation in a eukaryotic cell.

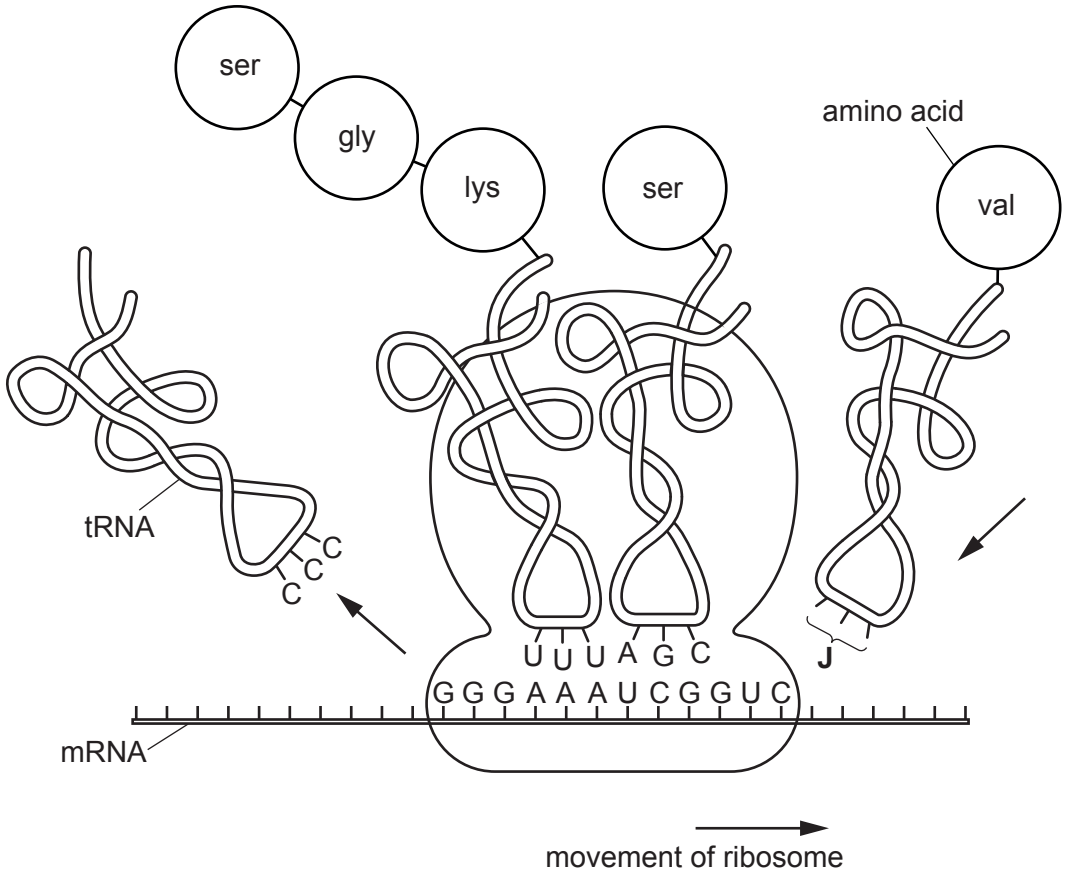


Fig. 6.1

(a) Name the purine bases shown in Fig. 6.1.

..... [1]

(b) State the name given to the group of three bases found at **J** on the tRNA molecule.

..... [1]

(c) Identify the three bases at **J**.

..... [1]

(d) State how the three bases at **J** on tRNA interact with the bases on mRNA.

..... [1]

[Total: 4]

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Answer **all** questions.

1 Picornaviruses are small viruses that are 30 nm in diameter. Picornaviruses are able to enter the cells of mammals and birds and can replicate within these cells.

Fig. 1.1 shows the entry of a picornavirus into its host cell.

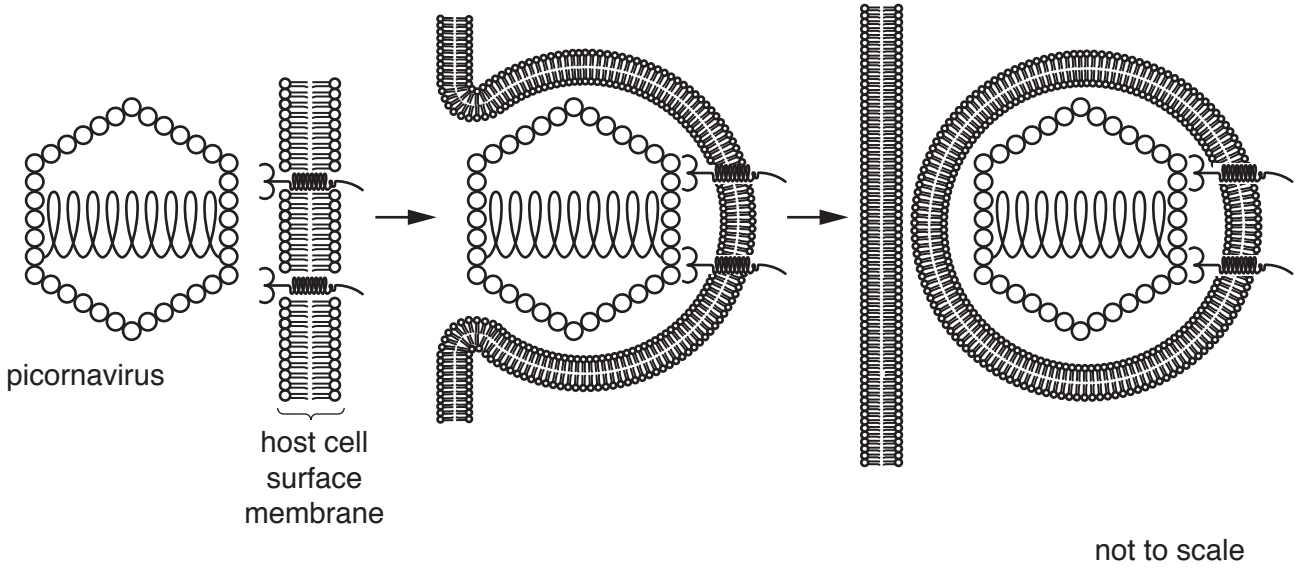


Fig. 1.1

(a) State the key features of a virus, such as picornavirus.

.....

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.....

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..... [2]

(b) State, with reasons, whether a picornavirus can be seen using the light microscope.

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..... [3]

(c) With reference to Fig. 1.1, describe how the picornavirus enters the host cell.

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..... [3]

[Total: 8]

2 In a healthy mammalian heart, contraction of the four chambers is coordinated by the action of the sinoatrial node (SAN) and atrioventricular node (AVN).

(a) After the atria fill with blood, atrial systole (contraction) occurs.

State the events that occur to initiate and cause atrial systole.

.....

.....

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..... [2]

(b) State **and** explain how the structure of the heart allows the atria to contract before the ventricles.

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.....

.....

.....

..... [2]

(c) Fig. 2.1 shows blood pressure changes that occur in the left ventricle, left atrium and aorta during one cardiac cycle.

E, **F**, **G** and **H** are the points at which a valve opens or closes as a result of blood pressure changes.

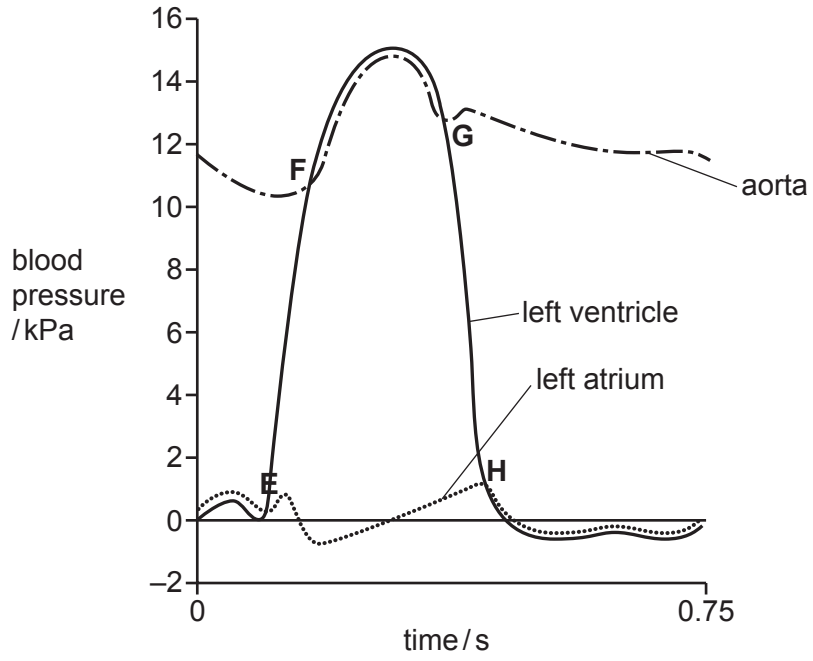


Fig. 2.1

(i) For each of the points **E**, **F**, **G** and **H** on Fig. 2.1, name the valve concerned **and** state whether the valve opens or closes.

E .....

F .....

G .....

H ..... [3]

(ii) Explain how Fig. 2.1 provides evidence that the wall of the left atrium has a different thickness to the wall of the left ventricle.

.....

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.....

.....

..... [2]

[Total: 9]

3 The Bacillus Calmette-Guérin (BCG) vaccine is the only vaccine used to provide protection against the infectious bacterial disease tuberculosis (TB). Most countries of the world have a BCG vaccination programme.

(a) TB is most commonly transmitted from person to person by aerosol infection. The causative organism is present in airborne droplets.

Name the species of causative organism of TB commonly passed from person to person by aerosol infection.

..... [1]

(b) In general, the countries that do not have a BCG vaccination programme are high-income countries that have a low number of cases of TB. In most of these countries, the vaccine is given only to babies and children at high risk of developing TB.

Suggest **one** reason why a child in a country with a low number of cases of the disease could be at a high risk of developing TB.

.....

.....

..... [1]

(c) Countries are classified by the World Bank into one of four income groups.

Table 3.1 shows the estimated incidence of TB for 2012 to 2016 for these income groups.

The incidence represents the number of new cases of TB occurring per 100 000 people in one year. The new cases include the number of cases that have occurred again after a period of recovery (relapse TB).

Table 3.1

	incidence per 100 000 people				
year / **income group**	**2012**	**2013**	**2014**	**2015**	**2016**
low	253	244	238	231	224
lower middle	244	240	236	232	227
upper middle	84	81	78	76	74
high	14	13	13	12	12

Describe the patterns and trends shown in Table 3.1.

.....

.....

.....

.....

.....

.....

.....

..... [3]

(d) There is evidence that the BCG vaccine has also provided protection against the disease leprosy.

Leprosy is caused by a bacterium that is closely related to the bacteria that cause TB.

Suggest why the BCG vaccine can also provide protection against leprosy.

.....

.....

.....

..... [2]

(e) A baby can gain artificial active immunity to TB after having the BCG vaccine. A baby can also gain natural passive immunity to TB.

State the differences between **artificial active** immunity and **natural passive** immunity.

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.....

.....

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..... [3]

[Total: 10]

4 Collagen is a major component of the cartilage found in some of the structures of the human gas exchange system. Cells that synthesise and secrete the components of cartilage are known as chondrocytes.

(a) Fig. 4.1 is a transmission electron micrograph of a chondrocyte.

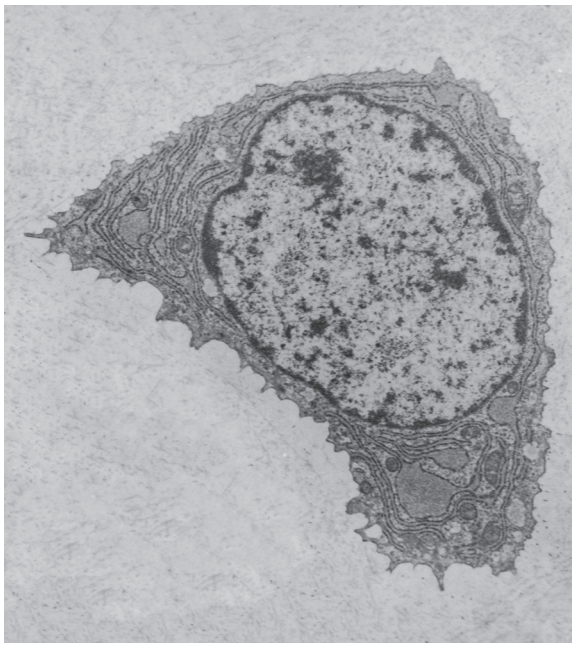


Fig. 4.1

With reference to Fig. 4.1, explain **two** features of the chondrocyte that show how the cell is adapted to its function.

.....

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.....

..... [2]

(b) **(i)** Describe the distribution of cartilage in the human gas exchange system.

.....

.....

.....

.....

..... [2]

(ii) Outline the function of cartilage in the human gas exchange system.

.....

.....

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.....

..... [2]

(c) Fig. 4.2 shows part of the primary structure of a collagen polypeptide.

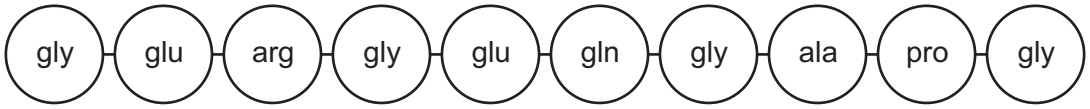


Fig. 4.2

(i) Name the type of covalent bond formed between the amino acids shown in Fig. 4.2.

..... [1]

(ii) Fig. 4.3 shows the molecular structure of the amino acid glycine (gly).

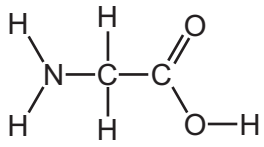


Fig. 4.3

With reference to Fig. 4.2 and Fig. 4.3 and the function of collagen, explain how the structure of a collagen polypeptide makes it suitable to form a collagen molecule.

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..... [3]

[Total: 10]

5 In most plants, sucrose is the main sugar that is transported from sources to sinks.

(a) In the source, sucrose is transferred from a mesophyll cell to a phloem sieve tube through a companion cell.

Describe **and** explain how the transfer of sucrose into a phloem sieve tube from a companion cell can lead to the transport of the sugar to a sink.

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..... [4]

(b) Fig. 5.1 shows part of one pathway that is used in plant cells to synthesise sucrose. The enzyme sucrose synthase catalyses the transfer of glucose from UDPG (uridine diphosphate glucose) to fructose.

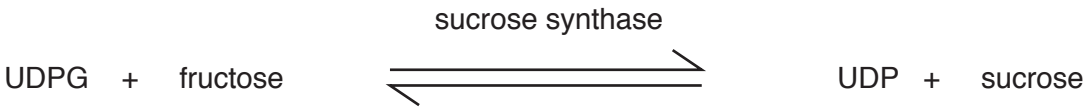


Fig. 5.1

The structure of UDPG is shown in Fig. 5.2.

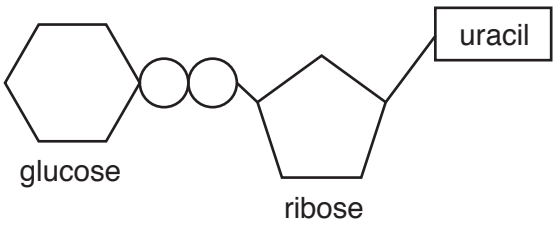


Fig. 5.2

(i) Name the type of bond formed when sucrose is synthesised.

..... [1]

(ii) Explain why UDP can be described as a phosphorylated nucleotide.

.....

.....

.....

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.....

.....

..... [2]

(iii) Sucrose synthase acts by using an induced fit mechanism rather than a lock and key mechanism.

With reference to sucrose synthase and the **synthesis** of sucrose, outline the difference between the induced fit mechanism and lock and key mechanism of enzyme action.

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.....

..... [4]

(c) UDPG is used in some algae (photosynthetic protoctists) to synthesise a storage compound known as floridean starch.

The molecular structure of floridean starch has been described as an intermediate between amylopectin and glycogen, with little or no amylose.

Describe the molecular structure of floridean starch by completing the passage.

Floridean starch is a polysaccharide composed of ..... monomers.

The monomers are joined by ..... and ..... linkages,

to give a branching structure that is less highly branched than

..... .

[4]

[Total: 15]

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6 The mitotic cell cycle in dividing cells is very carefully controlled.

(a) Complete Table 6.1 to show the correct order of stages in the mitotic cell cycle.

Some of the stages have been completed for you.

Table 6.1

stage of cell cycle	
G_1 phase	
.....	.....
.....	
.....	
.....	mitosis
.....	
telophase	
cytokinesis	

[3]

At various points during the mitotic cell cycle, checks are made. A cell goes through cell death (apoptosis) if errors occur that cannot be repaired. This makes sure that the daughter cells produced are genetically identical to each other and to the original cell.

Drugs have been developed that can inhibit the mitotic cell cycle and cause the cell to carry out apoptosis. These drugs are used in the treatment of cancer.

(b) Vincristine and 5-fluorouracil are chemical compounds that act as cell cycle inhibitors and can lead to apoptosis.

- Vincristine binds to spindle microtubules and prevents the spindle from carrying out its function.
- 5-fluorouracil prevents the synthesis of thymine nucleotides.

Complete Table 6.2 to show which event in the cell cycle will occur when Vincristine or 5-fluorouracil are added to healthy dividing cells at the start of the interphase stage of the cell cycle.

Place a tick (✓) if the event will occur or a cross (✗) if the event will **not** occur.

All boxes in the table should be completed.

Table 6.2

event in cell cycle / compound	S-phase completes	cell enters prophase of mitosis	chromosomes line up at spindle equator	sister chromatids move towards opposite poles
Vincristine				
5-fluorouracil				

[2]

(c) Vincristine has been used in the treatment of certain types of leukaemia.

Fig. 6.1 is a photomicrograph of a blood smear of a person with one form of leukaemia, which affects lymphocytes.

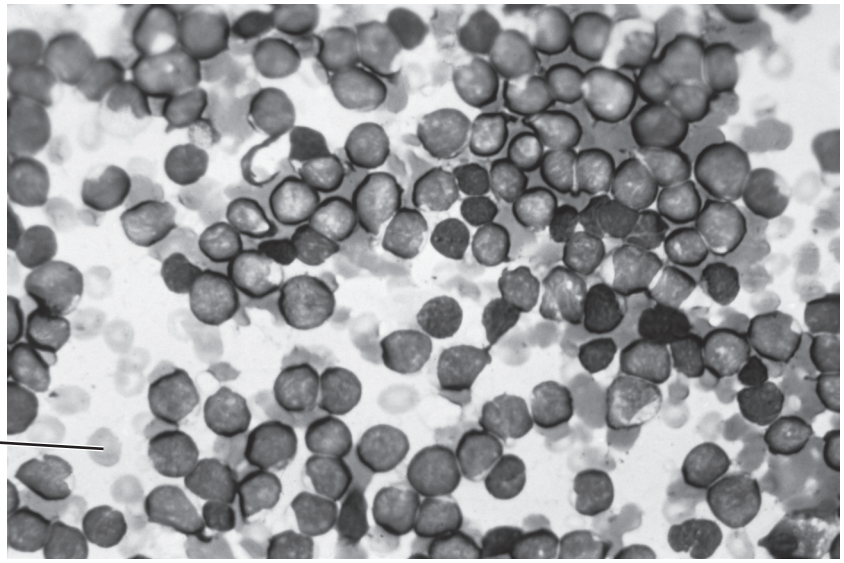


Fig. 6.1

Describe how:

- the blood smear shown in Fig. 6.1 differs from a blood smear of a healthy person
- the lymphocytes in a person with leukaemia, such as those shown in Fig. 6.1, differ from those of a healthy person.

blood smear differences .....

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.....

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lymphocyte differences .....

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..... [3]

[Total: 8]

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BIOLOGY **9700/23**

Paper 2 AS Level Structured Questions **May/June 2020**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Blank pages are indicated.

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[Turn over

Answer **all** questions.

1 Water and mineral ions are transported up the stem of a plant to the leaves within xylem vessels.

Some water and mineral ions can pass out of xylem vessel elements to supply parenchyma tissue in the stem.

(a) Fig. 1.1 is a plan diagram of a section through a stem.

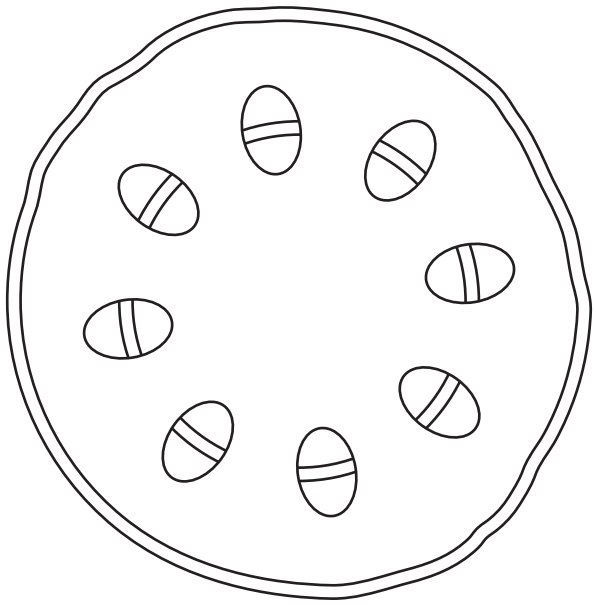


Fig. 1.1

Identify **one** location where xylem tissue occurs in the stem by drawing a label line and the letter **X** on Fig. 1.1. [1]

(b) Explain how hydrogen bonding between water molecules contributes to the movement of water within xylem vessels up the stem to the leaves.

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..... [3]

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(c) Fig. 1.2 is a diagram of a photomicrograph showing three adjacent parenchyma cells in the stem. These parenchyma cells can be described as typical plant cells.

The arrows show the direction of movement of water between the cells.

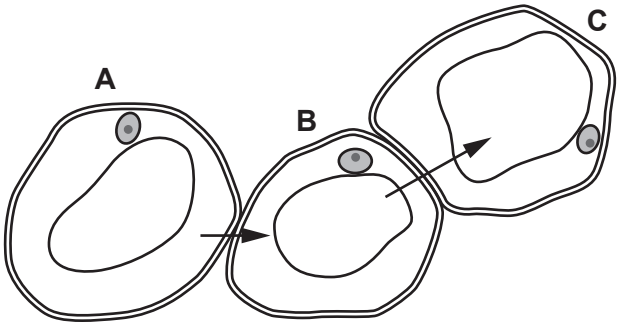


Fig. 1.2

(i) Describe **and** explain the movement of water shown in Fig. 1.2.

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..... [3]

(ii) Only some of the structures visible using the light microscope have been included in Fig. 1.2.

List the features that can be seen using the high power of a light microscope that help identify a parenchyma cell as a plant cell and **not** as an animal cell.

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..... [3]

[Total: 10]

2 In 2016, the highest number of cases of malaria and deaths caused by the disease were in sub-Saharan Africa. In many areas of sub-Saharan Africa, malaria is endemic (continually present) and people are at high risk of becoming infected with the *Plasmodium* pathogen.

In high risk areas it is recommended that:

- homes are provided with insecticide-treated nets (ITN)
- the surfaces inside homes where *Anopheles* mosquitoes may rest are sprayed with insecticide. This is known as indoor residual spraying (IRS).

(a) Explain how the use of ITN and IRS can help break the transmission cycle of malaria.

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..... [3]

(b) Fig. 2.1 shows the proportion of the population in sub-Saharan Africa at risk of malaria that is protected by using IRS or ITN, or both, in the years 2010 to 2016.

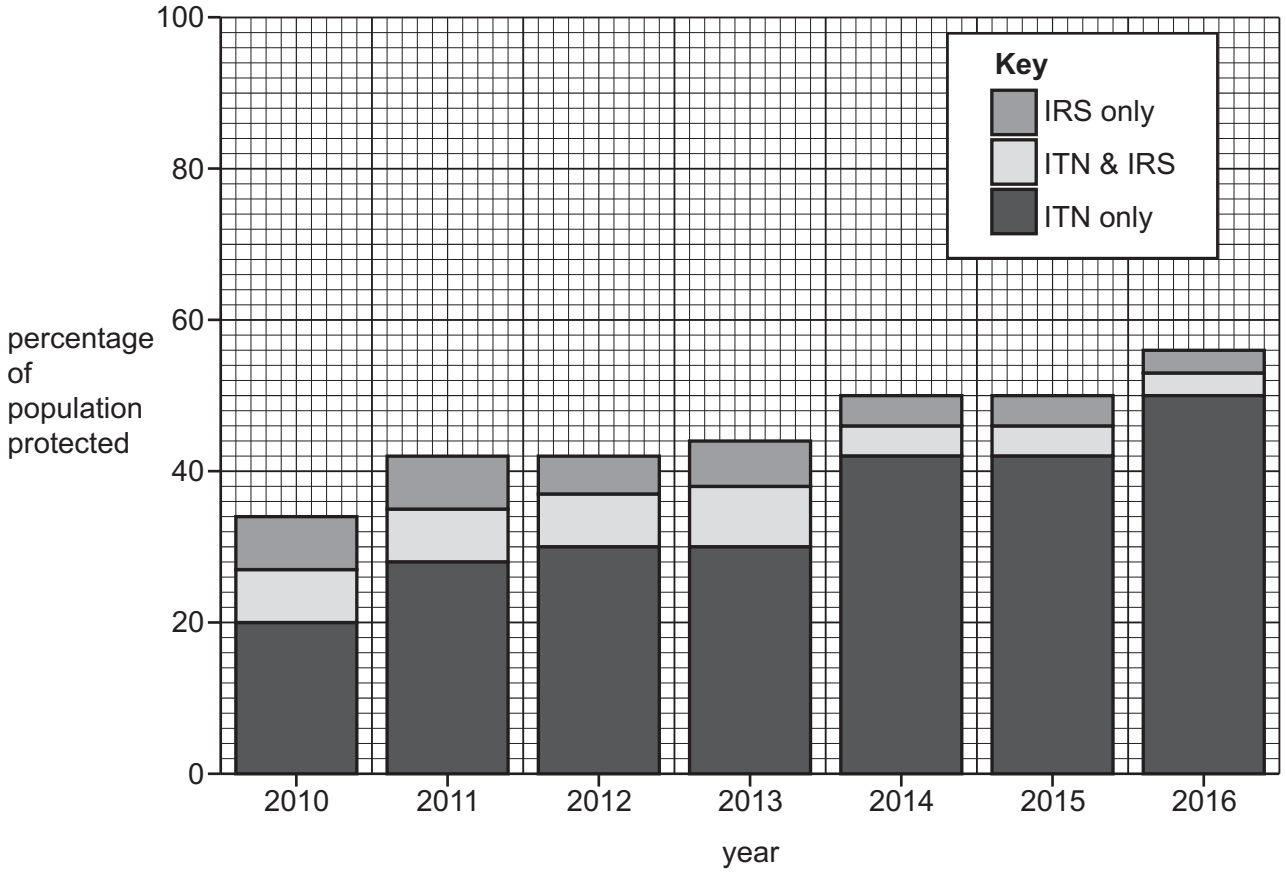


Fig. 2.1

The main trend in Fig. 2.1 shows that there is an increase in the percentage of the population protected over time.

(i) State **one** other trend shown in Fig. 2.1.

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..... [1]

(ii) Explain why the main trend shown in Fig. 2.1 could be a concern for the World Health Organization.

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..... [1]

(iii) With reference to Fig. 2.1, suggest a reason for the difference in trends shown for ITN only compared with IRS only.

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..... [1]

(c) In a primary immune response, antibodies against *Plasmodium* are produced within one to two weeks following infection. In some people, the pathogen is eliminated and the concentration of antibodies in the circulation decreases over time.

Infection again by *Plasmodium* with the same antigens causes a secondary response that also involves antibody production.

State **and** explain how the antibody response following a second infection will differ from the primary immune response.

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..... [3]

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[Turn over

(d) In malaria, the production of antibodies is beneficial to recovery, whereas in the disease myasthenia gravis the production of antibodies is harmful.

Explain why the production of antibodies in a person with myasthenia gravis is harmful.

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..... [2]

[Total: 11]

3 **(a)** Fig. 3.1 is a photomicrograph of a section through two different types of blood vessels, **X** and **Y**.

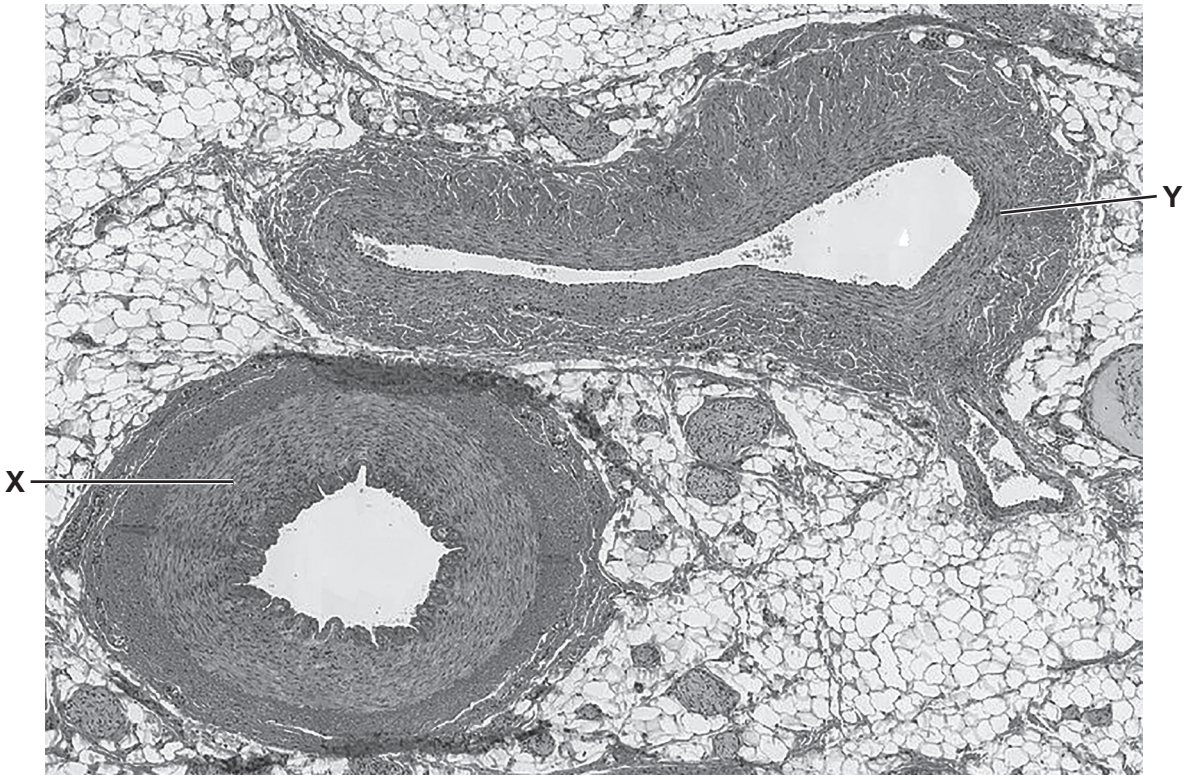


Fig. 3.1

(i) Name the two types of blood vessel shown by **X** and **Y** in Fig. 3.1.

X .....

Y ..... [1]

(ii) State the reasons for your identification of the type of blood vessel shown by **Y** in Fig. 3.1.

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..... [2]

(b) Tissue fluid and lymph are formed when blood arrives in the capillary networks of body tissues.

(i) Explain why tissue fluid is more similar to blood plasma than it is to blood.

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..... [2]

(ii) Explain why the tissue fluid formed after blood arrives in the capillary network has a **higher** concentration of amino acids than the newly formed lymph draining away from the network.

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..... [1]

(c) The trachea, bronchi and bronchioles in the gas exchange system require a supply of glucose and oxygen from the blood for the functioning of smooth muscle.

Outline the function of smooth muscle in the gas exchange system.

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..... [2]

[Total: 8]

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[Turn over

4 *Saccharomyces cerevisiae* is a unicellular fungus that is important in the brewing and baking industries.

Fig. 4.1 is a diagram of a transmission electron micrograph of *S. cerevisiae*.

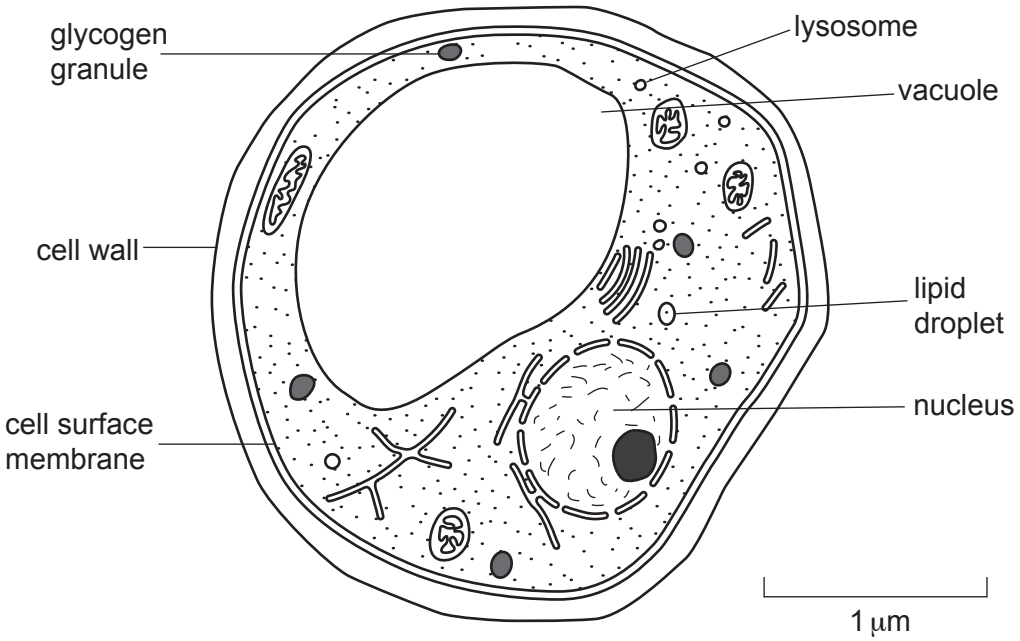


Fig. 4.1

(a) A student was asked to calculate the magnification of the image shown in Fig. 4.1.

The student began by measuring the length of the scale bar in millimetres using a millimetre ruler.

State what the student should do next to obtain the correct answer.

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..... [1]

(b) One function of the lipid droplets shown in Fig. 4.1 is to store triglycerides.

The triglycerides in a lipid droplet are surrounded by a single layer (monolayer) of phospholipids.

Suggest **and** explain why phospholipids, rather than triglycerides, are used for the outer monolayer of the lipid droplet.

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..... [2]

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(c) The lysosomes and vacuole of *S. cerevisiae* contain acid hydrolases (hydrolytic enzymes) that function in an acid pH.

Explain why lysosomes need hydrolases to carry out their function.

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..... [1]

(d) A disaccharide, trehalose, is a reserve store of energy for *S. cerevisiae* when glycogen stores decrease. The monomer of glycogen and trehalose is α-glucose.

(i) Complete Fig. 4.2 to show the ring structure of **one** α-glucose molecule.

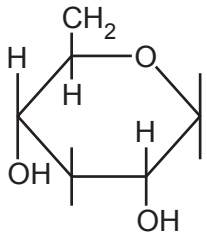


Fig. 4.2

[2]

(ii) A student carried out tests on a solution of trehalose and correctly concluded that trehalose is a **non-reducing** sugar.

Outline the procedure carried out by the student **and** state the results that were obtained.

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..... [3]

(e) The hydrolysis of trehalose is catalysed by two different enzymes produced by *S. cerevisiae*, regulatory trehalase and non-regulatory trehalase.

A study was carried out to compare regulatory trehalase and non-regulatory trehalase extracted from *S. cerevisiae*.

The results of the study showed that:

- regulatory trehalase had a higher K_m value (Michaelis-Menten constant) than non-regulatory trehalase
- the optimum pH of regulatory trehalase was pH 7.0–7.8
- the optimum pH of non-regulatory trehalase was pH 4.5–5.0.

(i) Explain what is meant by a higher K_m value.

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..... [2]

(ii) Regulatory trehalase is found only in the cytosol, the fluid part of the cytoplasm.

Non-regulatory trehalase has been found on the external surface of the cell surface membrane and inside the cell.

State the location inside the cell where non-regulatory trehalase is likely to be found **and** explain the reason for your answer.

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..... [2]

(iii) Explain whether both types of trehalase, regulatory and non-regulatory, can be described as intracellular enzymes.

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..... [1]

(f) *Saccharomyces boulardii* is a strain of *S. cerevisiae*. It has been researched for its possible health benefits for some gut diseases.

Researchers investigating trehalase extracted from *S. boulardii* concluded that only one type of trehalase was present in the extract.

Fig. 4.3 shows the effect of pH on the activity of the trehalase extracted from *S. boulardii*.

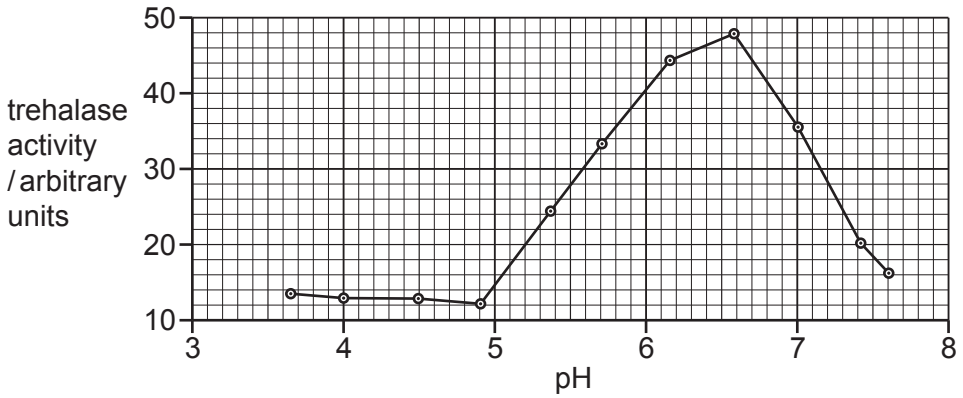


Fig. 4.3

With reference to Fig. 4.3 and to the two different types of trehalase enzyme produced by *S. cerevisiae*, state **and** explain what can be deduced about the type of trehalase present in *S. boulardii*.

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..... [3]

[Total: 17]

5 Blood cells are formed from tissue stem cells in the bone marrow. These bone marrow stem cells go through a number of mitotic cell cycles to form the fully functioning blood cell.

Fig. 5.1 shows the three main stages of the cell cycle.

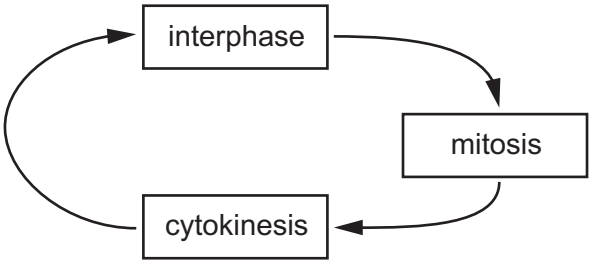


Fig. 5.1

The activity of genes changes during the mitotic cell cycle.

When genes are being expressed, the cell produces many messenger RNA (mRNA) molecules and ATP molecules.

(a) Explain what is meant by a gene.

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..... [2]

(b) Name the main stage of the cell cycle in Fig. 5.1 during which most mRNA and ATP is formed.

..... [1]

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(c) Fig. 5.2 is an incomplete diagram of an ATP molecule.

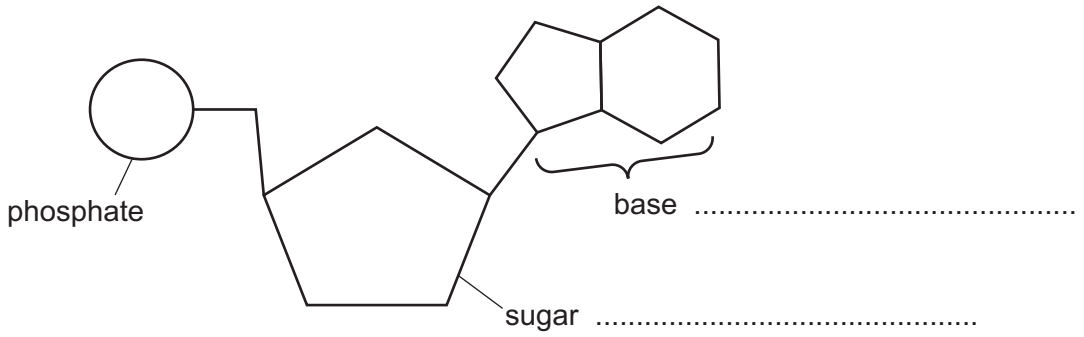


Fig. 5.2

(i) On Fig. 5.2:

- complete the diagram of the ATP molecule
- write the name of the base in the space provided
- write the name of the sugar in the space provided.

[3]

(ii) The base shown in Fig. 5.2 has a double ring structure.

State the term for a base that has a double ring structure.

..... [1]

(d) Suggest **and** explain the role of mitosis in the formation of blood cells by the bone marrow stem cells.

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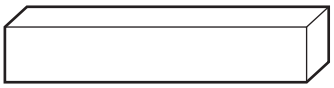
[Total: 10]

6 A student carried out an investigation to estimate the water potential of potato tissue. The main steps in the procedure and in the analysis of results are outlined in Fig. 6.1.

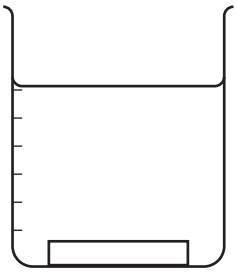
beaker	concentration of sucrose solution / mol dm^{-3}
1	0.0
2	0.1
3	0.2
4	0.3
5	0.4
6	0.5

Six different concentrations of sucrose solution were prepared and an equal volume of each was placed in a labelled beaker.

↓



Six equal-sized blocks of potato tissue were cut out of the same potato, blotted dry and weighed.



One potato block was immersed in the solution in each beaker for 30 minutes.

After this time, the block was removed, blotted dry and reweighed.

↓

The experiment was repeated twice.

↓

The mean percentage change in mass of potato tissue was calculated for each concentration of sucrose used.

↓

A graph was drawn of mean percentage change in the mass of potato tissue against concentration of sucrose.

Fig. 6.1

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(a) Explain why the different concentrations of sucrose result in different mean percentage changes in mass of potato tissue.

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(b) State how the graph is used to estimate the water potential of the potato tissue.

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..... [1]

[Total: 4]

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