Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/11**

Paper 1 Multiple Choice **October/November 2014**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

8867272227

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice 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.
Electronic calculators may be used.

This document consists of **15** printed pages and **1** blank page.

CAMBRIDGE International Examinations

1 When making measurements in experiments, which methods could have parallax errors?

1 using a calibrated eyepiece graticule to measure length

2 using a measuring cylinder to measure volume

3 using a ruler to measure length of a shoot

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

2 Which part of the cell is often continuous with the rough endoplasmic reticulum?

A cell surface membrane

B Golgi apparatus

C mitochondrion

D nuclear envelope

3 Which structures are found in both chloroplasts and mitochondria?

1 70S ribsomes

2 80S ribsomes

3 circular DNA

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

4 Tay-Sachs disease occurs when cells are unable to produce an enzyme, leading to a build up of certain lipids in cells.

Which cell structure would **not** function correctly, resulting in the disease?

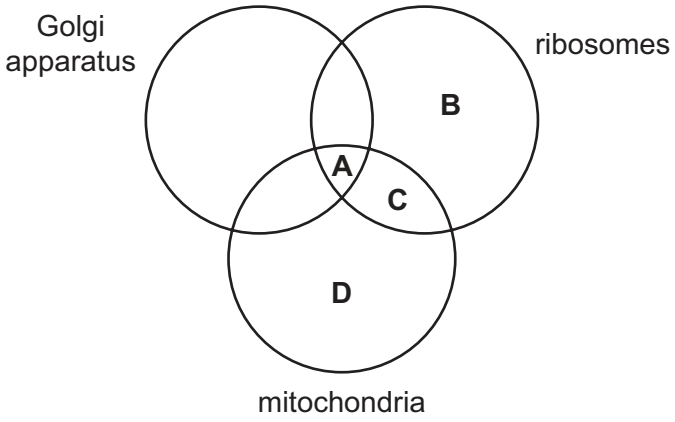
A Golgi apparatus

B lysosome

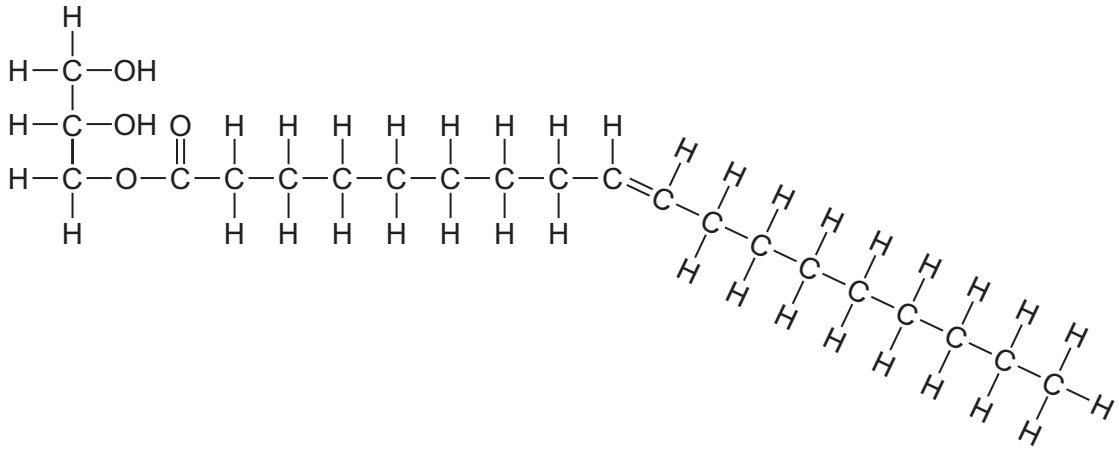
C mitochondrion

D smooth endoplasmic reticulum

5 Which structures are present in a cell of *Plasmodium*?



6 The diagram shows a triglyceride molecule that has been partially hydrolysed.



What will be the products of the total hydrolysis of the molecule shown?

A a molecule of glycerol and a saturated fatty acid molecule only

B a molecule of glycerol and an unsaturated fatty acid molecule only

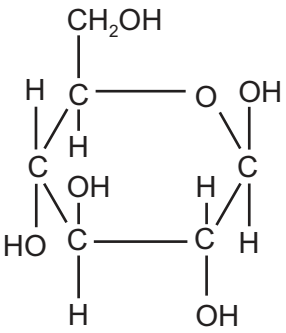
C a molecule of water, a molecule of glycerol and a saturated fatty acid molecule

D a molecule of water, a molecule of glycerol and an unsaturated fatty acid molecule

[Turn over

7 Which shows α-glucose?

A



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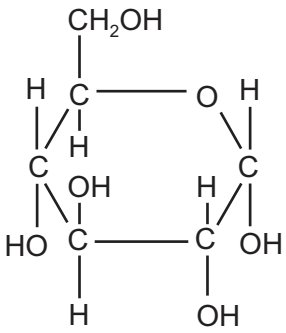

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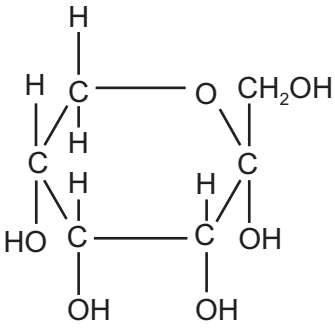
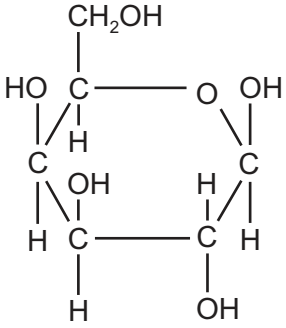


D

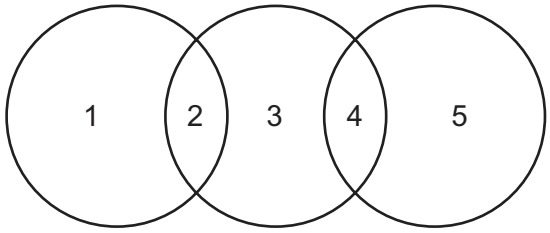


8 Which correctly matches the functional and structural features of cellulose, collagen, glycogen or triglyceride?

		function	structure		
			fibrous	molecule held together by hydrogen bonds	branched chains
A	cellulose triglyceride	support energy source	✓ ✗	✓ ✗	✗ ✗
B	collagen cellulose	strengthening support	✓ ✓	✓ ✗	✗ ✓
C	collagen glycogen	strengthening storage	✓ ✗	✓ ✗	✓ ✓
D	glycogen triglyceride	storage energy source	✗ ✗	✓ ✓	✓ ✗

key ✓ = true ✗ = false

9 The diagram shows the relationship between the levels of protein structure and bonds.



Which row is correct?

	1	2	3	4	5
A	primary	peptide	secondary	ionic	tertiary
B	secondary	hydrogen	tertiary	peptide	primary
C	tertiary	ionic	primary	peptide	quaternary
D	quaternary	ionic	tertiary	ionic	secondary

10 How many molecules of oxygen are bound to one molecule of haemoglobin, when it is fully saturated with oxygen?

A 1 **B** 2 **C** 4 **D** 8

11 Why do large increases in the temperature **or** pH alter enzyme activity?

1 They change the three-dimensional shape of the enzyme.

2 They disrupt hydrogen and ionic bonds in the enzyme.

3 They increase hydrophobic interactions in the enzyme.

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

12 Ethylene glycol is a chemical used to prevent water from freezing. If ethylene glycol is swallowed accidentally, it is metabolised by an enzyme found in liver cells to produce a toxic product.

The enzyme normally catalyses the oxidation of ethanol to a harmless product.

People who have swallowed ethylene glycol are treated with large doses of ethanol. This prevents formation of a toxic product and allows the body to excrete the ethylene glycol.

Which statement describes why this treatment works?

A Ethanol binds near the active site on the enzyme, altering its shape.

B Ethanol binds permanently to the active site of the enzyme, blocking it.

C Ethanol changes the tertiary structure of the enzyme, denaturing it.

D Ethanol is more likely to bind to the active site on the enzyme.

13 Increasing which type of bond helps to increase the fluidity of the cell surface membrane?

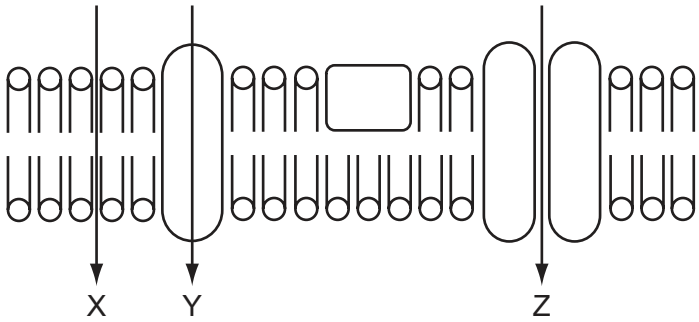
A C—O—C

B C—N

C C=C

D hydrogen

14 The diagram shows three routes, X, Y and Z, through which substances can pass across a cell surface membrane.



Which correctly shows the routes for vitamin D, which is fat soluble, and vitamin C, which is water soluble?

	vitamin D	vitamin C
A	Y	X
B	X	Y
C	X	Z
D	Z	Y

15 In plants adapted to cold conditions, their cell surface membranes change as the weather gets colder, allowing the plants to carry out exocytosis.

Which change occurs in their cell surface membranes?

A a decrease in the ratio of proteins to saturated phospholipids

B a decrease in the ratio of unsaturated phospholipids to saturated phospholipids

C an increase in the ratio of proteins to unsaturated phospholipids

D an increase in the ratio of unsaturated phospholipids to saturated phospholipids

16 Which statement about a diploid cell is **not** correct?

A It can undergo a mitotic division to allow growth to occur.

B It can undergo a mitotic division to repair a cell.

C It can undergo a reduction division to form haploid cells.

D It is one that possesses two complete sets of chromosomes.

17 Laboratory mice whose *p53* genes had been switched off developed tumours.

When their *p53* genes were switched on again, the tumour cells stopped dividing and died within a few days. Healthy cells in the mice were unaffected.

What do these observations suggest?

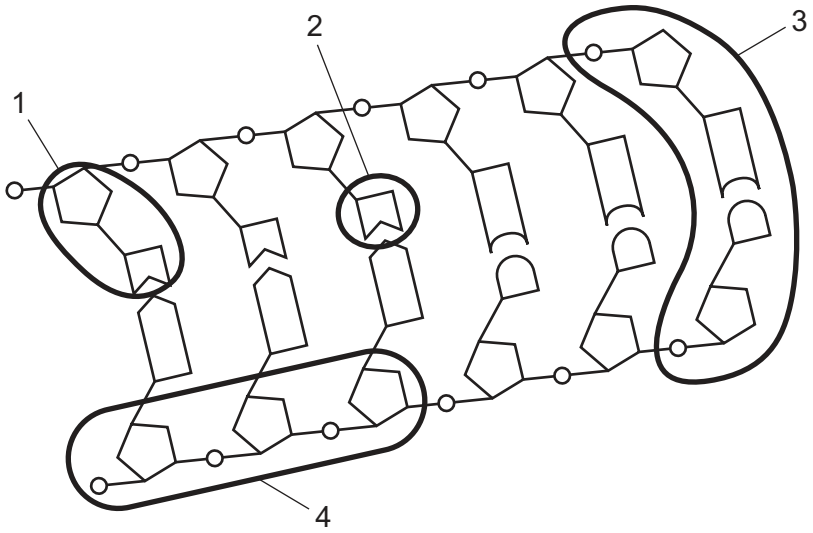
A *p53* protein speeds up the mitotic cell cycle

B *p53* protein causes all cells to die

C the *p53* gene acts as a tumour suppressor gene

D the *p53* gene encourages the growth of tumours

18 The diagram shows part of a DNA molecule.



Which regions contain phosphate groups?

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

19 Some antibiotics work by binding to ribosomes and preventing protein synthesis.

Which statement explains why these antibiotics kill bacterial cells but not human cells?

A In bacterial cells mRNA is formed in the cytoplasm from naked DNA.

B Ribosomes in human cells have a different structure from those in bacterial cells.

C The antibiotics cannot pass through human cell surface membranes.

D The tRNA molecules in bacterial cells are different from those in human cells.

20 Which statements about tRNA are correct?

1 contains base pairing

2 contains hydrogen bonds

3 is single stranded

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

21 What is the main function of a companion cell in phloem tissue?

A providing cytoplasmic contact with the sieve tube element for loading

B providing structural support for the sieve tube element

C providing the nucleus for cell division in the phloem

D providing the source of assimilates for storage

22 How does sucrose move from chloroplasts to the phloem?

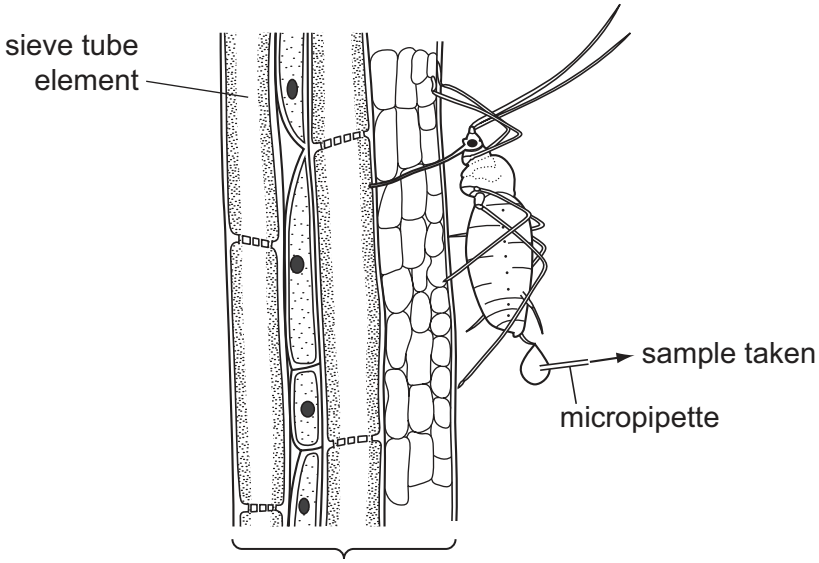
1 mass flow

2 apoplast pathway

3 symplast pathway

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

23 A large number of aphids were used to collect samples of the contents of the sieve tube elements of a tomato plant.



(aphid and stem are **not** drawn to the same scale)

Different samples of the sieve tube solution were tested.

Which was the correct result?

	Benedict's test		iodine solution
	before hydrolysis	after hydrolysis	
A	blue	blue	blue-black
B	blue	red	orange
C	red	blue	blue-black
D	red	red	orange

24 Which row is correct for the pulmonary vein?

	blood carried	muscle in walls	lumen size
A	deoxygenated	thick	small
B	deoxygenated	thin	large
C	oxygenated	thick	small
D	oxygenated	thin	large

[Turn over

25 Which statement describes the Bohr effect?

A In high partial pressure of oxygen and high partial pressure of carbon dioxide, the affinity of haemoglobin for oxygen increases.

B In high partial pressure of oxygen and low partial pressure of carbon dioxide, the affinity of haemoglobin for oxygen decreases.

C In low partial pressure of oxygen and high partial pressure of carbon dioxide, the affinity of haemoglobin for oxygen decreases.

D In low partial pressure of oxygen and low partial pressure of carbon dioxide, the affinity of haemoglobin for oxygen is unchanged.

26 What is produced by the action of carbonic anhydrase?

A carbaminohaemoglobin

B haemoglobinic acid

C hydrogencarbonate ions

D oxyhaemoglobin

27 During the cardiac cycle, the movement of the valves causes sounds that can be heard using a stethoscope.

What causes the first sound after atrial systole in the cardiac cycle?

1 closing of the atrioventricular valves

2 opening of the semilunar valves

3 closing of the semilunar valves

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

28 The following are all parts of the heart that control the heart action.

1 sinoatrial node (SAN)

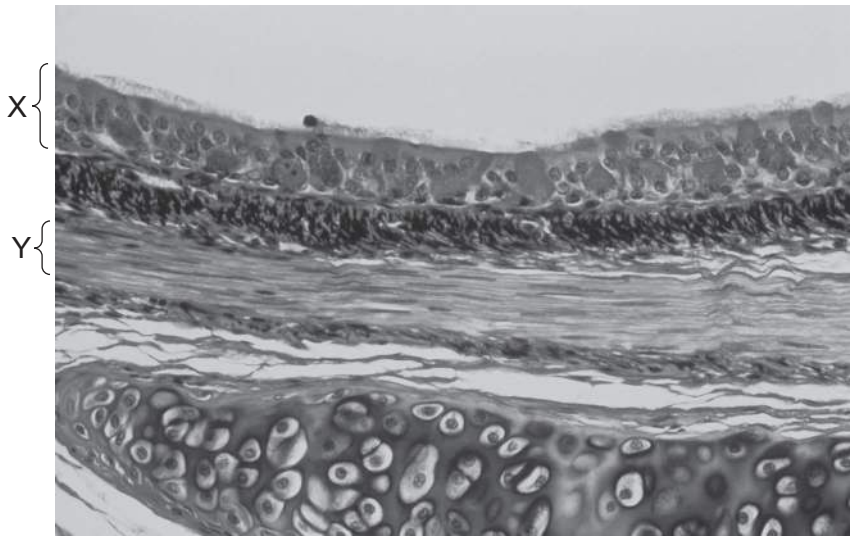
2 atrioventricular node (AVN)

3 Purkyne tissue

Which row for atrial contraction and ventricular contraction is correct?

	atrial contraction	ventricular contraction
A	AVN produces wave of excitation	SAN produces wave of excitation
B	Purkyne tissue carries wave of excitation	AVN produces wave of excitation
C	SAN and AVN node produce wave of excitation	Purkyne tissue carries the wave of excitation
D	SAN produces wave of excitation	Purkyne tissue carries wave of excitation

29 The photomicrograph shows a cross-section through a bronchus.



What is the function of the tissues X and Y?

	X	Y
A	secrete mucus	prevent collapse of the airway
B	support the airway	dilate airway
C	trap dust and dirt	secrete mucus
D	waft dust and dirt upwards	constrict airway

30 Which component(s) of tobacco smoke cause an increase in blood pressure and clot formation?

1 carcinogens

2 nicotine

3 tar

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

31 Peak Flow is used in hospitals to diagnose some lung diseases. It measures the maximum rate at which air can be breathed out from the lungs.

How will the Peak Flow for a person with emphysema differ from that for a healthy person?

A It falls as carbon monoxide reduces oxygen-carrying capacity of the blood.

B It falls as elastic fibres are damaged in the alveoli.

C It remains constant as the damage to the lungs does not affect the lung volume.

D It rises as larger air spaces make it easier for the air to flow.

32 The following are all methods of transmission of infectious diseases.

1 droplet

2 food

3 contact

4 vector

Which row shows the correct organism and method of transmission of each disease?

	malaria	TB	HIV
A	bacterium 4	virus 1 and 2	virus 3 and 4
B	protoctist 4	bacterium 1 and 2	virus 3
C	protoctist 3	virus 1	bacterium 3
D	bacterium 3	protoctist 1	bacterium 1 and 3

33 40% of the world's population live in an area where malaria is a threat to health. In recent years there have been many more cases of malaria in Africa.

What is the **social factor** that is letting the spread of malaria get out of control?

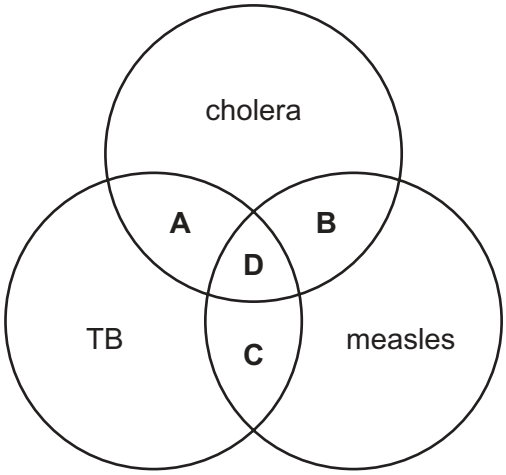
A an increase in drug resistant forms of malaria

B climate change

C difficulty in producing a vaccine

D migration of people because of wars

34 Which diseases are treated with antibiotics?



35 Which are specific immune responses?

1 phagocytosis

2 production of antibodies

3 effect of histamine

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

36 Why has vaccination failed to eradicate cholera?

A The pathogen exists in many strains which mutate.

B The pathogen is present in the lumen of the gut.

C The pathogen is waterborne.

D There is a stage of the life cycle in other mammals.

37 A person's blood group is determined by antigens present on the red blood cells. Most people have antibodies in their blood plasma even if they have never received a blood transfusion. It is these antibodies in the plasma of the person who receives the blood which makes some blood transfusions unsafe.

The table shows the antigens and antibodies in the blood of people with different blood groups.

blood group	antigens on red blood cells	antibodies in plasma
A	A	antibodies to B
B	B	antibodies to A
AB	A and B	no antibodies to A and B
O	neither A nor B	antibodies to A and B

Which are the blood groups of people who can safely receive blood from a person who has blood group A?

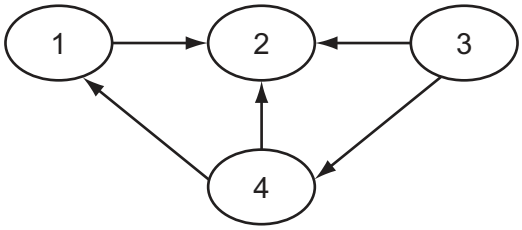
A A and AB

B A and O

C B and O

D AB only

38 The diagram shows the flow of energy between organisms in an ecosystem.



Which correctly identifies each organism in the ecosystem?

	1	2	3	4
A	primary consumers	decomposers	secondary consumers	producers
B	primary consumers	secondary consumers	producers	decomposers
C	secondary consumers	decomposers	producers	primary consumers
D	secondary consumers	primary consumers	decomposers	producers

39 In a freshwater food chain, which involves the least efficient energy transfer?

A Large fishes feed on the small fishes.

B Small fishes feed on the water fleas.

C Unicellular algae trap sunlight.

D Water fleas feed on the unicellular algae.

40 Which statement concerning events occurring in the nitrogen cycle is **not** correct?

A Free-living nitrogen-fixing bacteria release organic nitrogen compounds into the soil where bacteria convert these to nitrites and nitrates.

B Nitrifying bacteria cause an increase in nitrate ions which are used by plants to make proteins.

C Nitrogen-fixing bacteria use atmospheric nitrogen which is replaced by the action of denitrifying bacteria in waterlogged soil.

D Saprophytic bacteria and fungi decompose organic nitrogen compounds excreted and egested by producers and consumers.

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