OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE BIOLOGY A

A222/01

Unit 2: Modules B4 B5 B6
(Foundation Tier)

OCE/10201

Candidates answer on the question paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:
- Pencil
- Ruler (cm/mm)

Wednesday 20 May 2009
Afternoon

Duration: 40 minutes

A222201

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **42**.
- This document consists of **20** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Some types of bacteria are able to break down dead leaves in soil.

The bacteria are called decomposers and live in soil.

The bacteria release **enzymes** onto the dead leaves to speed up the process of decay.

(a) What type of substance are enzymes made of?

Put a tick (✓) in the box next to the correct answer.

carbohydrate	☐
fat	☐
protein	☐

[1]

(b) Some soil and dead leaves increase in temperature from 4 °C to 10 °C.

What will happen to the **collision rate** between the enzymes released by the bacteria and the molecules in the leaves as the temperature increases?

Put a (ring) around the correct answer.

decreases **increases** **stays the same**

[1]

(c) Complete the sentences about enzymes.

Choose words from the list.

colour

keep

shape

start

stop

taste

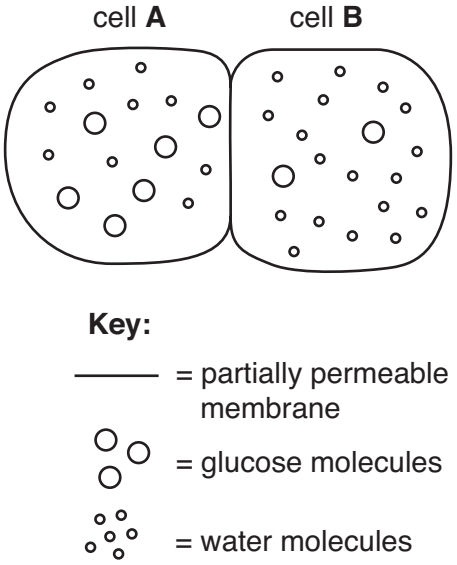
At very high temperatures, enzymes ..... working.

Only molecules with the correct ..... can fit into the enzyme. **[2]**

[Total: 4]

2 Viktor is studying osmosis.

He draws a diagram showing a **model** of osmosis.



(a) What does cell **A** in the diagram contain compared to cell **B**?

Put a tick (✓) in the box next to the correct answer.

pure water ☐

a more concentrated solution of glucose ☐

a more dilute solution of glucose ☐

[1]

(b) Viktor wants to describe how water moves between these cells.

What will happen to the water molecules?

Put a tick (✓) in the box next to the correct description.

water molecules will move equally between **A** and **B** ☐

more water molecules will move from **A** to **B** ☐

more water molecules will move from **B** to **A** ☐

[1]

(c) Complete the sentences about osmosis.

Choose words from the list.

cell division

concentrated

diffusion

dilute

glucose

heat

oxygen

water

Osmosis is a specific type of ..... .

Osmosis is the overall movement of ..... molecules.

These molecules move from a ..... to a more ..... glucose solution through a partially permeable membrane. **[2]**

[Total: 4]

3 Sophie takes part in an exercise class.

She starts to sweat.

(a) What happens to Sophie's **body temperature** to cause her to sweat?

Put a (ring) around the correct answer.

decreases slightly **doubles** **halves** **increases slightly**

[1]

(b) The changes in Sophie's body temperature are detected and processed.

Complete the sentences describing how this happens.

Choose words from the list.

The words may be used once, more than once, or not at all.

brain

heart

kidneys

liver

lungs

skin

Changes in the temperature of the blood are detected by temperature receptors in the ..... .

Changes in the external temperature are detected by temperature receptors in the ..... .

Information received from the temperature receptors is processed by the ..... . **[2]**

(c) Sophie loses water when she sweats.

How can Sophie replace some of this lost water?

Put a (ring) around the correct answer.

breathing **growing** **respiring** **excreting urine**

[1]

(d) Sweating is involved in homeostasis.

What is **homeostasis**?

Draw **two** straight lines to link the correct **beginning**, **middle** and **end** to complete the sentence.

beginning	middle	end
The change …		… total environment.
or	… of a constant …	or
The maintenance …	or	… internal environment.
or	… of a varying …	or
The increase …	or	… external environment.
or	… of a different …	or
The decrease …		… natural environment.

[2]

[Total: 6]

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Question 4 starts on page 10.

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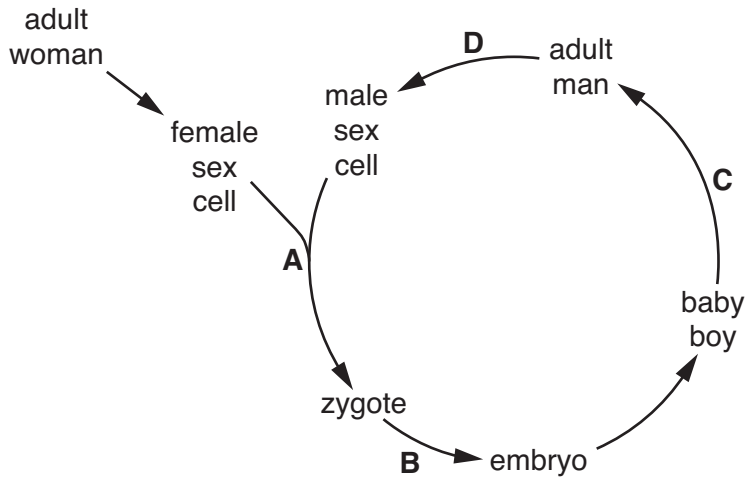
4 The human life cycle has different stages.

Some of the stages are shown in the diagram.



(a) At which stage, **A**, **B**, **C** or **D**, does **meiosis** take place?

stage ..... **[1]**

(b) What happens to the chromosome number in each of the new cells produced during **meiosis**?

Put a (ring) around the correct answer.

doubles **halves** **stays the same**

[1]

(c) Here are some statements about zygotes.

Put ticks (✓) in the boxes next to the **three** correct statements.

Zygotes contain …

… a unique combination of chromosomes. ☐

… a set of chromosomes from each parent. ☐

… only a set of chromosomes from the mother. ☐

… twice the number of chromosomes found in the sperm. ☐

… half the number of chromosomes found in the egg. ☐

[2]

(d) **Mitosis** is a different type of cell division.

A body cell with a chromosome number of **46** divides by mitosis.

What is the chromosome number in each of the cells produced?

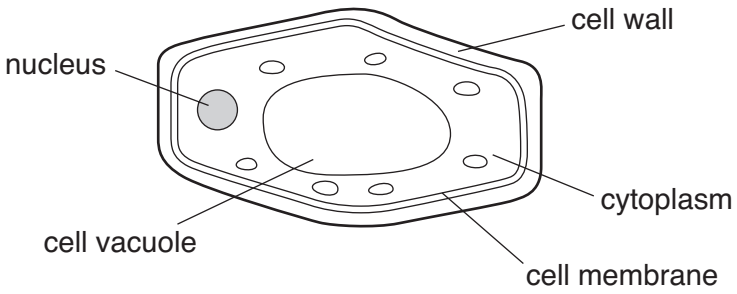
Put a (ring) around the correct answer.

23 **46** **92**

[1]

[Total: 5]

5 The diagram shows parts of a plant cell.



(a) The genetic code is held in the DNA molecule.

DNA carries the code for the production of proteins.

Complete the table using labels on the diagram.

	part of cell
where DNA is found	
where proteins are produced	

[2]

(b) DNA has a number of important features.

Complete the following sentences about DNA.

Use words from the list.

acids

bases

double

genes

single

triple

The DNA molecule is a ..... helix.

Each DNA molecule contains four different ..... . **[2]**

(c) Animals and plants use cell division and cell specialisation for growth.

Put ticks (✓) in the boxes next to the **two** correct statements.

All animals continue to grow in height throughout their lives.	☐
Most animal cells become highly specialised.	☐
Plants do not continue to grow in height throughout their lives.	☐
Some plant cells remain unspecialised.	☐

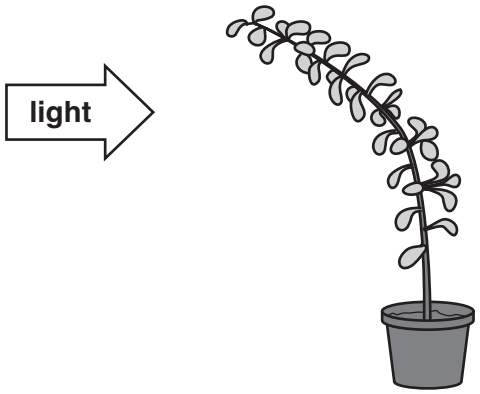
[2]

[Total: 6]

6 Helen is studying the growth of plants.

She puts a plant next to a source of light.

After a few days the plant stem has grown towards the light.



(a) Name the process which causes plant stems to grow towards light.

..... **[1]**

(b) Helen does not want her plant to have a 'curved' stem.

What should Helen do?

Put a tick (✓) in the box next to the **best** answer.

Helen should …

… give the plant more water. ☐

… grow the plant next to another plant. ☐

… give the plant a light source from above. ☐

… grow the plant in the same position but in brighter light. ☐

[1]

(c) Helen decides to take a cutting from her plant.

Complete the sentences about taking cuttings.

Choose words from the list.

enzymes

hormones

leaves

roots

specialised

sugar

unspecialised

xylem

The cut stem is dipped in plant ..... .

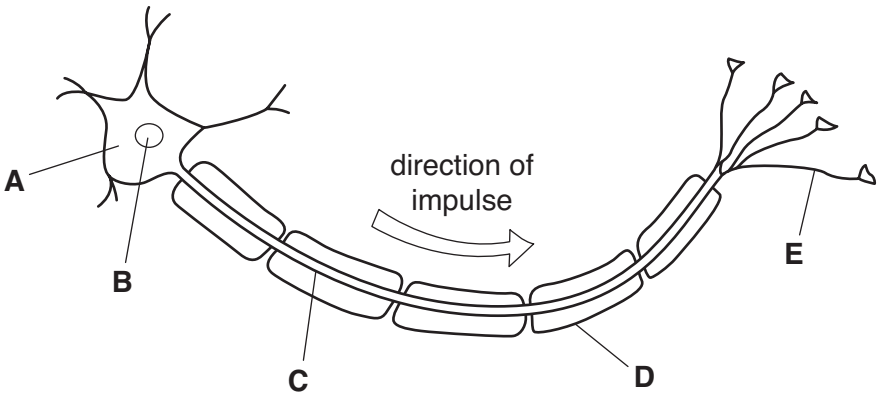
The cut end starts to grow new ..... .

This new growth is from ..... cells. **[3]**

[Total: 5]

7 The human nervous system contains neurons.

(a) The drawing shows a motor neuron.



Identify the parts of the motor neuron.

Write the correct letter, **A**, **B**, **C**, **D** or **E** in each box.

One of the letters is not used.

axon	
cytoplasm	
fatty sheath	
nucleus	

[2]

(b) The fatty sheath has two functions.

Put ticks (✓) in the boxes next to the **two** correct answers.

The fatty sheath …

… detects the stimulus. ☐

… stimulates the neuron. ☐

… acts as a link between two neurons. ☐

… insulates the neuron from neighbouring cells. ☐

… increases the speed of transmission of a nerve impulse. ☐

[2]

(c) The central nervous system (CNS) coordinates an animal's responses by carrying impulses.

Complete the sentences about the CNS.

Use words from the list.

blood

effectors

motor neurons

receptors

sensory neurons

Impulses are carried **to** the CNS by ..... .

Impulses are carried **from** the CNS by ..... . **[2]**

[Total: 6]

8 This question is about the human brain and memory.

(a) The cerebral cortex has a number of functions.

Put a (ring) around **two** correct functions from the list.

balancing water levels

controlling heart beat

learning language

regulating temperature

thinking to solve problems

[2]

(b) What is **memory**?

Put a tick (✓) in the box next to the **best** answer.

Memory is the …

… response to a stimulus. ☐

… storage and retrieval of information. ☐

… ability to coordinate different effectors. ☐

[1]

[Total: 3]

9 Pip is a young puppy.

Pip's brain contains billions of neurons.

(a) What will happen to neuron pathways in Pip's brain as he **develops**?

Put a tick (✓) in the box next to the **best** answer.

Neuron pathways …

… carry more blood.	☐
… stay the same.	☐
… are formed.	☐
… get shorter.	☐

[1]

(b) Pip learns how to bring a ball back to his owner.

Complete the sentences about learning these types of skills.

Choose words from the list.

chance growing new old recent recognition repetition the same

Some skills, like learning to fetch a ball, are best learnt by ..... .

The variety of potential pathways in the brain makes it possible for dogs, like Pip, to adapt to ..... situations. **[2]**

[Total: 3]

END OF QUESTION PAPER

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