

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
BIOLOGY A**

A222/01

Unit 2: Modules B4 B5 B6 (Foundation Tier)

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 22 June 2011
Morning**

Duration: 40 minutes



Candidate forename		Candidate surname	
-----------------------	--	----------------------	--

Centre number						Candidate number				
---------------	--	--	--	--	--	------------------	--	--	--	--

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

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 **16** pages. Any blank pages are indicated.

1 This question is about homeostasis and body control systems.

(a) What is homeostasis?

Complete the sentence.

Use words from the list.

- changing
- constant
- lowering
- maintenance
- raising
- recording
- warm

Homeostasis is the of a internal environment. [2]

(b) Which piece of equipment operates like a body control system?

Put a ring around the correct answer.

- digital radio electric drill incubator microwave oven [1]

(c) A body control system has three key parts.

Draw a straight line to link each **key part of the body control system** to its correct **function**.

key part of the body control system	function
processing centre	produces the response
receptor	detects stimuli
effector	receives information and coordinates responses

[2]

[Total: 5]

- 2 Stefan is running in a marathon.
He **sweats** during the race.



- (a) How can Stefan **replace** the water lost by sweating?

Put a **ring** around each of the **three** correct answers.

breathing **drinking** **eating**
respiration **excreting**

[2]

- (b) Stefan's kidneys play a vital role in balancing his water levels.

What other functions are carried out by the kidneys?

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

controlling temperature

excreting urea in urine

forming gametes

producing insulin

reabsorbing glucose

[1]

(c) Sweating affects the balance of water in the body.

Which other factors will affect the balance of water levels in Stefan's body?

Put ticks (✓) in the boxes next to the **three** best answers.

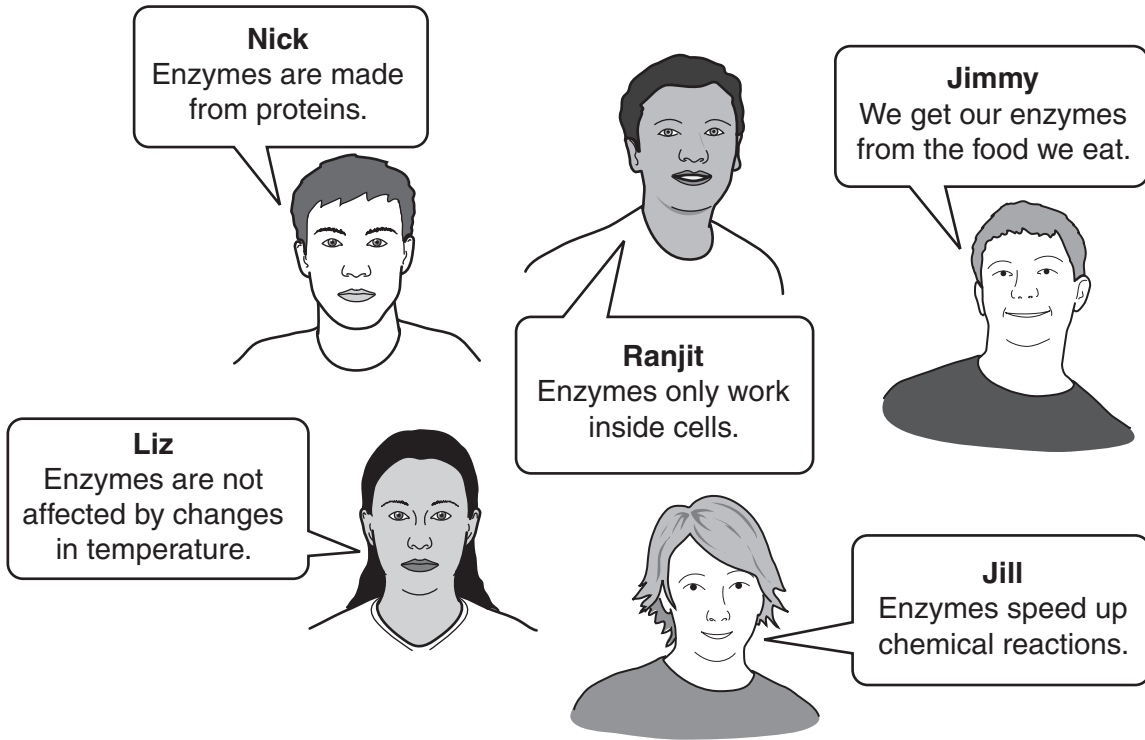
- hair colour
- drinking fluids
- eating lots of salty food
- external temperature
- his height
- wearing goggles

[2]

[Total: 5]

3 Maria is studying **enzymes** in a lesson.

(a) She works with a group of friends and asks them to describe an enzyme.



Which two friends give the best answers?

names and [2]

(b) Maria reads about the **lock and key** model.

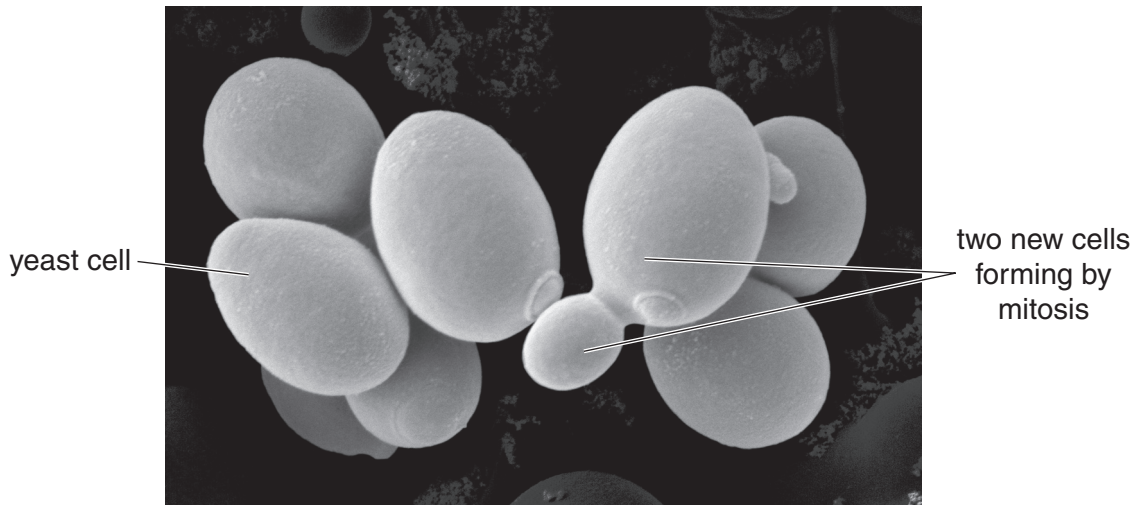
It describes how an enzyme works.

Explain the lock and key model.

.....
.....
..... [3]

[Total: 5]

- 4 Yeast is a fungus.
Yeast uses **mitosis** to produce new cells by a process called budding.



- (a) The cells produced by mitosis are identical to each other.

Why are they called **identical**, even though they are different sizes?

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

The two new cells are identical because they ...

... are at the same temperature.

... have the same water concentration.

... contain copies of the same chromosomes.

[1]

- (b) The number of chromosomes in a yeast cell is **16**.

How many chromosomes will be found in each new cell produced by mitosis?

Put a **ring** around the correct answer.

8

12

16

32

48

64

[1]

(c) **Meiosis** is a different type of cell division.

The cells produced are called gametes.

Explain why it is important that the gametes only contain **half** the chromosome number of the parent cell.

Include in your answer

- what happens to the gametes involved in reproduction
- the number of chromosomes in the zygote.

.....

.....

.....

..... [2]

[Total: 4]

5 This question is about the genetic code and protein synthesis.

(a) Complete the sentences.

Use words from the list.

cell wall

cytoplasm

membrane

nucleus

starch

vacuole

In cells, the genetic code is held in the

Proteins are produced in the

[2]

(b) Each gene is made from DNA.

What is the structure of a DNA molecule?

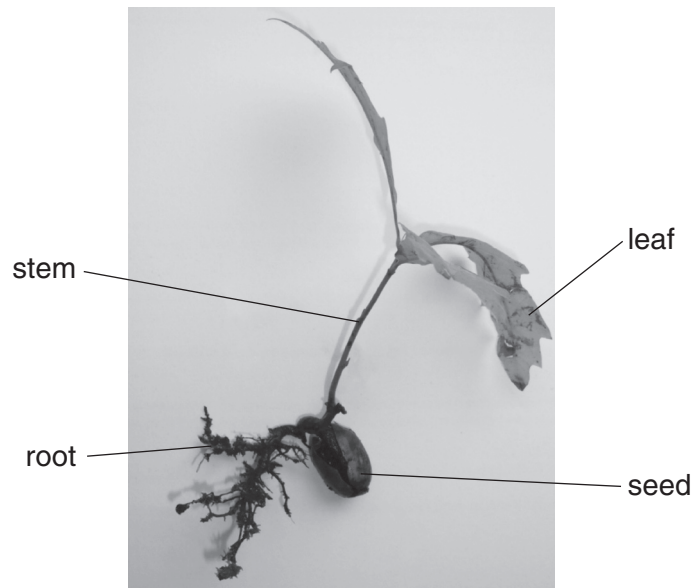
Put a **ring** around the correct number in each column.

number of different types of bases	number of strands
1	1
2	2
3	3
4	4

[2]

[Total: 4]

6 George finds an oak tree seedling growing in his garden.



(a) A tissue at the tip of the root and stem of the oak seedling contains unspecialised cells.

These cells can continue to divide.

What is the name of this tissue?

answer [1]

(b) George lets the seedling grow into a young tree.

He takes a cutting from the young tree.

He cuts through one of the side-stems of the young tree and dips the cut end in a powder.

What **should** the powder contain?

Put a ring around the correct answer.

enzymes **hormones** **sugar** **fats** [1]

(c) Which type of plant organ starts to grow from the cut surface of the stem in his new cutting?

answer [1]

(d) George plants his cutting in a pot of soil.

He puts the pot on a window ledge.

His cutting grows at an angle towards the light.

What is the name of this directional growth response?

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

photosynthesis

phototropism

reflex

stimulus

[1]

(e) How does this directional growth response increase a plant's chance of survival?

.....

.....

..... [3]

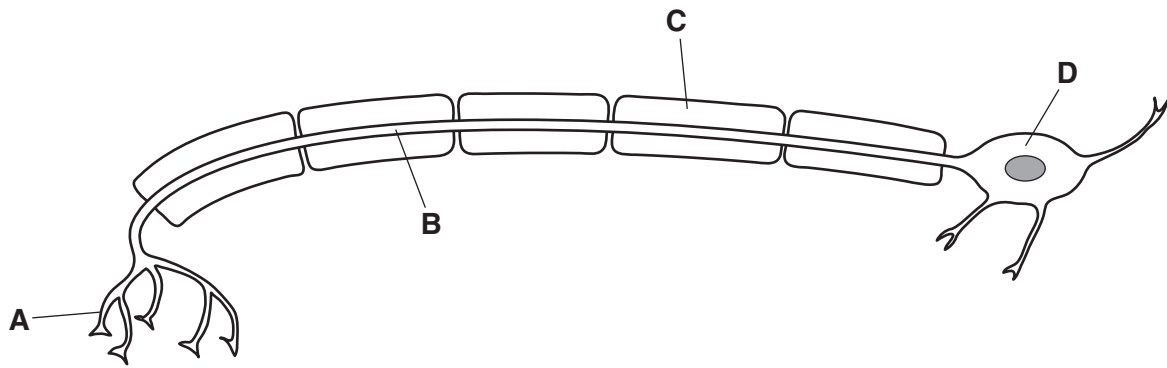
[Total: 7]

11
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

Question 7 starts on page 12

7 The motor neuron is a cell in the human nervous system.



(a) What is the name of each part **A**, **B**, **C** and **D**?

Write the correct letter in each box.

You may only use each letter **once**.

axon	
cytoplasm	
fatty sheath	
membrane	

[2]

(b) Some neurons do not have a **fatty sheath**.

The table gives information about two different neurons.

	speed of transmission of impulse in m/s
neuron with a fatty sheath	100
neuron without a fatty sheath	5

A fatty sheath increases the speed of transmission of a nerve impulse.

(i) How many times faster is the speed of transmission for the neuron with a fatty sheath?

answer = times faster [1]

(ii) Describe **one other** function of a fatty sheath.

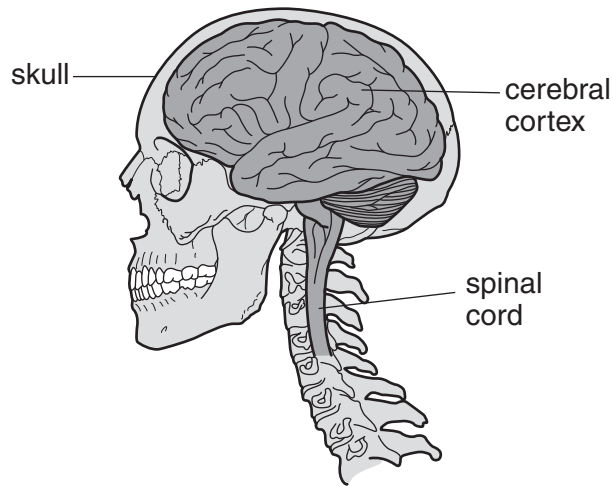
.....
 [1]

(c) What is the name of the gap between two neurons?

answer [1]

[Total: 5]

8 The **cerebral cortex** is a large part of the human brain.



(a) What is the cerebral cortex most involved with?

Put a **ring** around each of the **three** correct answers.

memory

language

intelligence

water balance

temperature control

[2]

(b) Scientists can map the regions of the cerebral cortex in humans.

Describe **two** ways of mapping the cerebral cortex.

1

2

[2]

[Total: 4]

9 Impulses are transmitted within the brain in mammals.

What happens to the brain when a mammal develops and learns new skills?

Include in your answer ideas about

- neuron pathways
- transmission of impulses
- repetition.

.....

.....

..... [3]

[Total: 3]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.