

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

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

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

A222/01

**TWENTY FIRST CENTURY SCIENCE
BIOLOGY A**

Unit 2: Modules B4 B5 B6 (Foundation Tier)

WEDNESDAY 22 JUNE 2011: Morning

DURATION: 40 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**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)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. 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.**

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.**

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.

Nick says, 'Enzymes are made from proteins.'

Jimmy says, 'We get our enzymes from the food we eat.'

Ranjit says, 'Enzymes only work inside cells.'

Liz says, 'Enzymes are not affected by changes in temperature.'

Jill says, 'Enzymes speed up chemical reactions.'

Which two friends give the best answers?

names _____ and _____ [2]

(b) Maria reads about the LOCK AND KEY model.

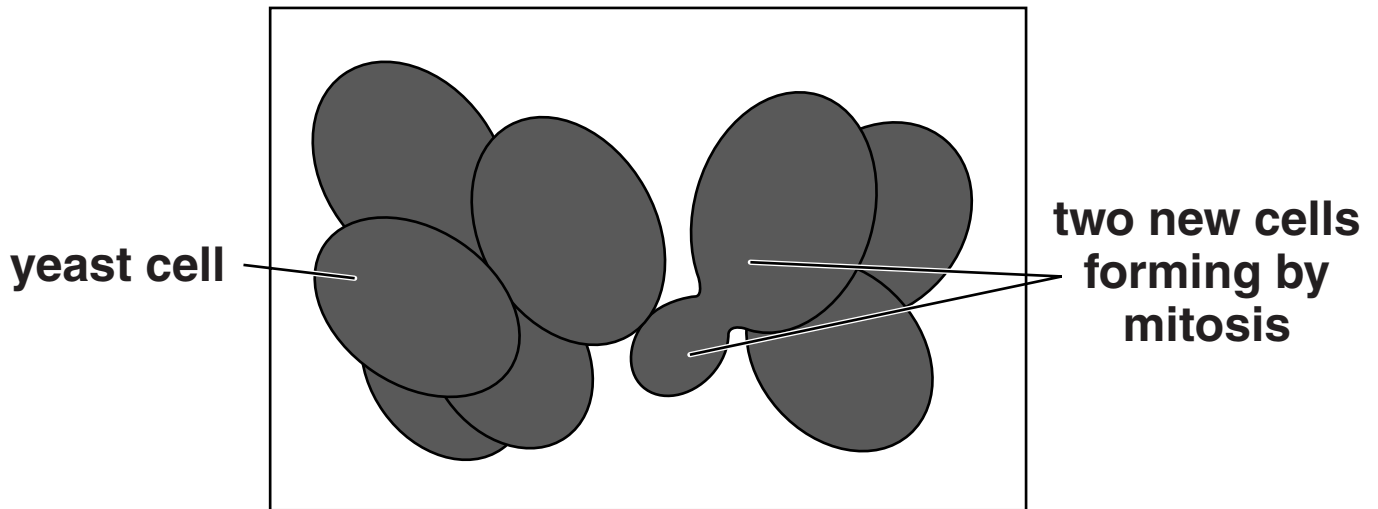
It describes how an enzyme works.

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

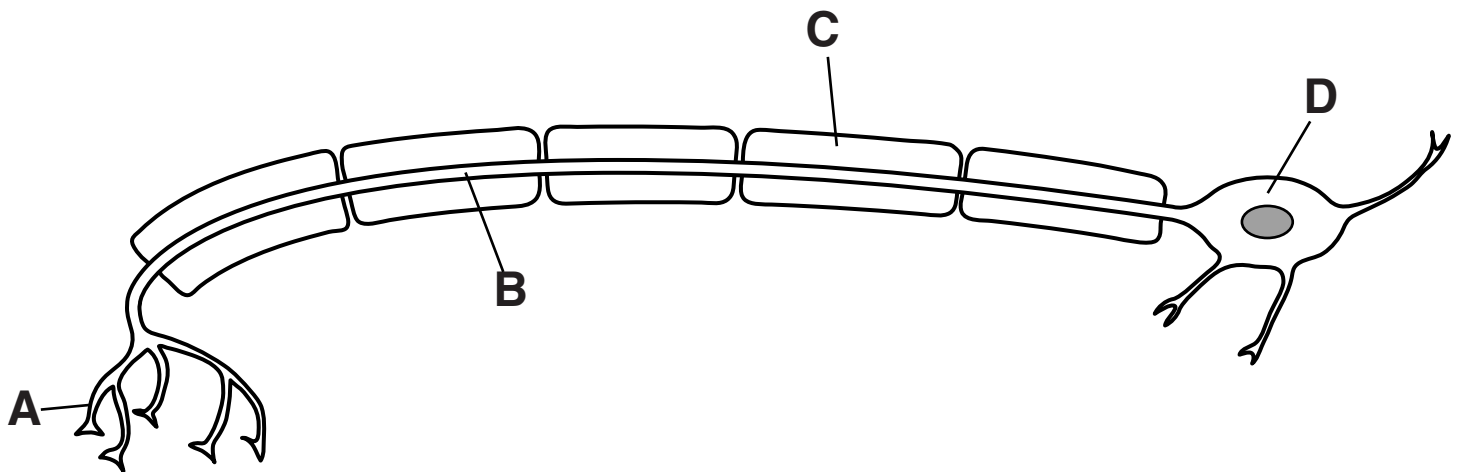
[1]

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

_____ **[3]**

[Total: 7]

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

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.