

<b>Candidate Forename</b>		<b>Candidate Surname</b>	
-------------------------------	--	------------------------------	--

<b>Centre Number</b>						<b>Candidate Number</b>				
--------------------------	--	--	--	--	--	-----------------------------	--	--	--	--

**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 20 MAY 2009: Afternoon**

**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 clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **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.**

**BLANK PAGE**

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.**

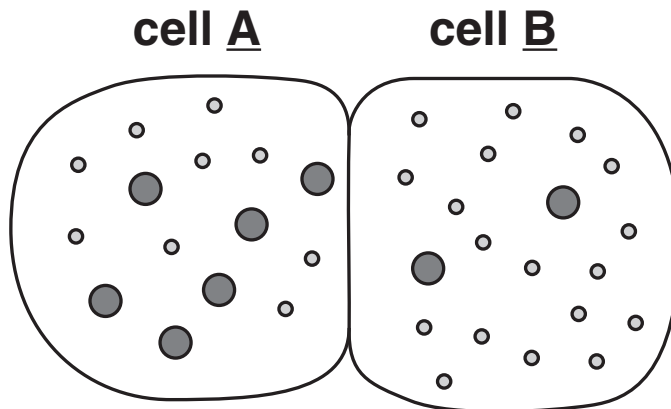
**Only molecules with the correct \_\_\_\_\_  
can fit into the enzyme.**

**[2]**

**[Total: 4]**

2 Viktor is studying osmosis.

He draws a diagram showing a MODEL of osmosis.



Key:

———— = partially permeable membrane

 = glucose molecules

 = water molecules

(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]**



**BLANK PAGE**

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?

On the opposite page draw TWO straight lines to link the correct BEGINNING, MIDDLE and END to complete the sentence.

**BEGINNING**

The change ...

or

The maintenance ...

or

The increase ...

or

The decrease ...

[2]

[Total: 6]

**MIDDLE**

... of a constant ...

or

... of a varying ...

or

... of a different ...

**END**

... total environment.

or

... internal environment.

or

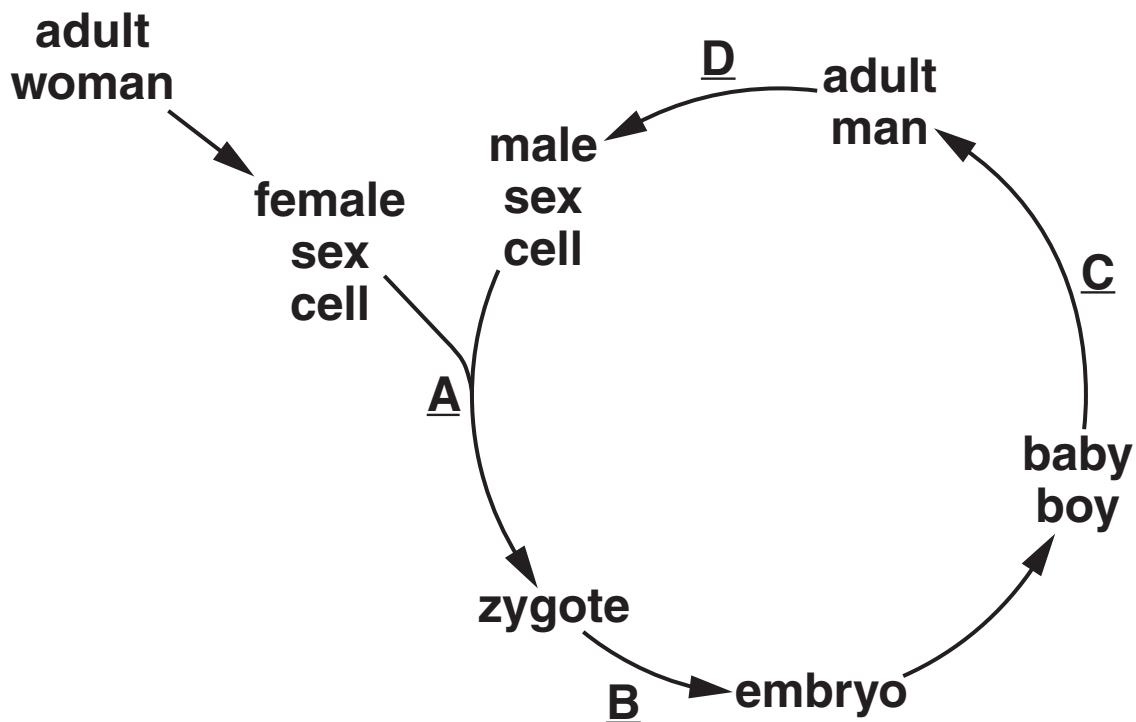
... external environment.

or

... natural environment.

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

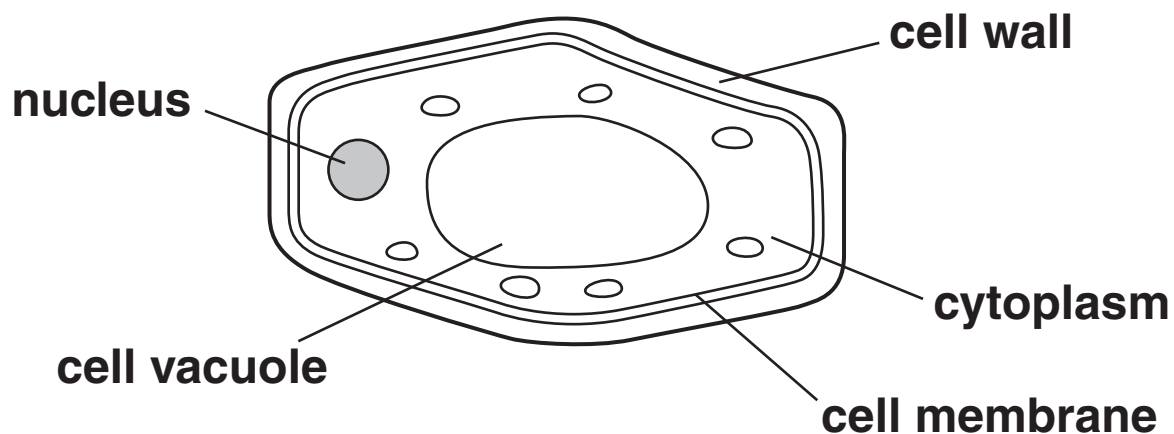
46

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.

	<u>PART OF CELL</u>
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]**

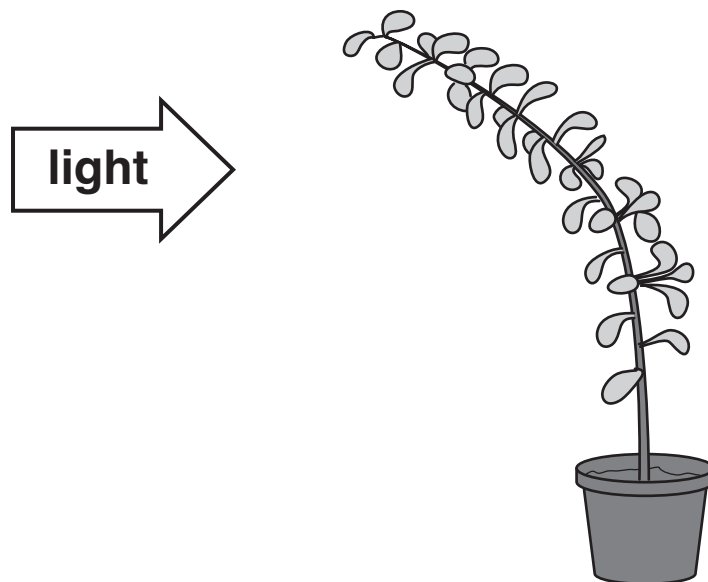
**[Total: 6]**

**BLANK PAGE**

**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.

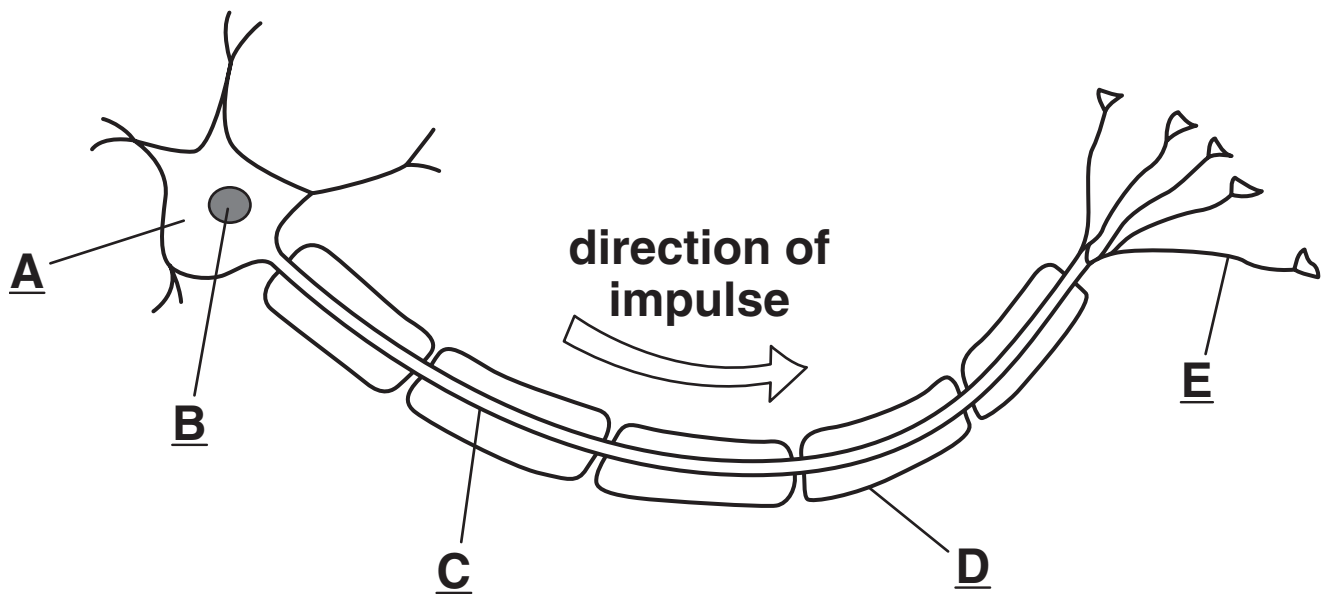
[3]

[Total: 5]

**BLANK PAGE**

**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.**

<b>axon</b>	
<b>cytoplasm</b>	
<b>fatty sheath</b>	
<b>nucleus</b>	

**[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]

**BLANK PAGE**

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]

**BLANK PAGE**

**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**



## **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, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://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 1PB.**

**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.**