OCR
RECOGNISING ACHIEVEMENT

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A222/02

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE

BIOLOGY A

Unit 2 Modules B4 B5 B6 (Higher Tier)

WEDNESDAY 23 JANUARY 2008

Afternoon

Time: 40 minutes

Candidates answer on the question paper
Additional materials (enclosed):
None

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

CUP/T42375

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **42**.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
1	**8**	
2	**6**	
3	**8**	
4	**6**	
5	**7**	
6	**7**	
TOTAL	**42**	

This document consists of **12** printed pages.

[Turn over

Answer **all** the questions.

1 This question is about keeping things inside the body the same.

(a) Name the process which means **maintenance of a constant internal environment**.

..... [1]

(b) Which conditions inside the body need to be kept constant?

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

blood oxygen levels	☐
skin pigmentation	☐
water content of the body	☐
salt content of the body	☐

[1]

(c) The internal environment is often controlled by **negative feedback**.

Which **two** statements describe negative feedback?

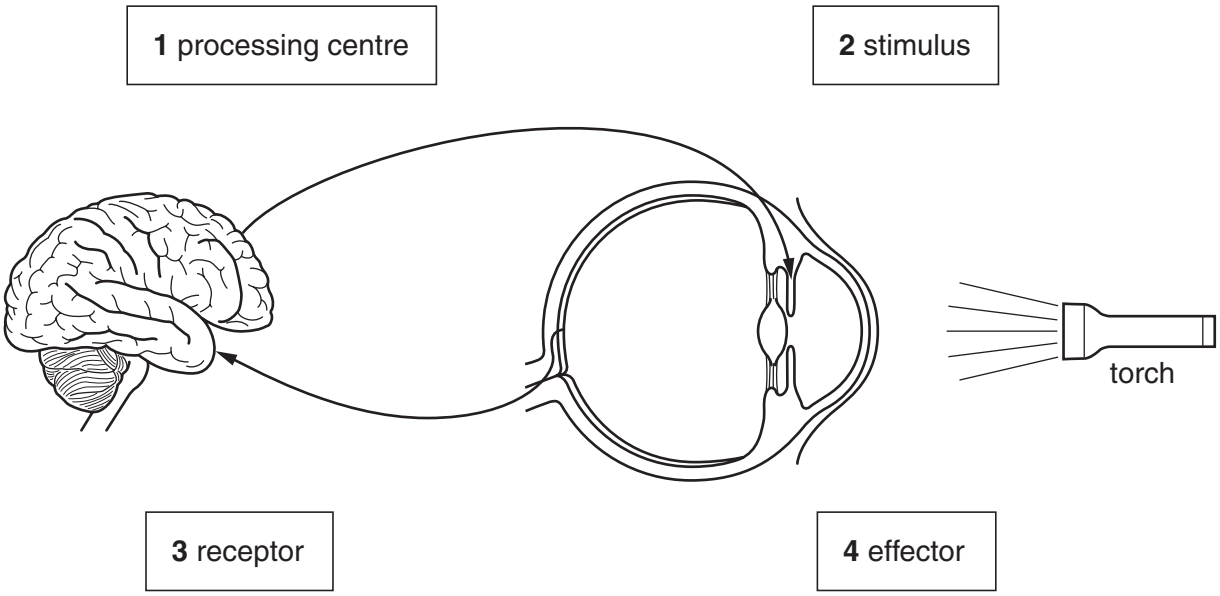
Put ticks (✓) in the boxes next to the **two** best answers.

negative feedback increases rates of chemical reactions as body temperature rises	☐
negative feedback works to change any steady state	☐
negative feedback can be used to maintain a constant level	☐
negative feedback between effectors and receptors reverses any changes that take place	☐
negative feedback decreases rates of chemical reactions as body temperature rises	☐

[2]

(d) Negative feedback mechanisms are involved in controlling the amount of light entering the eye. The diagram shows negative feedback between the brain and the eye.

Draw **straight lines** to join each of the labels, **1**, **2**, **3** and **4**, to the correct part of the diagram.



[4]

[Total: 8]

2 This question is about processes in cells.

(a) Which statement **best** describes osmosis?

Put a tick (✓) in the correct box.

movement of molecules from a region of high concentration to a region of low concentration	☐
movement of water molecules from a dilute to a more concentrated solution through a partially permeable membrane	☐
movement of molecules from a region of low concentration to a region of high concentration	☐
movement of water molecules from a concentrated to a more dilute solution through a partially permeable membrane	☐

[1]

(b) Look at the examples of diffusion and osmosis in an animal cell.

Put a **d** in the boxes next to the examples of diffusion.

Put an **o** in the boxes next to the examples of osmosis.

carbon dioxide moving out of a cell	☐
water moving into a cell	☐
oxygen moving into a cell	☐
water moving out of a cell	☐
digested food moving into a cell	☐

[3]

(c) Enzymes are found in cells.

Which **one** of the following must remain constant for enzymes to work at their optimum?

Put a (ring) around the correct answer.

number of cells **size of cell** **temperature of cell** **shape of cell**

[1]

(d) Which conditions will increase the rate of reaction of enzymes?

Put a tick (✓) in the correct box.

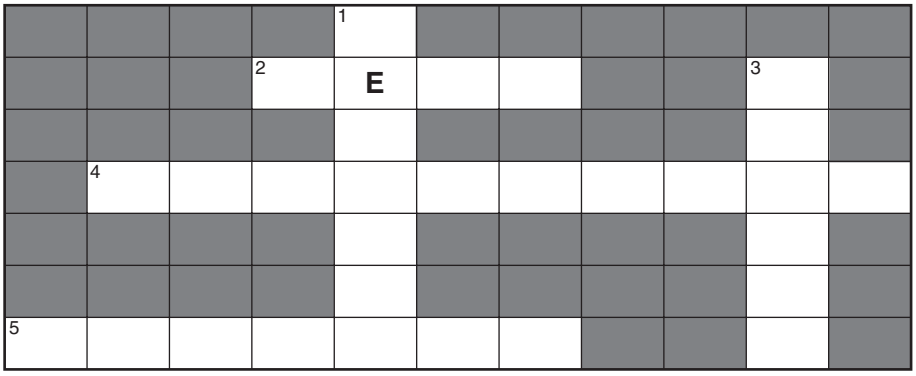
fewer collisions between enzymes and other molecules	☐
faster collisions between enzymes and other molecules	☐
slower collisions between enzymes and other molecules	☐
rapid changes of temperature	☐

[1]

[Total: 6]

3 This question is about how organisms produce more cells.

(a) Use the clues to complete the crossword puzzle.



Across

2 A section of DNA that codes for one protein

4 A long strand of DNA found in the nucleus of a cell

5 A type of cell division that produces identical copies of the cell

Down

1 A type of cell division that produces sex cells with half the number of chromosomes

3 Another name for a sex cell

[5]

(b) The statements describe how organisms produce new cells.
They are in the wrong order.

A The copies of chromosomes separate.

B The number of organelles in the cell increases.

C The cell divides into two cells.

D Each strand is copied to make two new strands (chromosomes).

E The two strands of each DNA molecule separate.

Put the statements into the correct order. The first one has been done for you.

B				

[3]

[Total: 8]

4 This question is about DNA.

(a) DNA is made from different bases.

(i) How many different types of bases are found in DNA?

answer ..... [1]

(ii) Draw **four** straight lines connecting the different bases in the left hand column with the correct bases in the right hand column to show which bases always pair up.

base 1	**base 2**
A	A
C	C
T	T
G	G

[1]

(b) Cells may divide by mitosis or meiosis.

Draw **two** straight lines from **each** type of **cell division** to its **two** correct **descriptions**.

cell division	**descriptions**
	The new cells are gametes.
meiosis	The new cells are identical to each other.
	The new cells contain half the number of chromosomes.
mitosis	The new cells are the same as the parent cell.
	The new cells contain double the number of chromosomes.

[2]

(c) Which **two** of the statements best describe embryonic stem cells?

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

cells that have no inactive genes so that they can form cells of all tissue types	☐
cells that are found in stems	☐
cells that have the potential to replace damaged tissue	☐
cells that have developed to become highly specialised	☐
cells that do not change once they have been produced	☐

[2]

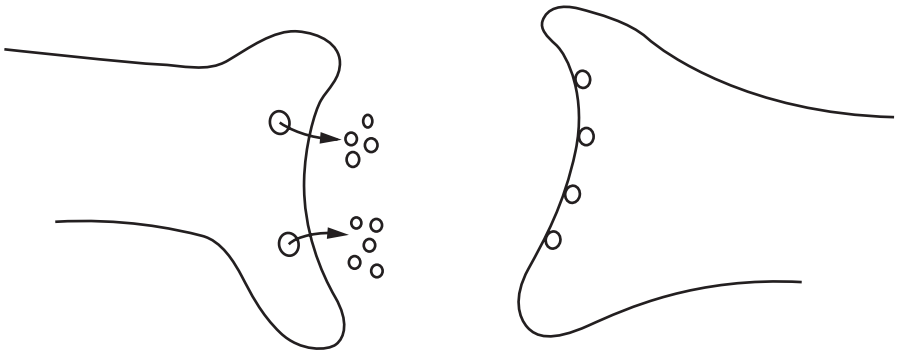
[Total: 6]

5 This is a question about the human nervous system.

(a) The diagram shows the endings of two nerve cells.

(i) Use these words to label the diagram.

receptor molecules **synapse** **synaptic chemicals**



[3]

(ii) Add an arrow to the diagram to show which way the impulse is travelling. [1]

(b) Reflex actions are used by most animals.

Look at the statements about reflex actions.

Some are **true** and some are **false**.

Write **T** in the box next to each **true** statement and **F** in the box next to the **false** one.

	T (true) or **F** (false)
Reflexes produce rapid involuntary responses.	
Only simple animals use simple reflexes.	
Conditioning is when reflex responses are learnt.	
Only complex reflexes are used to improve an animal's chances of survival.	
Conditioned reflexes usually increase the chances of survival.	

[3]

[Total: 7]

6 This question is about different kinds of reflexes.

(a) Which **two** statements best describe a conditioned reflex?

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

Conditioned reflexes happen when something occurs only once.	☐
Pavlov's dogs show an example of a conditioned reflex.	☐
Being startled by a loud noise is an example of a conditioned reflex.	☐
Conditioned reflexes reduce an animal's chances of survival.	☐
The final response has no direct connection with the stimulus.	☐

[2]

(b) Draw a straight line linking each **type of reflex** to its correct **example** and then to its correct **purpose**.

type of reflex	example	purpose
	falling asleep	protecting a sense organ
simple		
	salivating when hearing a bell ring	refreshing the brain
conditioned		
	blinking in a bright light	helping digestion

[2]

(c) In some circumstances it is possible for the brain to modify a reflex response.

Which three statements are the best examples of how the brain can modify a reflex response?

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

being frightened of thunderstorms	☐
holding on to a hot plate	☐
going to the dentist even though you are frightened	☐
killing spiders	☐
salivating when you smell some delicious food	☐
not blinking when something comes close to your eyes	☐
hearing someone speak your name across a crowded room	☐

[3]

[Total: 7]

END OF QUESTION PAPER