

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
BIOLOGY A

UNIT 2 – Modules B4 B5 B6 (Foundation Tier)

SAMPLE ASSESSMENT MATERIAL
(from 2010 onwards)

Time: 40 minutes

Candidates answer on the question paper

Additional materials (enclosed):

None

Calculators may be used.

Additional materials: Pencil
 Ruler (cm/mm)

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 black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure 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	11	
2	6	
3	8	
4	6	
5	8	
6	3	
TOTAL	42	

This document consists of **10** printed pages and **2** blank pages.

Answer **all** the questions.

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

(a) Which word means **maintenance of a constant internal environment**?

Put a tick (✓) in the correct box.

homeopathy

homeostasis

homogenised

homologous

[1]

(b) Which **two** are examples of conditions inside the body that need to be kept constant?

Put ticks (✓) in the correct boxes.

body temperature

hair growth

water and salt balance

[1]

(c) Which **two** activities are most likely to affect the maintenance of a constant internal environment?

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

sitting reading a book

sleeping

running a marathon

watching the television

camping in winter

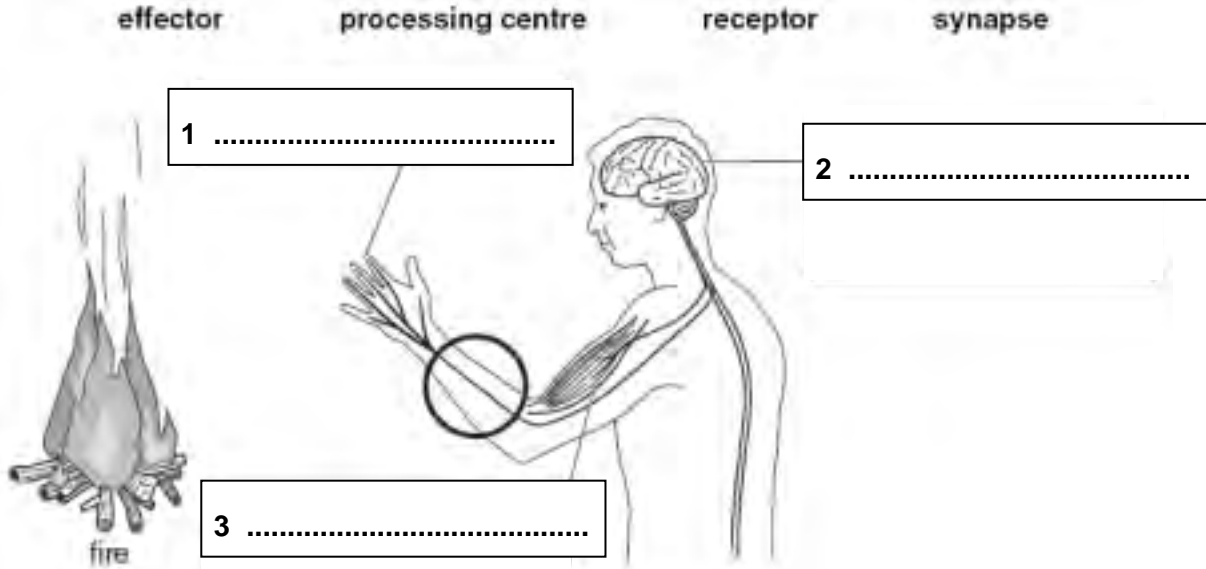
[2]

(d) The following diagram shows parts of the human body involved in controlling our body temperature.

Ian puts out his hand to feel the heat from a fire.

(i) Add labels to the boxes, 1, 2 and 3, to identify the parts involved.

Choose from this list.



[3]

(ii) Draw an arrow in the circle to show the direction the nerve impulse travels.

[1]

(iii) An animal responds to a stimulus.

Which of the following methods could be used to investigate this?

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

- gossip
- internet
- rumours
- experiment
- library
- dreams
- argument

[3]

[Total: 11]

Turn over

2 This question is about processes in cells.

(a) Water enters and leaves cells by osmosis.

Explain what is meant by osmosis.

Use these words to help you.

concentrated dilute membrane water partially permeable

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

(b) Explain **one** difference between osmosis and diffusion.

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

(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 condition will increase the rate of enzyme reactions?

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) Write down the term which best fits each description.

(i) A section of DNA that codes for one protein.

answer

(ii) A long strand of DNA found in the nucleus of a cell.

answer

(iii) A type of cell division that produces identical copies of the cell.

answer

(iv) A type of cell division that produces a sex cell with half the number of chromosomes.

answer

(v) Another name for a sex cell such as a sperm or egg.

answer

[5]

(b) Sex cells contain only half the number of chromosomes of ordinary body cells.

Explain why.

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

[Total: 8]

4 This question is about DNA.

(a) DNA is made from different bases.

Explain simply how the bases are arranged to form the strands of DNA.

.....

.....

.....

.....

..... [3]

(b) In humans, the zygote divides by mitosis to form which structure?

Put a ring around the correct answer.

- embryo
- ovary
- seed
- uterus

[1]

(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 not yet become specialised

cells that are found in plant stems

cells that can develop into any other kind of cells

cells that do not develop from an embryo

cells that do not change once they have been produced

[2]

[Total: 6]

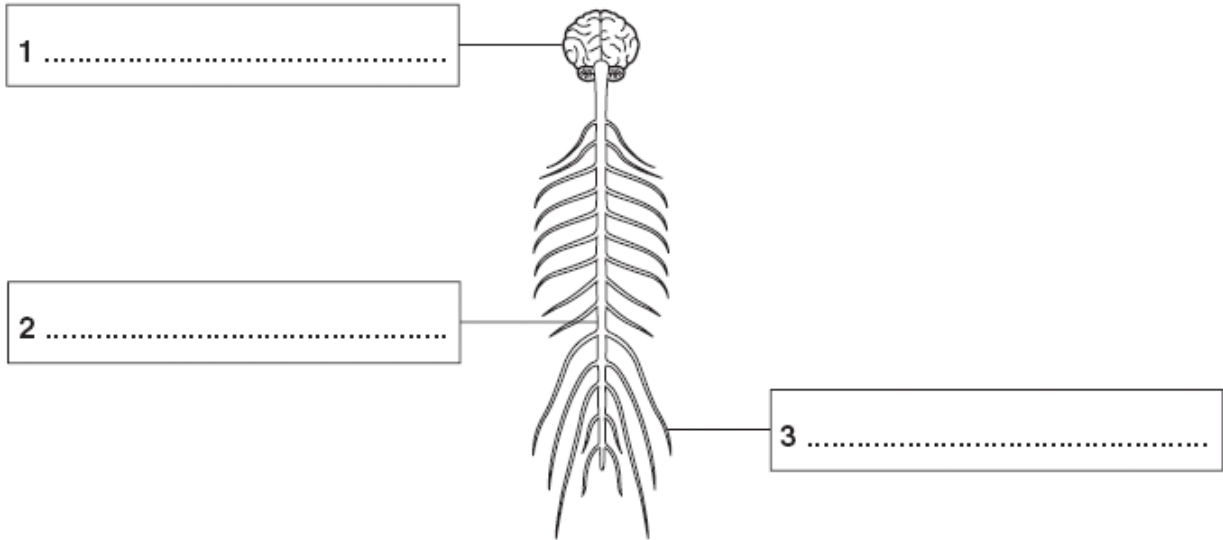
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5 This is a question about the human nervous system.

- (a) Add labels to the boxes, 1, 2 and 3, to identify the parts involved.
Choose from this list.

brain
effector
PNS (peripheral nervous system)
spinal cord
synapse



[3]

(b) Some actions controlled by the nervous system are called reflex actions.

Which **two** statements are examples of reflex actions?

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

working out a maths problem

deciding what to eat

pupils of the eyes narrowing in bright light

new born baby gripping a parent's finger

thinking about your last holiday

[2]

(c) Human beings have the ability to learn.

This involves memory.

Which statement **best** describes memory?

Put a tick (✓) in the correct box.

reflex arc

storage and retrieval of information

response to a stimulus

mapping the different regions of the brain

[1]

(d) Different scientists have produced different theories for how memory works. So far none of these theories have been able to provide an adequate explanation.

Explain how a scientist would get his theory accepted by other scientists.

.....
.....
.....
..... [2]

[Total: 8]

- 6 Some drugs, such as ecstasy, affect the nervous system.
The nervous system works by passing impulses between neurons.
Neurons are separated by small gaps called synapses.

Describe how drugs can affect our nervous system.
Use the following words to help you.

synapse drugs impulse transmission

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

[Total: 3]

END OF QUESTION PAPER

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GCSE Unit

MARK SCHEME

SAMPLE ASSESSMENT MATERIAL
(from 2010 onwards)

Biology A (J633)
Modules B4, B5 and B6
Foundation Tier

A222/01

Maximum Mark: 42

Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, e.g. mis-spellings if phonetically correct (but check additional guidance).
4. Abbreviations, annotations and conventions used in the detailed mark scheme:

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
not/reject	= answers which are not worthy of credit
ignore	= statements which are irrelevant - applies to neutral answers
allow/accept	= answers that can be accepted
(words)	= words which are not essential to gain credit
<u>words</u>	= underlined words must be present in answer to score a mark
ecf	= error carried forward
AW/owtte	= alternative wording
ORA	= or reverse argument

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy' (1)

work done = 0 marks

work done lifting = 1 mark

change in potential energy = 0 marks

gravitational potential energy = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.
7. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

8. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Question		Expected Answers	Marks	Rationale													
1	a	homeostasis <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)		✓			1	if more than 1 box ticked then 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc									
✓																	
	b	body temperature <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table> water and salt balance <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table>	✓		✓		1	both are needed for one mark									
✓																	
✓																	
	c	running a marathon <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) camping in winter <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)			✓				✓		2	if more than 2 boxes ticked then deduct 1 mark for each additional answer candidate cannot score less than 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc					
✓																	
✓																	
	d	i	1 receptor (1) 2 processing centre (1) 3 effector (1)	3													
		ii	arrow drawn from hand to brain (1)	1													
		iii	internet <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1) experiment <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1) library <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)		✓				✓				✓			3	if more than 3 boxes ticked then deduct 1 mark for each additional answer candidate cannot score less than 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc
✓																	
✓																	
✓																	
		Total		11													

Question		Expected Answers	Marks	Rationale				
2	a	water moves (1) from high to low concentration (of water) / from dilute to concentrated solution (1) cross a (partially permeable) membrane (1)	3	accept water moves from low (dilute) to high (concentrated) concentration of dissolved solute (sugar)				
	b	osmosis only involves movement of molecules of water (solvent)/ORA / osmosis involves a (partially permeable) membrane/ORA (1)	1					
	c	temperature of cell (1)	1	if more than one answer ringed, 0 marks				
	d	faster collisions <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1)		✓			1	if more than 1 box ticked then 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc
✓								
Total			6					

Question			Expected Answers	Marks	Rationale
3	a	i	gene/allele (1)	1	
		ii	chromosome (1)	1	
		iii	mitosis (1)	1	
		iv	meiosis (1)	1	
		v	gamete (1)	1	
	b		correct reference to meiosis (1) correct reference to fertilisation (return to full number) (1) correct explanation of consequence of not having half the number, ie more and more chromosomes in cell (1)	3	
Total				8	

4	a		four different bases (1) group / come together / combin; (1) in pairs (1)	3								
		b	embryo (1)	1	if more than one answer ringed, 0 marks							
		c	cells not yet specialised <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="text-align: center;">✓</td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1) develop into any other kind of cell <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="text-align: center;">✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1)	✓		✓			✓			
✓												
✓												
✓												
Total				6								

Question		Expected Answers	Marks	Rationale
5	a	1 brain (1) 2 spinal cord (1) 3 PNS/peripheral nervous system (1)	3	
	b	pupils narrowing in bright light <input type="checkbox"/> (1) baby gripping a parent's finger <input checked="" type="checkbox"/> (1)	2	if more than 2 boxes ticked then deduct 1 mark for each additional answer candidate cannot score less than 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc
	c	storage and retrieval of information <input checked="" type="checkbox"/> (1)	1	if more than 1 box ticked then 0 marks accept any clear, unambiguous method of indicating correct boxes e.g. crosses, shading etc
	d	publish results (to other scientists) (1) get others to replicate results (1)	2	
Total			8	
6		drugs enter/reach/are transported to the synapse (1) drugs affect the transmission of the impulse (1) across the synapse (1)	3	
Total			3	