OCR
RECOGNISING ACHIEVEMENT

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A222/01

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE

BIOLOGY A

UNIT 2 Modules B4 B5 B6 (Foundation Tier)

TUESDAY 17 JUNE 2008

Morning
Time: 40 minutes

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

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

CUP/T44357

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.
- 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	5	
2	3	
3	6	
4	6	
5	5	
6	4	
7	5	
8	3	
9	5	
TOTAL	42	

This document consists of **15** printed pages and **1** blank page.

[Turn over

Answer **all** the questions.

1 This question is about the **kidney**.

(a) Which processes take place in the kidney?

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

excreting unwanted molecules | **digesting food** | **balancing water levels**

making eggs or sperm | **keeping body temperature constant**

[2]

(b) The blood entering the kidney contains sugar (glucose), water, urea and other substances.

Filtering and reabsorbing take place in the kidney.

Complete the table by putting a tick (✓) in the correct box on each row.

part of blood	filtered out only	filtered out and reabsorbed
sugar (glucose)		
water		
urea		

[2]

(c) How does drinking **alcohol** affect the volume of urine produced?

Put a ring around the correct answer.

increases | **stays the same** | **decreases**

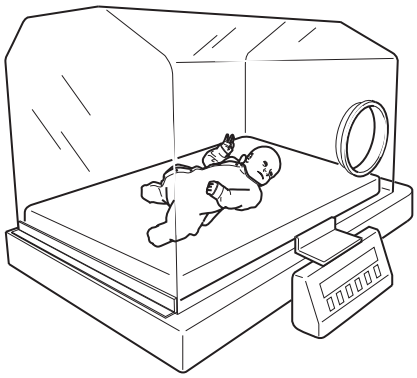
[1]

[Total: 5]

2 Lee is a premature baby.

Lee has problems in maintaining a constant body temperature.

He is put in an incubator.



The temperature and moisture content of the air in the incubator are kept constant.

(a) Name the process of maintaining a constant body temperature.

Put a (ring) around the correct answer.

haemodialysis **homeostasis** **hyperactivity** **hypertension**

[1]

(b) Temperature control systems in incubators work in a similar way to the body control systems in humans.

Draw a straight line from each part of the **incubator** control system to the matching part of the **body** control system.

incubator	**body**
probe used to detect temperature in the incubator	brain
heating system	effector
thermostat	receptor

[2]

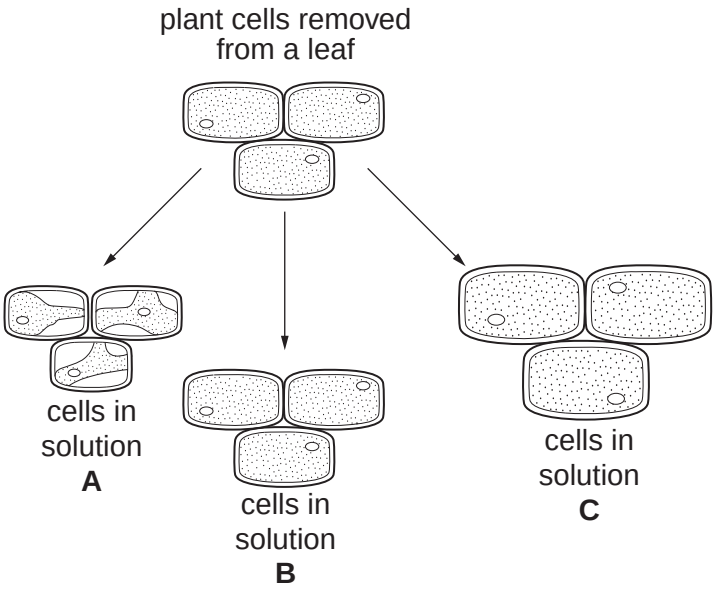
[Total: 3]

3 Jayne removes some cells from a leaf.

She looks at them using a microscope.

She then puts the cells into three different solutions, **A**, **B** and **C**.

After an hour, she looks at the cells to see how they have changed.



(a) Draw a straight line from each **solution** to the correct **cell appearance** and then to the correct **type of solution**.

solution	cell appearance	type of solution
A	cells appear larger	concentrated salt solution
B	smaller cells and the contents pull away from the cell wall	dilute salt solution
C	cells stay the same	water

[4]

(b) The changes in the cells are due to osmosis.

What is osmosis?

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

Osmosis is the movement of water ...

… from a concentrated to a more dilute solution through a completely permeable membrane. ☐

… from a concentrated to a more dilute solution through a partially permeable membrane. ☐

… from a dilute to a more concentrated solution through a completely permeable membrane. ☐

… from a dilute to a more concentrated solution through a partially permeable membrane. ☐

[1]

(c) How could Jayne make the cells in solution **A** larger?

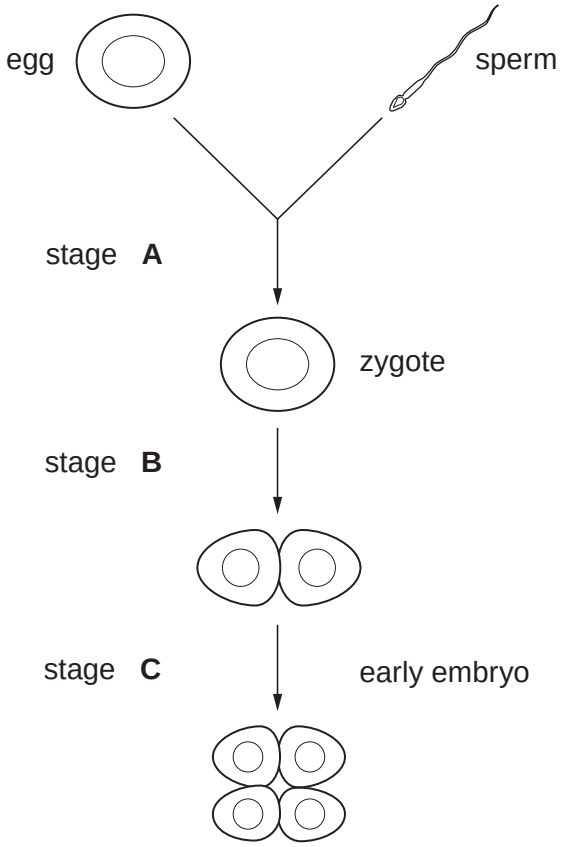
Put a (ring) around the correct answer.

add a small amount of salt **add lots of salt** **add lots of water**

[1]

[Total: 6]

4 The diagram shows some stages in the formation and growth of a human embryo.



(The drawing is not to scale.)

(a) Name the process taking place at each stage, **A**, **B** and **C**.

Choose your answers from this list.

Each word may be used once, more than once or not at all.

fertilisation **meiosis** **mitosis** **pairing**

A ☐

B ☐

C ☐

[3]

(b) The egg and sperm cells are produced by parent cells.

What happens to the chromosome number during the production of eggs and sperm?

Put a tick (✓) in the correct box.

The chromosome number in the egg and sperm cells is ...

… double that found in the parent cells. ☐

… half that found in the parent cells. ☐

… the same as that found in the parent cells. ☐

[1]

(c) The number of cells in the embryo increases as it grows.

Each cell goes through the cell cycle.

Here is a list of stages in the cell cycle.

They are in the wrong order.

A cell divides

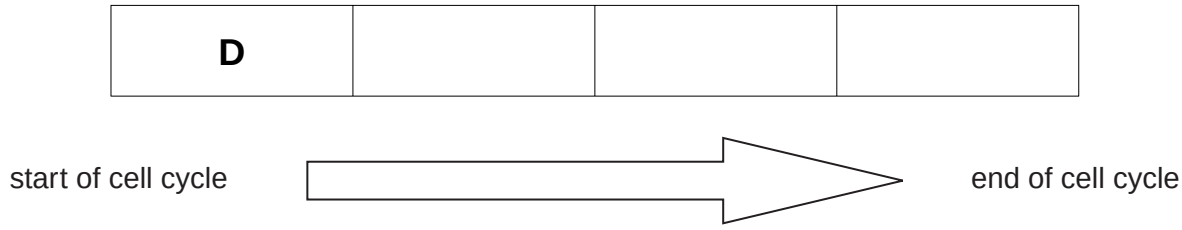
B chromosomes are copied

C chromosomes separate

D number of organelles increases

Write the letters **A**, **B**, **C** and **D** in the boxes to show the correct order.

The first one has been done for you.

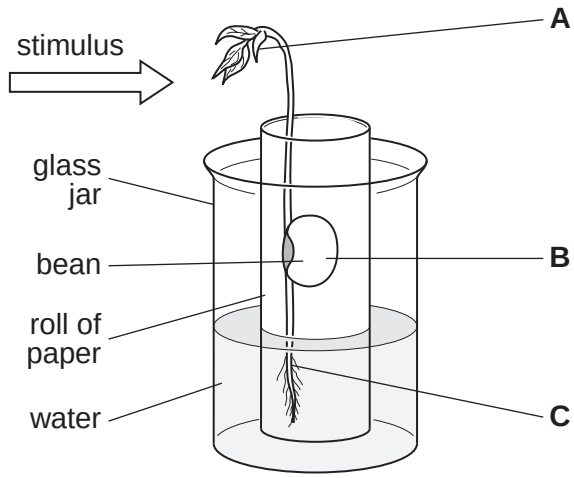


[2]

[Total: 6]

5 Joe does an experiment to study the germination and growth of a bean seed.

He sets up the experiment as shown in the diagram.



(a) Joe notices that the tip of the seedling is growing towards the stimulus.

(i) What is the name of the stimulus?

Put a ring around the correct answer.

water **gravity** **light** [1]

(ii) What is the name of this growth response?

Put a ring around the correct answer.

reproduction **transpiration** **phototropism** [1]

(b) The seedling grows.

New cells are produced in **meristems**.

(i) Which area, **A**, **B**, or **C**, does **not** contain a meristem?

answer …… [1]

(ii) What does each meristem contain?

Put a ring around the correct answer.

phloem cells **unspecialised cells** **xylem cells** [1]

(c) Joe wants to produce more plants.

Joe cuts a shoot from the seedling.

He dips the cut stem in rooting powder to help it grow.

What does the powder contain?

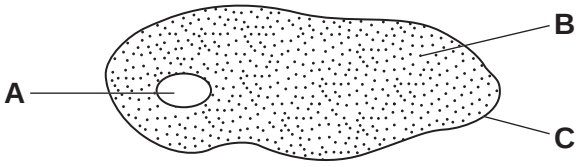
Put a ring around the correct answer.

hormones **soil** **sugar**

[1]

[Total: 5]

6 Look at the diagram of an animal cell.



(a) Show where

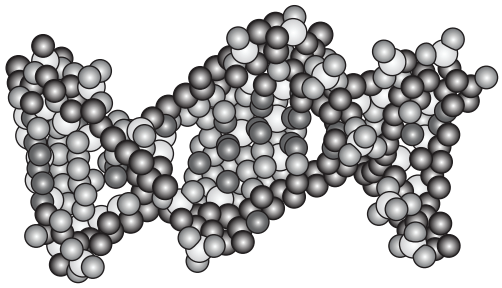
- the genetic code is found
- protein synthesis takes place.

Write the correct letter, **A**, **B** or **C**, in each box.

site of the genetic code ☐

site of protein synthesis ☐ [2]

(b) The genetic code is based on the structure of DNA.



Complete the sentences.

Choose words from the list.

base	**carbohydrate**	**double**
enzyme	**single**	**triple**

DNA has a …… helix structure.

There are four different types of …… in DNA. [2]

[Total: 4]

7 Jenny has an accident at work and hurts her leg.

She is taken to her local hospital.

(a) A nurse does some tests.

She tests Jenny's reflexes.

(i) Which **two** words describe a simple reflex?

Put a tick (✓) in the **two** correct boxes.

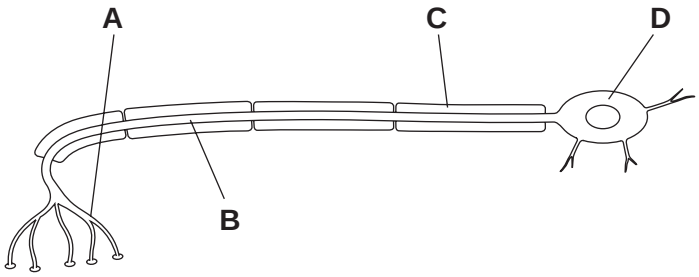
involuntary	☐
rapid	☐
slow	☐
voluntary	☐

[1]

(ii) Jenny can move her toes.

The motor neurons in her leg have not been damaged.

The diagram shows a motor neuron.



Which structure, **A**, **B**, **C** or **D**, is the **fatty sheath**?

…… [1]

(iii) What are the functions of the fatty sheath?

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

to allow the neuron to connect to other cells	☐
to allow the neuron to grow longer	☐
to insulate the neuron from neighbouring cells	☐
to speed up nerve impulses	☐

[2]

(b) Jenny is then asked if she can feel a pin touching different parts of her leg.

What is the function of the **receptors** in Jenny's skin?

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

to carry impulses from the central nervous system to an effector	☐
to carry impulses to the central nervous system	☐
to stimulate the muscle	☐
to detect the stimulus	☐

[1]

[Total: 5]

8 Andy is a neuroscientist.

He studies the human brain.

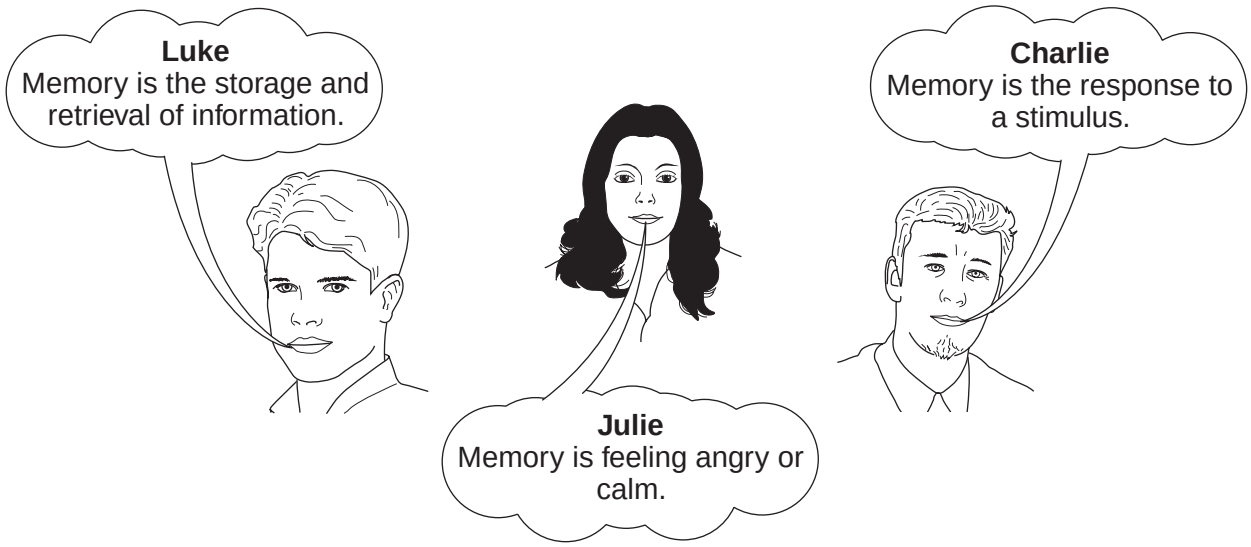
(a) The **cerebral cortex** has many functions.

Put a (ring) around each of the **two** functions of the cerebral cortex.

heart-rate control	**intelligence**	**language**
temperature control	**water/salt balance**	

[2]

(b) Andy asked three of his friends to describe **memory**.



Who gave the **best** answer?

..... [1]

[Total: 3]

9 This question is about the **nervous system**.

(a) Which **two** are examples of reflex actions?

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

blinking your eyelids in bright light	☐
listening to music	☐
pulling your hand out of very hot water	☐
reading your favourite magazine	☐
singing a song with your friends	☐

[2]

(b) Which two structures are parts of the **central nervous system**?

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

brain **ear** **eye**

spinal cord **taste buds**

[2]

(c) Which part of the human nervous system is located in your arms and legs?

Put a ring around the correct answer.

distant **peripheral** **secondary** [1]

[Total: 5]

END OF QUESTION PAPER

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