OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE BIOLOGY A

A222/01

Unit 2: Modules B4 B5 B6 (Foundation Tier)

OCE/16204

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)

Monday 25 January 2010
Afternoon

Duration: 40 minutes

A222201

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly 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 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, 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**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 **(a)** David's body maintains a constant internal temperature.

What is the name for this process in David's body?

Put a (ring) around the correct answer.

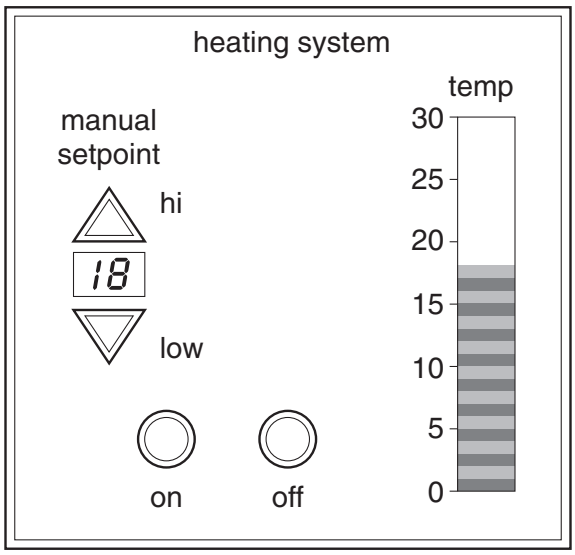
homeostasis **hormonal** **hyperactivity** **hypothermia**

[1]

(b) David moves into a new apartment.

The apartment has an automatic temperature control system.

The system maintains a constant temperature in the apartment.



Parts of the temperature control system in the apartment act like parts of the human body.

Draw a straight line from each **part in the control system** to the **part in the human body** that does the same job.

part in the control system	**part in the human body**
heating and cooling unit	receptor
computer	brain
unit used to detect room temperature	effector

[2]

(c) How does the control system in David's body work to maintain a constant internal temperature?

In your answer you should consider the part played by:

- receptors
- brain
- effectors.

.....

.....

.....

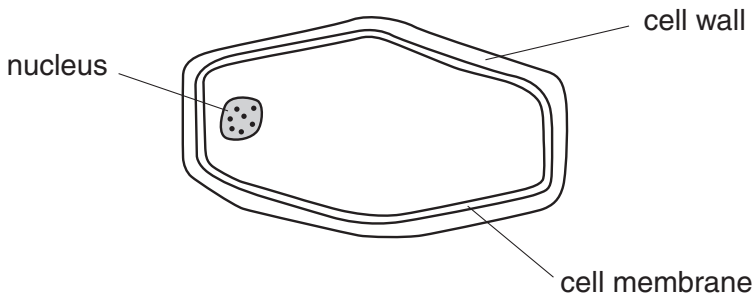
.....

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

[Total: 6]

2 Charlie is studying osmosis.

She looks at an onion cell using a microscope.



(a) The cell membrane is important in osmosis.

What is the best description of this membrane?

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

The membrane is …

… partially permeable. ☐

… fully permeable to all molecules. ☐

… not permeable to any molecules. ☐

… not permeable to water molecules. ☐ **[1]**

(b) Charlie has some onion cells in a dilute sucrose solution.

She puts some of the cells in pure water and some in a concentrated sucrose solution.

What will happen to the **amount of water** in the cells?

Put a tick (✓) in the correct box for each row.

	increases	**decreases**	**stays the same**
onion cells in pure water			
onion cells in a concentrated sucrose solution			

[2]

(c) Red blood cells are carried around the body in a fluid called blood plasma.

The amount of water in the red blood cells does not change.

Which statement explains why the amount of water does not change?

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

The concentration of the solution inside the red blood cells is …

… less than the blood plasma. ☐

… the same as the blood plasma. ☐

… greater than the blood plasma. ☐ **[1]**

[Total: 4]

3 This question is about kidneys.

(a) The kidneys excrete excess water from the body in urine.

Put a (ring) around **three** other ways in which water can be lost.

breathing **drinking** **eating** **producing faeces**

respiring **sweating**

[1]

(b) The kidneys filter some chemicals out of the blood.

Some chemicals are reabsorbed and others leave the body in the urine.

Complete the table to show what happens to each of these chemicals.

Put ticks (✓) in the correct boxes.

One row has been done for you.

	filtered out of the blood	**found in the urine**
salt	✓	✓
sugar		
urea		
water		

[2]

(c) Kidneys can produce **concentrated** or **dilute** urine.

The concentration of urine is affected by different conditions.

For these two conditions, state the type of urine produced (**concentrated** or **dilute**) and explain why this happens.

- **high external temperature**

type of urine produced ……

explanation .....

.....

- **eating too much salty food**

type of urine produced ……

explanation .....

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

[Total: 5]

4 Mr Mahmood is a biology teacher.

He gets his students to construct a model of DNA.

(a) Complete the sentences about the DNA model.

Use words from this list.

double

four

single

three

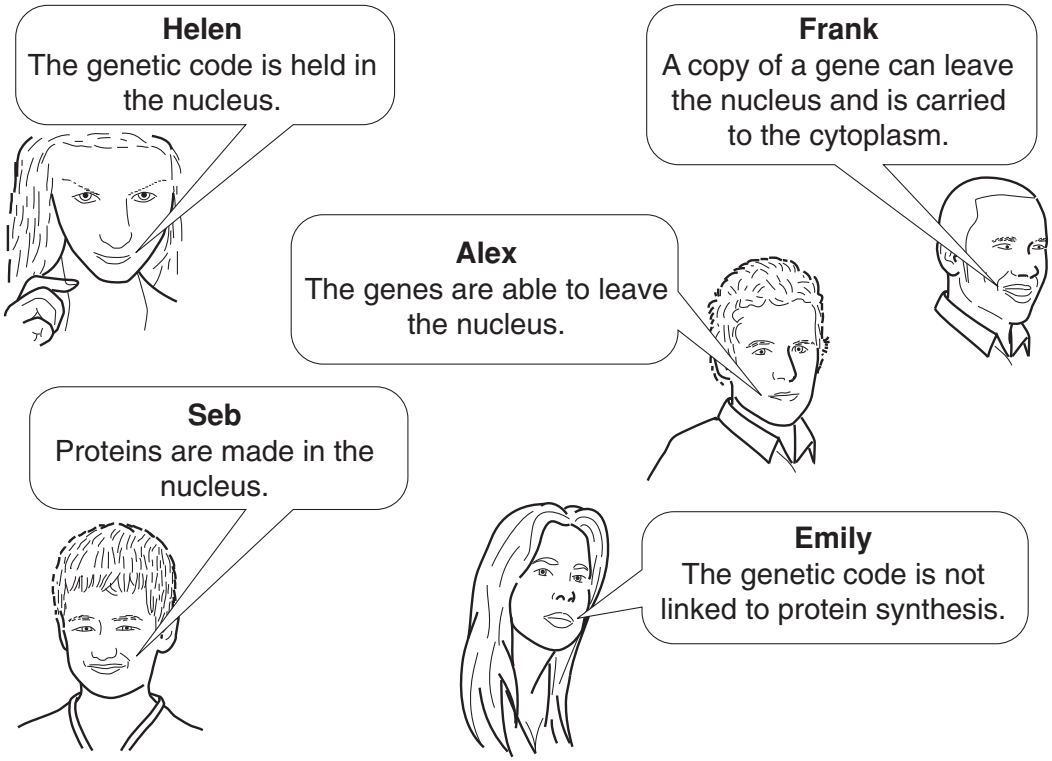
triple

two

The DNA model must be made from …… different bases.

The strands of DNA are held together by the bases to form a …… helix.
[2]

(b) Five students make statements about genes and protein production.



Which two students made correct statements?

answer …… and …… **[1]**

(c) Mr Mahmood asks his students to find out about the **cell cycle**.

What happens to the chromosomes during **cell growth** and **mitosis** in the cell cycle?

during **cell growth**

.....

.....

during **mitosis**

.....

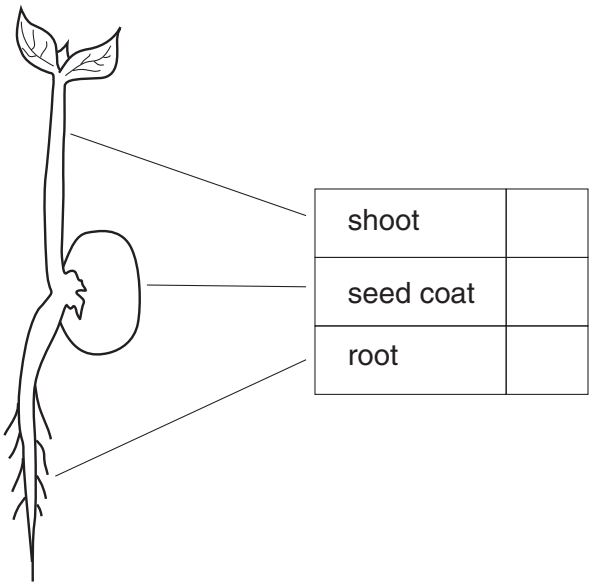
..... **[2]**

[Total: 5]

5 Amy grows a bean seedling.

(a) Which part of the bean seedling does **not** contain a meristem?

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



[1]

(b) The shoot of the bean seedling breaks.

Amy tries to grow a new plant from the piece of shoot that has broken off.

She dips the end of the damaged shoot in a powder before planting it.

What needs to be in the powder?

Draw a ring around the correct answer.

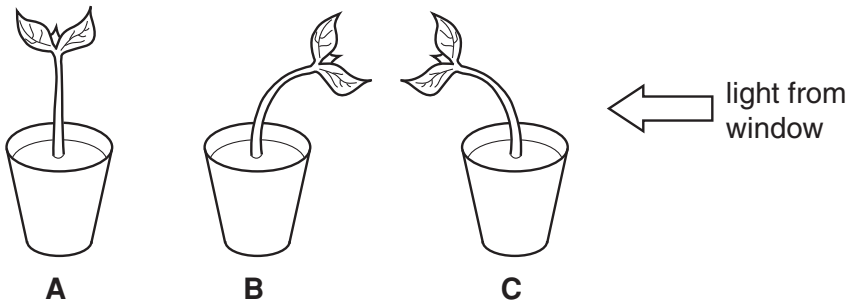
chlorophyll **enzymes** **hormones** **sugar**

[1]

(c) Amy grows some more bean seedlings.

(i) What will the seedlings look like after three days?

Choose from **A**, **B** or **C**.



answer ..... **[1]**

(ii) The seedlings carry out many different processes.

Which process is directly affected by light?

Draw a ring around the correct answer.

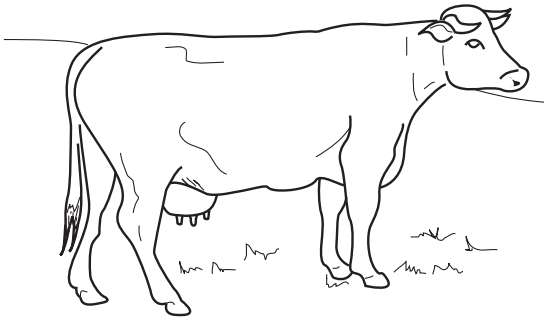
excretion **photosynthesis** **reproduction** **respiration**

[1]

[Total: 4]

6 Joe is a farmer.

He is very proud of his prize cow because she produces good quality milk.



Joe would like his cow to give birth to calves that could also produce good quality milk.

(a) An adult cow has 60 chromosomes in its body cells.

How many chromosomes are in a cow's egg cell?

Put a (ring) around the correct answer.

15 **30** **60** **120**

[1]

(b) The cow's egg cells are fertilised by sperm from a bull.

Complete the sentences.

Use words from this list.

all

fertilisation

half

meiosis

mitosis

most

The egg cells and sperm cells are gametes and are produced by …… .

An egg cell and a sperm cell fuse to form a zygote.

The zygote will contain …… of the chromosomes found in the cow's egg cell. **[2]**

(c) Each zygote will grow to form an embryo.

Joe finds out that scientists can take individual cells from an embryo and make identical copies of the embryo.

This is not successful after a certain stage of embryo development.

Why is this?

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

The cells have become …

… larger. ☐

… older. ☐

… smaller. ☐

… specialised. ☐ **[1]**

(d) An embryo grows into a female cow.

Every cell in the cow contains the same genes.

Only some of the cells in the cow produce milk.

Explain why.

Use ideas about **genes** and **protein production** in your answer.

.....

.....

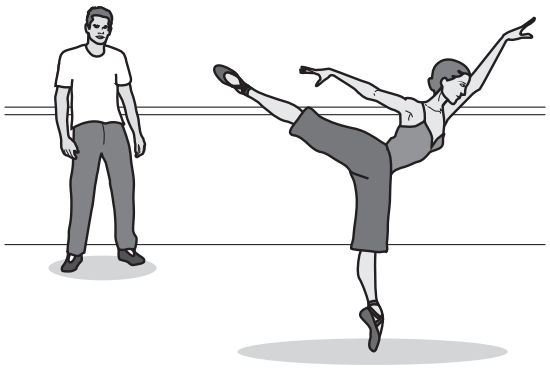
.....

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

[Total: 6]

7 Lucy and James are learning a dance for their next performance.

Lucy is struggling to remember the new steps.



Lucy's cerebral cortex is the part of her brain responsible for memory.

(a) What else is the cerebral cortex responsible for?

Put a (ring) around the **three** correct answers.

balancing water levels	**consciousness**	**homeostasis**
intelligence	**language development**	**reflex actions**

[2]

(b) Lucy asks James to describe what memory is.

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

looking at information	☐
responding to information	☐
storing information	☐
retrieving information	☐

[1]

(c) James tries to explain the dance steps to Lucy.

He uses verbal memory.

(i) What does James need to use verbal memory?

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

James needs …

… long-term memory only. ☐

… short-term memory only. ☐

… both short and long-term memory. ☐

[1]

(ii) James tells Lucy that she will eventually learn the new steps by repeating them during rehearsals.

What will happen to the neuron pathways in Lucy's brain as she learns the steps?

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

Some neuron pathways …

… are more likely to transmit impulses than others. ☐

… start to transmit impulses in both directions. ☐

… transmit impulses more quickly. ☐

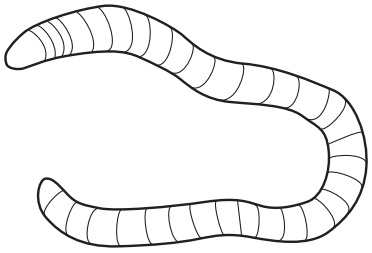
… stop transmitting impulses. ☐ **[1]**

[Total: 5]

8 Earthworms have a nervous system.

They have the same sort of reflexes as humans.

They can be seen above the soil surface when they leave their burrows.



(a) An earthworm will move back into its burrow quickly if it is touched.

This is a reflex action.

Complete this sentence about the reflex action shown by the earthworm.

Use words from this list.

complex

involuntary

simple

voluntary

The earthworm's reflex action is both …… and …… .

[1]

(b) Why is **this** reflex action an advantage to earthworms?

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

It helps earthworms to …

… find a mate. ☐

… gain oxygen. ☐

… search for food. ☐

… hide from predators. ☐ **[1]**

(c) Humans have a more complicated nervous system than earthworms.

Humans have a central nervous system.

Which **two** structures are part of the central nervous system?

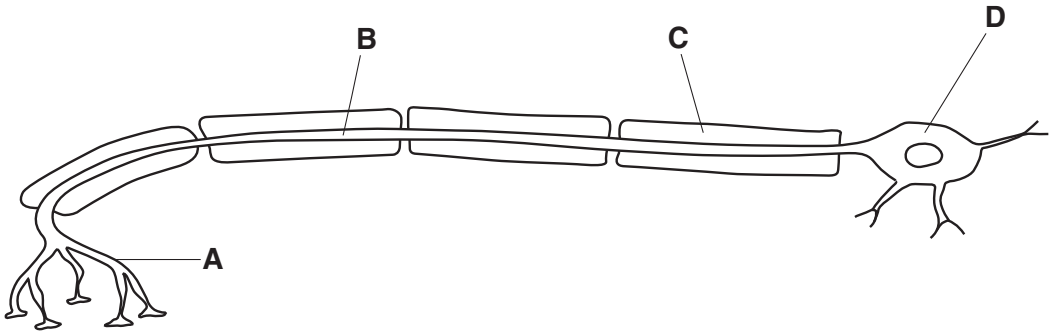
Put a (ring) around the **two** correct answers.

brain **liver** **muscle** **skin** **spinal cord**

[1]

[Total: 3]

9 The diagram shows a motor neuron.



(a) Which structure, **A**, **B**, **C** or **D**, is the **axon**?

answer ..... **[1]**

(b) Write about the fatty sheath.

In your answer include

- where it is
- what job it does.

.....

.....

.....

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

[Total: 4]

END OF QUESTION PAPER