OCR
RECOGNISING ACHIEVEMENT

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B631/02

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

BIOLOGY B

Unit 1 Modules B1 B2 B3 (Higher Tier)

WEDNESDAY 21 MAY 2008

Afternoon
Time: 1 hour

CUP/T52556

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 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 **60**.

FOR EXAMINER'S USE		
Section	**Max.**	**Mark**
A	**20**	
B	**20**	
C	**20**	
TOTAL	**60**	

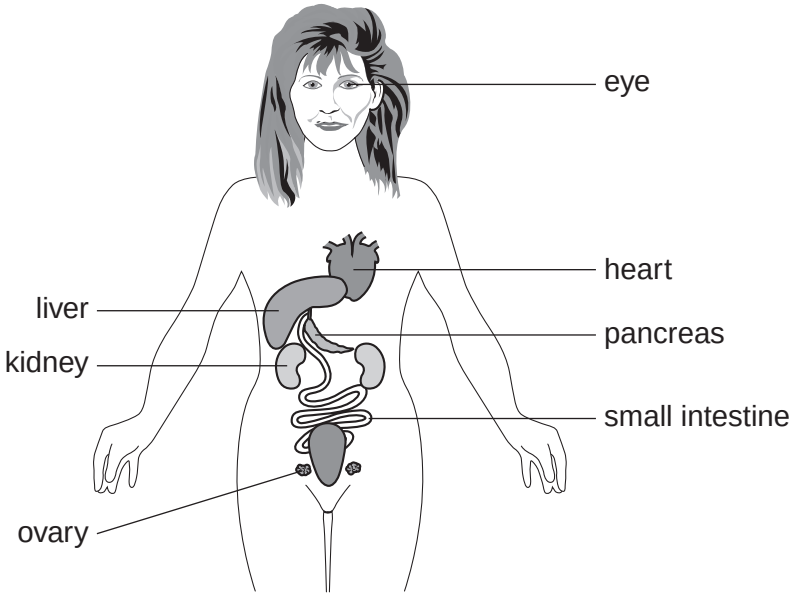
This document consists of **20** printed pages.

[Turn over

Answer **all** the questions.

Section A – Module B1

1 The diagram shows some of the organs in the body.



(a) Write down the name of the organ that fits each description.

Choose the organ from the diagram.

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

(i) An organ that may develop cirrhosis if too much alcohol is consumed

..... [1]

(ii) Two organs that work together to control the levels of glucose in the blood

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

(iii) An organ that contains suspensory ligaments and ciliary muscles

..... [1]

(b) All the organs in the diagram are made up of cells with the same genes.

Genes code for proteins.

Why do these organs **only** produce the proteins that they need?

.....

..... [1]

[Total: 4]

2 Nick is keen on exercising.

He is using an exercise cycle.

(a) **(i)** When Nick cycles, his muscles use oxygen for respiration.

Finish the word equation for this type of respiration.

oxygen + …… → carbon dioxide + …… + energy

[2]

(ii) When Nick cycles faster, he finds that his muscles start to hurt.

Nick knows that the pain is caused by lactic acid.

Why is lactic acid produced in Nick's muscles when he cycles fast?

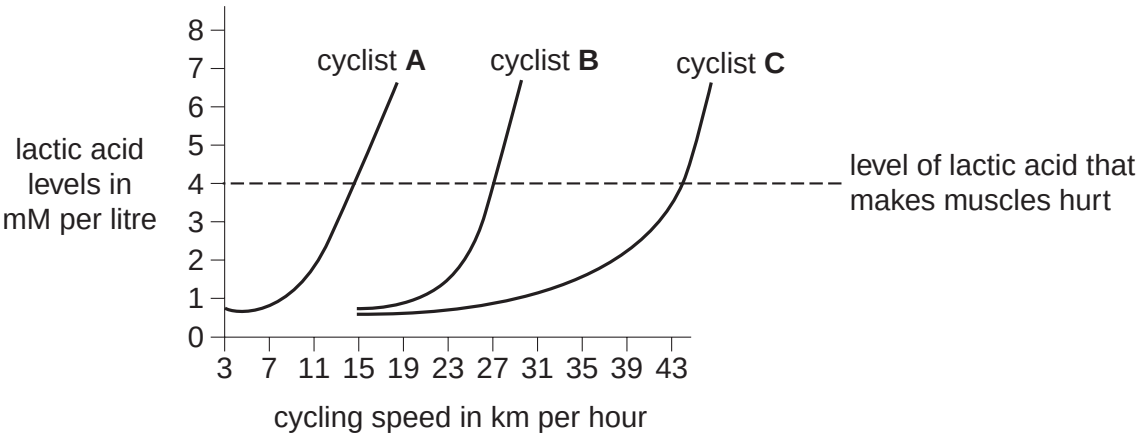
..... [1]

[Turn over for the remainder of question 2

(b) Nick looks in a book about exercise.

The book has a graph.

It shows the lactic acid levels in three different cyclists when they cycle at different speeds.



Put a tick (✓) next to the only conclusion that **cannot** be made from the graph.

Cyclist **C** is healthier than cyclist **A**. ☐

Cyclist **C** can cycle faster than cyclist **A** without his muscles hurting. ☐

Cyclist **C** is fitter than cyclist **A**. ☐

Cyclist **B** can cycle up to 27 km per hour before his muscles hurt. ☐

At low speeds, the cyclists make very little lactic acid. ☐

[1]

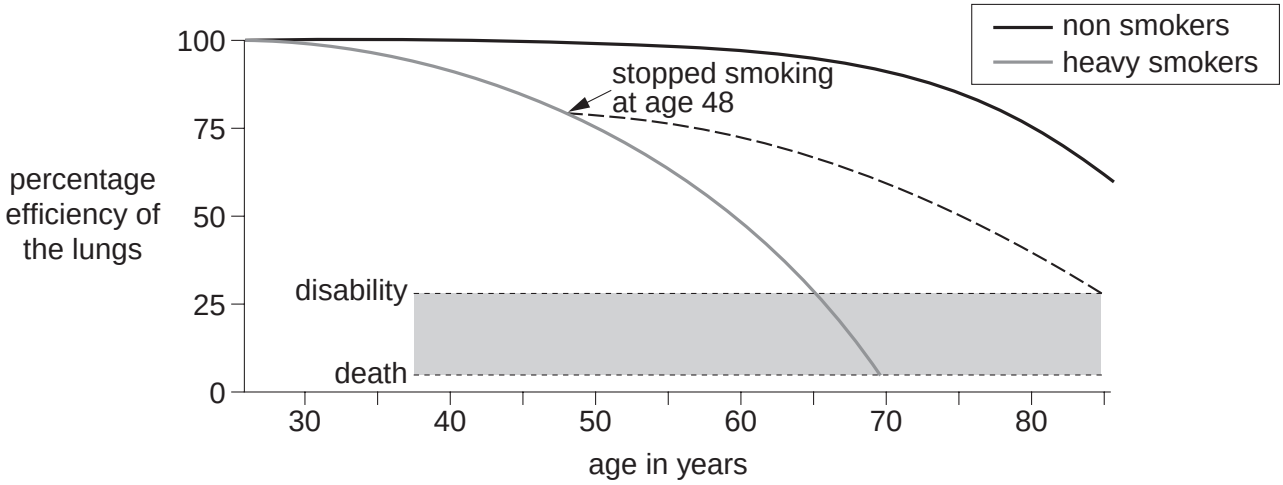
(c) After exercise, lactic acid is transported to an organ in the body for breakdown.

Write down the name of this organ.

..... [1]

[Total: 5]

3 Tobacco smoke can affect the lungs.
The graph shows how well the lungs work at different ages.
This is shown for two groups of people.
One group are heavy smokers, and the others do not smoke.
It also shows the effect of stopping smoking at age 48.



Use the graph to help you answer the questions.

(a) Continuing to smoke heavily can damage the lungs and lead to disability.
At what age does the graph show this disability occurring?

..... [1]

(b) Doug is a 48 year-old heavy smoker.

What can Doug tell **from the graph** about what he might expect if he gives up smoking now?

.....

.....

.....

..... [2]

[Total: 3]

4 MCDA is a genetic disorder.

It is caused by a mutation.

People who have MCDA cannot use fatty acids.

(a) **(i)** What is a mutation?

.....

..... [1]

(ii) How do mutations stop cells from functioning normally?

.....

..... [1]

(b) Fatty acids are the products of fat digestion.

Write about how fats are digested in the body.

In your answer, include

- where they are digested
- the enzyme that breaks them down
- the function of bile.

.....

.....

.....

..... [3]

(c) Toby and Premika **both** have the allele for MCDA but **neither** of them has the disorder.

(i) What does this tell you about the allele for MCDA?

..... [1]

(ii) Toby and Premika want to have children.

What is the probability of their first child having MCDA?

Complete this genetic diagram to help you.

Toby's gametes

Premika's gametes

	N	n

probability = ... [2]

[Total: 8]

Section B – Module B2

5 Look at the photograph.

It shows two palm trees.

(a) During photosynthesis, the trees make glucose.

The trees change the glucose into other substances, such as starch for storage.

Explain **one other** way that the trees change the glucose and use the glucose.

what the glucose is changed into .....

what the glucose is used for ..... [2]

(b) Trees also carry out respiration.

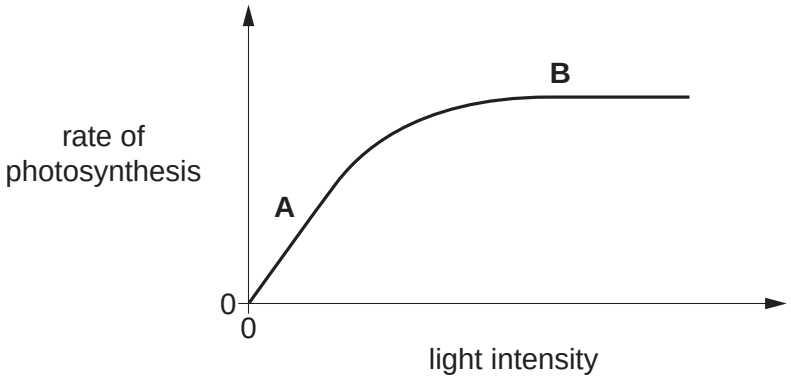
Explain why plants need to respire 24 hours a day.

..... [1]

(c) Look at the graph.

It shows the effect of increasing light intensity on the rate of photosynthesis.

The concentration of CO_2 is kept at 0.4% throughout the experiment.



At **A**, the rate of photosynthesis is increasing.

At **B**, the rate stays constant.

Explain why.

Use ideas about limiting factors in your answer.

A .....

.....

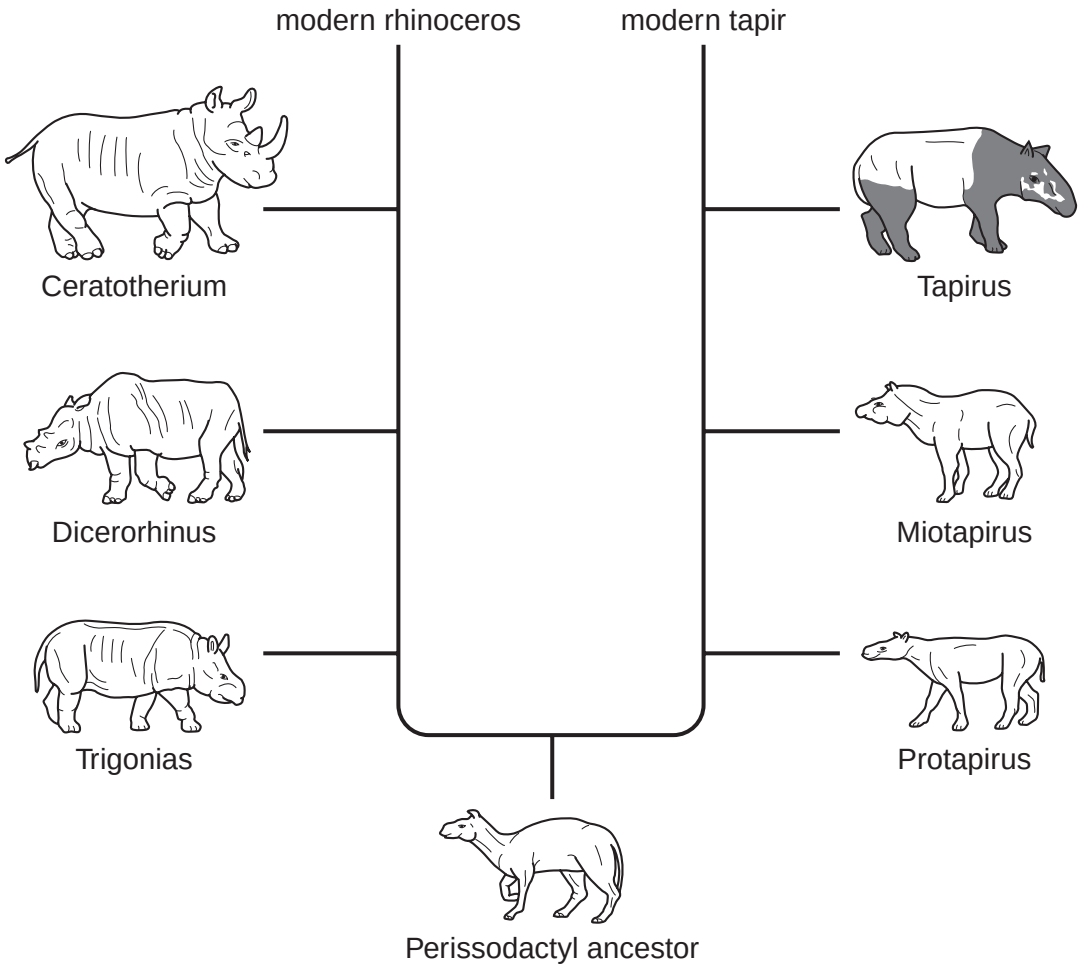
B .....

..... [2]

[Total: 5]

6 Look at the picture.

It shows the fossil record of the rhinoceros and tapir.



(a) Explain how the diagram shows that the rhinoceros and the tapir are related species.

.....

..... [1]

(b) The fossil record is based on fossils found in rocks.

Describe how animals become fossilised.

.....

.....

.....

..... [2]

(c) Rhinoceros have adapted to changes in the environment over time.

Adaptations are passed onto the next generation.

Write down the name of the structures in the nucleus of cells that control adaptations.

..... [1]

(d) Look at the picture.

It shows a bird called an oxpecker in the ear of a rhinoceros.

The oxpecker eats insects that are parasites on the rhinoceros.

Both the rhinoceros and the oxpecker benefit.

(i) Write down the name given to a relationship where both organisms benefit.

..... [1]

(ii) The insects are parasites.

What is meant by the term **parasite**?

.....

..... [1]

[Total: 6]

7 Look at the picture of a red squirrel.

(a) Red squirrels belong to the class of vertebrates called mammals.

Write down **one** characteristic found **only** in this class.

..... [1]

(b) Red and grey squirrels occupy a similar ecological niche.

Suggest **two** reasons why they are described as occupying a similar niche.

1 .....

2 ..... [2]

(c) Read the following information about red and grey squirrels.

> Grey squirrels feed on acorns from oak trees, tree shoots, flowers, nuts, fruits and roots.
>
> Red squirrels eat spruce and pine seeds, acorns, berries, bark and fungi.
>
> Grey squirrels can digest unripe acorns; red squirrels cannot.

Grey squirrels have a competitive advantage over red squirrels in oak woods.

Explain why.

.....

..... [2]

[Total: 5]

8 Read this newspaper story.

> **UK 'must protect fishing industry'**
>
> Cod fishing needs to stop before stocks are virtually wiped out by 2048.
>
> However, Britain has to protect its fishing industry.
>
> The UK fisheries minister has ruled out a complete ban on cod fishing, saying a "zero catch" would see "the end of all fishing in the UK".

(a) The fishing industry can protect the cod through sustainable development.

One way to sustain the cod is to set quotas.

(i) How does setting quotas help to protect the cod?

.....

..... [1]

(ii) Describe **one other** way the fish can be sustained.

.....

..... [1]

(b) If Britain banned cod fishing, the cod could still become extinct.

Suggest **two** reasons why.

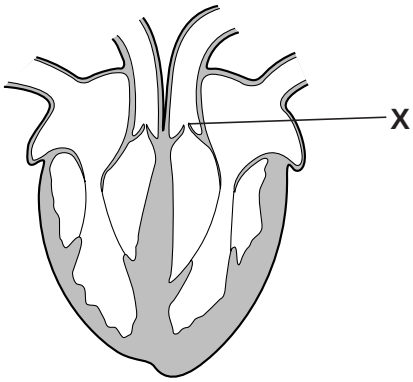
1 .....

2 ..... [2]

[Total: 4]

Section C – Module B3

9 Look at the diagram of a heart.



(a) **(i)** Write down the **name** of part **X**.

..... [1]

(ii) Write down the **job** of part **X**.

.....

..... [1]

(b) The left ventricle has a thicker muscle wall than the right ventricle.

Explain why.

.....

..... [1]

(c) Some people need to have a heart transplant.

People often have to wait a long time for a heart transplant.

Suggest **one** reason why.

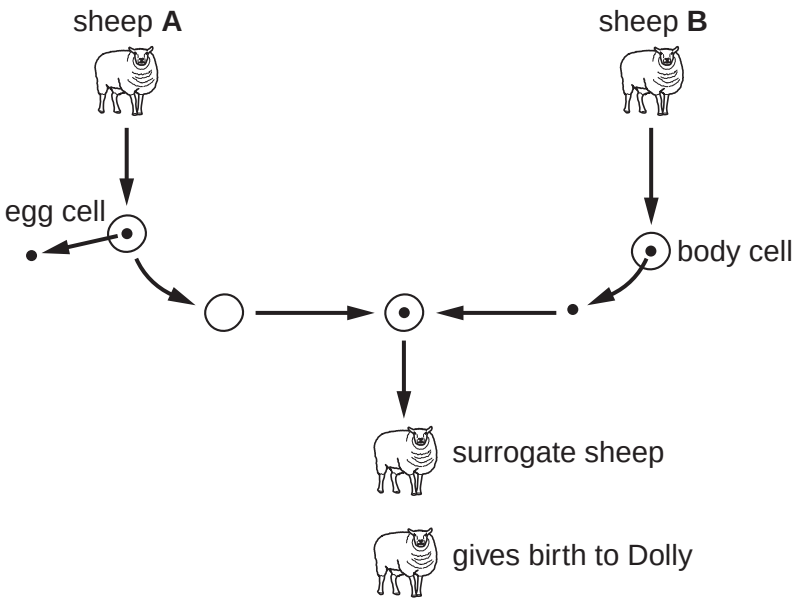
.....

..... [1]

[Total: 4]

10 Look at the diagram.

It shows the cloning technique used to produce Dolly the sheep.



(a) Describe the cloning technique used to produce Dolly.

Use the diagram to help you.

.....

.....

.....

..... [3]

(b) Is Dolly a clone of sheep **A** or **B**?

Explain your answer.

sheep .....

reason why .....

..... [1]

(c) Some people object to the cloning of mammals.

Suggest why.

.....

..... [1]

[Total: 5]

11 This question is about DNA.

(a) Scientists can use DNA to identify people.

They use a process called DNA fingerprinting.

Look at the diagram.

It shows the DNA fingerprints of four people suspected of a crime.

It also shows the DNA from the crime scene.

Which suspect, **A**, **B**, **C** or **D**, was present at the crime scene? .....

Explain your answer.

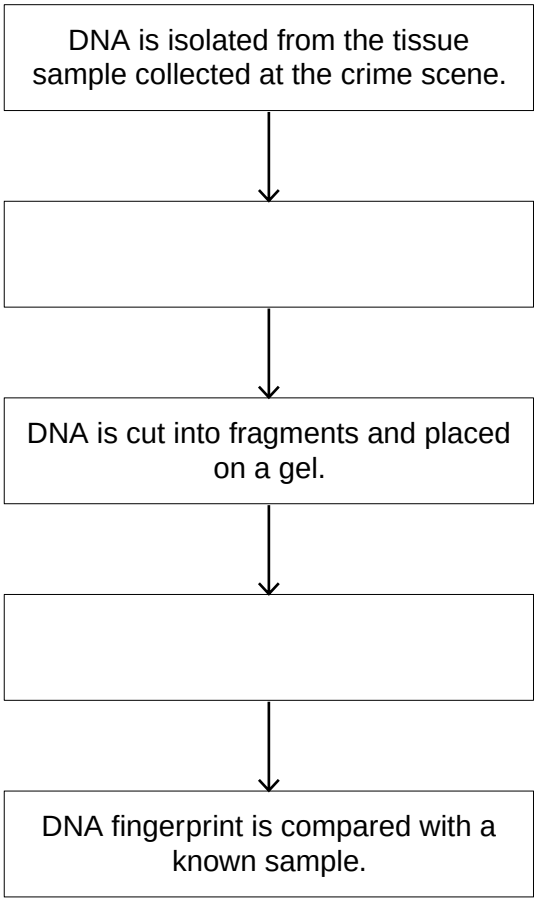
.....

..... [2]

(b) Look at the flow diagram.

It shows the stages in the production of a DNA fingerprint.

Finish the flow diagram by writing in the missing stages.



[2]

[Total: 4]

12 Look at the picture.

It shows rice being planted in China.

(a) Rice belongs to the plant kingdom.

Write down the name of **one** structure found in a plant cell that is **not** found in an animal cell.

..... [1]

(b) Scientists have taken the gene that controls beta-carotene and placed it into rice.

(i) Humans convert beta-carotene into a vitamin.

Write down the name of this vitamin.

..... [1]

(ii) People living in China rely on rice for food.

Suggest why **this** genetically engineered rice could help them.

.....

..... [1]

(iii) Describe **one** disadvantage of genetic engineering.

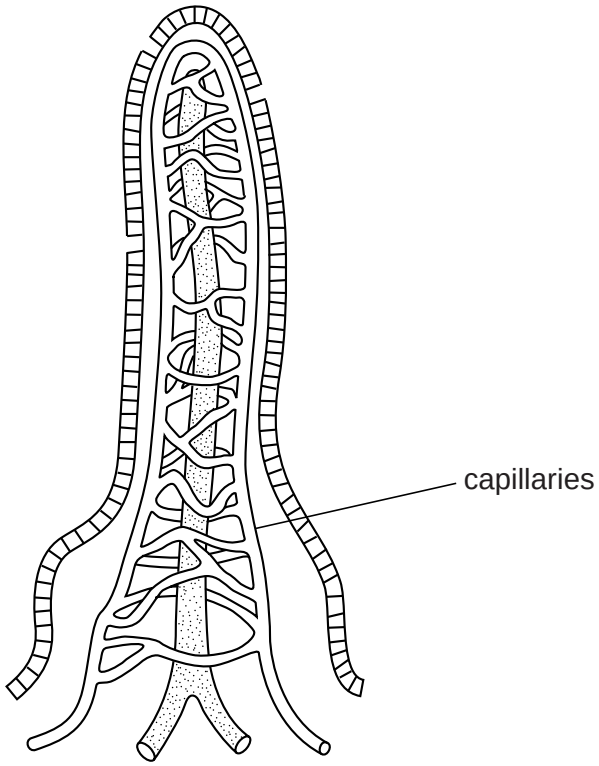
.....

..... [1]

[Total: 4]

13 Look at the diagram.

It shows a villus from the small intestine.



(a) The capillaries provide a good blood supply, which helps speed up diffusion.

Describe **two other** ways the **villi** are adapted to speed up the rate of diffusion in the small intestine.

1 .....

.....

2 .....

..... [2]

(b) **Capillaries** are adapted to carry out their function.

Explain how.

.....

..... [1]

[Total: 3]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE