

Centre No.					
Candidate No.					

Surname	Initial(s)
Signature	

Paper Reference(s)
7040/02

London Examinations GCE
Biology
Ordinary Level
Paper 2
Tuesday 23 May 2006 – Afternoon
Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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Question Number	Leave Blank
1	
2	
3	
4	
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6	
7	
8	
9	
10	
11	
Total	

<u>Materials required for examination</u>	<u>Items included with question papers</u>
Nil	Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.

Answer ALL questions in the spaces provided in this book.

Information for Candidates

Calculators may be used.
 The total mark for this paper is 100.
 The mark allocation is indicated at the end of each question.
 Marks for parts of questions are shown in round brackets: e.g. (2).
 This paper has eleven questions. All blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.
 In calculations, show **all** the steps in your working.

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Turn over



Answer ALL questions in the spaces provided.

1. A balanced diet normally includes carbohydrate, lipid (fat) and protein.

(a) Name **two** other components of a balanced diet.

1

2

(2)

(b) People can become overweight if they do not eat a balanced diet. Overweight people can now take a tablet to help them reduce their weight. A chemical in the tablet prevents the lipid in the diet being digested.

(i) Name the enzyme that digests lipid.

.....

(1)

(ii) Explain how preventing lipid from being digested helps overweight people.

.....

.....

.....

.....

.....

(3)



- (c) The chemical in the tablet prevents 30% of the lipid in the diet from being digested. The table below lists three foods found in a sandwich. The lipid contained in each food is also shown.

Food in sandwich	Lipid content of food (in g)
bread	0.6
butter	1.7
beef	9.7

A person eats this sandwich and takes the tablet.

Calculate how many grams of lipid would be egested. Show your working.

Answer g

(2)

Q1

(Total 8 marks)

2. The table below lists different types of microorganisms. Complete the table to give a **named** example for each type. Use a tick (✓) or a cross (✗) to show if each has a cell wall and can carry out photosynthesis. The first line has been done for you.

Microorganism	Example	Has a cell wall	Carries out photosynthesis
Bacterium	<i>Pneumococcus</i>	✓	✗
Unicellular alga			
Unicellular fungus			
Parasitic protozoan			
Free-living protozoan			

Q2

(Total 8 marks)



3. Humans show variation in blood group. This is controlled by a single gene that has three alleles **A**, **B** and **O**. The three alleles give four different blood groups. The possible genotypes for each blood group are shown in the table below.

Blood group	Possible genotypes
Group A	AA AO
Group B	BB BO
Group AB	AB
Group O	OO

(a) (i) One of the alleles is recessive to the other two. Which is the recessive allele? Give a reason for your answer.

.....

.....

.....

.....

(2)

(ii) Which two of the alleles show codominance? Give a reason for your answer.

.....

.....

.....

.....

(2)



(b) A father has blood group **A** and a mother has blood group **B**. The father's genotype is **AO**. Their four children each have a different blood group. Complete the genetic diagram below to show the genotype of the mother, the gametes and the genotypes of their children.

Father
Blood group **A**

Mother
Blood group **B**

Genotype

AO

Gametes

Genotypes of children

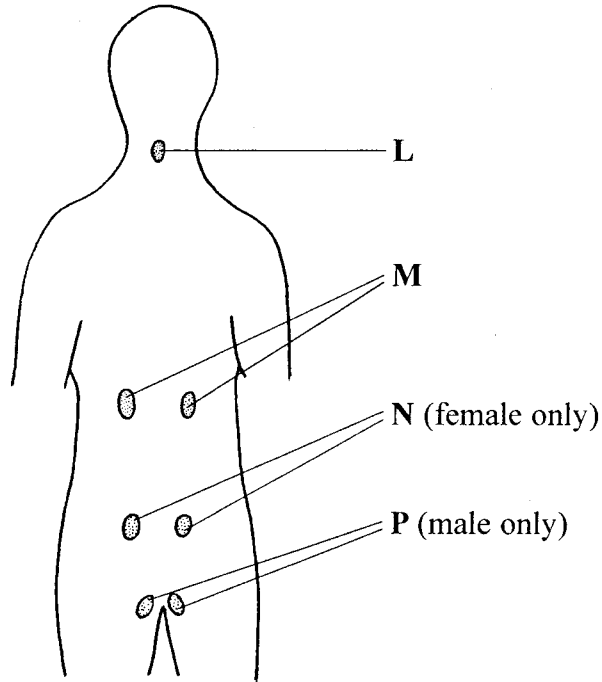
(3)

Q3

(Total 7 marks)



4. The diagram below shows the position of some of the endocrine glands in the body.



(a) Name the organs labelled L, M, N and P.

L

M

N

P

(4)

(b) Describe the general role of the endocrine glands in the body.

.....
.....
.....
.....

(2)



(c) Insulin is produced by an endocrine gland. Some people develop a condition called diabetes in which insulin is not produced.

(i) Describe how a lack of insulin would affect the body.

.....
.....
.....
.....
.....

(3)

(ii) Suggest **two** possible treatments for diabetes.

1

.....

2

.....

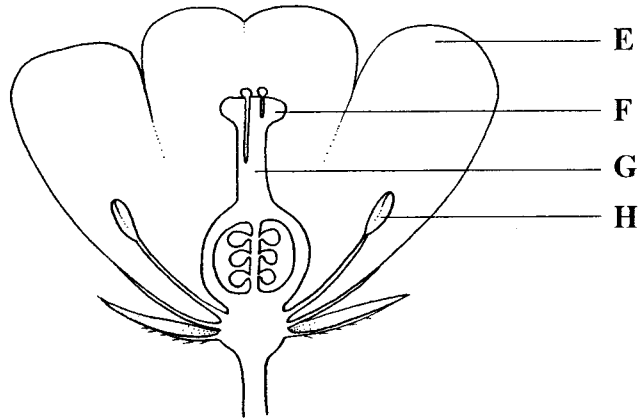
(2)

(Total 11 marks)

Q4



5. The diagram below shows the structure of an insect-pollinated flower.



(a) Name the structures labelled E, F, G and H.

- E
 - F
 - G
 - H
- (4)

(b) Complete the sentence.

Pollination is the transfer of pollen from the
to the

(2)



(c) Give **two** features that are present in insect-pollinated flowers but not present in wind-pollinated flowers. For **each** feature describe how it helps pollination to occur.

Feature 1

.....

.....

.....

(2)

Feature 2

.....

.....

.....

(2)

(Total 10 marks)

Q5



6. (a) (i) Rats are mammals. State **two** external features characteristic of mammals.

- 1.
 - 2.
- (2)**

(ii) Rats are pests that can cause damage to a farming community. Give **two** ways that rats can affect a farming community.

- 1.
 -
 - 2.
 -
- (2)**

(b) Fleas are insects that feed on the blood of rats.

Describe this type of feeding relationship.

-
 -
 -
 -
- (2)**



(c) The following food chain contains three feeding levels.



(i) Name each feeding level.

Maize

Rats

Fleas

.....

.....

.....

(3)

(ii) In a field there are 1000 maize plants, 15 rats, and each rat has 10 fleas. Draw a pyramid of numbers for this food chain.

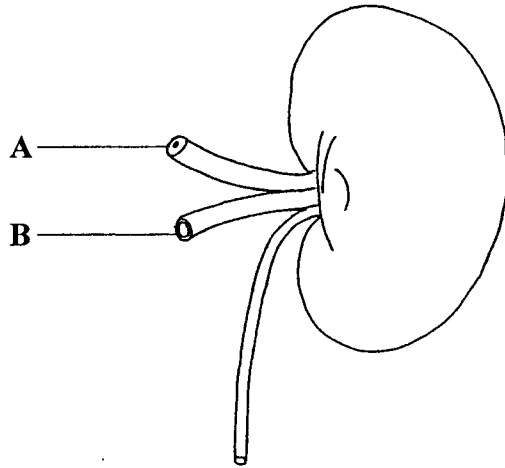
(3)

Q6

(Total 12 marks)



7. The diagram below shows the main tubes entering or leaving a human kidney.



(a) Name the tubes labelled A and B.

A

B

(2)

(b) Two functions carried out by the kidney are excretion and osmoregulation. Explain what is meant by each of these terms.

Excretion

.....

(1)

Osmoregulation

.....

(1)

(Total 4 marks)

Q7

3/4



8. The table below lists the changes that occur during breathing.

Draw a circle around the correct change when a person breathes in (inspiration). The first change has been done for you.

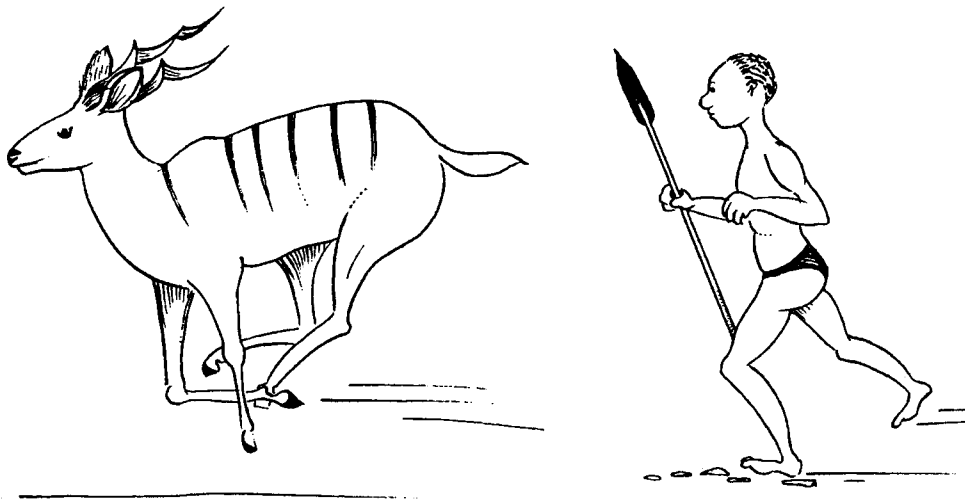
Direction of air flow	<u>Inwards</u>	Outwards
Diaphragm	Relaxes	Contracts
Position of diaphragm	Lowers	Rises
External intercostal muscles	Relax	Contract
Rib cage	Lowers	Rises
Volume of chest cavity	Increases	Decreases
Pressure in chest cavity	Increases	Decreases

Q8

(Total 6 marks)



9. The diagram below shows a desert bushman hunting a type of antelope called a kudu.



During the hunt, the bushman runs after the kudu for hours in the hot desert temperatures. The body temperature of both the bushman and the kudu rises. The bushman is smaller and this helps him control his body temperature better than the kudu. The bushman is able to replace water lost from his body during the hunt by drinking from a container he carries.

When the body temperature of the kudu rises too high it collapses onto the ground. The bushman kills the kudu and eats its meat.

(a) Name the process that causes the body temperature to rise in the bushman and in the kudu.

..... (1)

(b) Explain why the size of the bushman helps him control body temperature better than the kudu.

.....
.....
..... (2)

(c) Explain how the changes to the blood vessels in the skin help the bushman control his body temperature.

.....
.....
..... (2)



(d) Name **two** ways in which the bushman loses water from his body while he is running.

1

2

(2)

(e) Explain what could happen to the red blood cells of the bushman if he did not replace water lost during the hunt.

.....

.....

.....

.....

.....

(3)

(f) Describe what happens to the protein in the kudu meat in the gut of the bushman after he has swallowed it.

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.....

.....

(5)

(Total 15 marks)

Q9

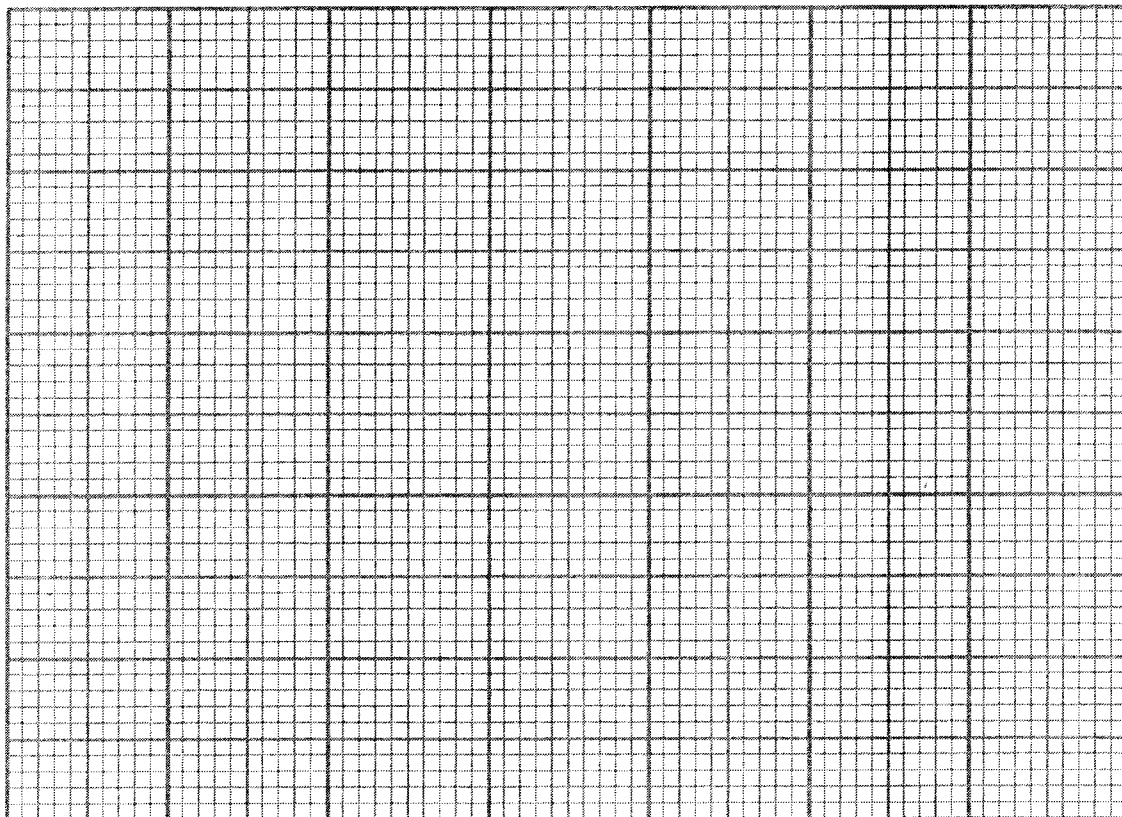


10. Mutations are rare and random changes to genetic material. Exposure to radiation can affect the number of mutations.

The table below shows the percentage of organisms in a population showing a mutation after exposure to different amounts of radiation.

Amount of radiation in arbitrary units	Organisms showing a mutation (%)
1000	4.0
2000	6.0
3000	8.5
4000	10.0
5000	13.0
6000	17.0
7000	20.0

(a) (i) Use the grid to plot a line graph to show the relationship between percentage of organisms showing a mutation and the amount of radiation. Join the points with straight lines.



(4)



(ii) Describe the relationship shown by the graph.

.....
(1)

(iii) How much radiation would give a percentage mutation of 15%?

.....
(1)

(iv) How many mutations would you predict in a population of 20 000 of these organisms when exposed to radiation of 1500 arbitrary units?

.....
(1)

(b) Name the molecule that genetic material is made from.

.....
(1)

(c) In some plants there has been a mutation in the gene for making chlorophyll. If a plant has two of the mutant alleles it cannot make chlorophyll. Explain how this would affect the growth of the plant.

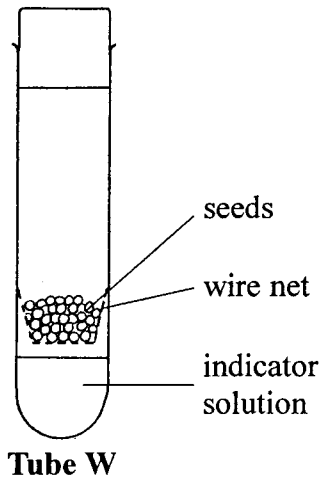
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.....
(2)

Q10

(Total 10 marks)



11. Gerard set up the following experiment to investigate gas exchange in germinating pea seeds.



(a) (i) During the germination the seeds carry out respiration and release a gas.

Name this gas.

..... (1)

(ii) Suggest a suitable indicator solution that Gerard could use to detect the gas.

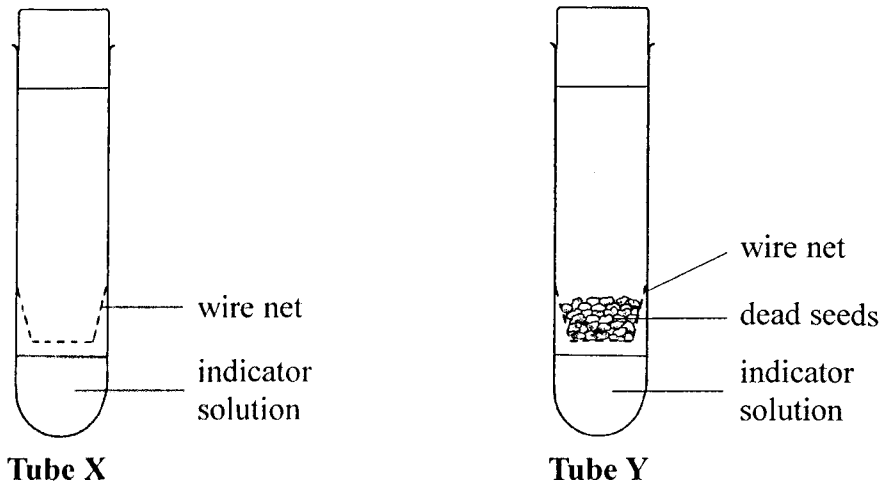
..... (1)

(iii) Describe the change you would see in the indicator solution as the seeds respire.

.....
.....
..... (2)



(b) In his investigation Gerard set up tube X which was the same as tube W but without the seeds.



(i) Describe the purpose of tube X.

.....
.....
.....

(2)

(ii) Another pupil suggested setting up tube Y, rather than tube X. Tube Y contained dead pea seeds. Describe what this pupil should do to obtain the dead pea seeds.

.....
.....

(1)

(c) Tube W was left in the light for 10 days. The seeds in tube W were allowed to germinate until they grew small green leaves.

Suggest what would happen to the composition of gases in this tube.

.....
.....
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(2)

(Total 9 marks)

Q11

TOTAL FOR PAPER: 100 MARKS

END

