Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	0	4	0	/	0	1	Signature	

Paper Reference(s)

7040/01

London Examinations GCE

Biology

Ordinary Level

Paper 1

Tuesday 5 May 2009 – Morning

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
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8	
9	
10	
11	
12	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Check that you have the correct question paper.
Answer **ALL** the questions. Do not use pencil. Use blue or black ink.
Write your answers in the spaces provided in this question paper.

Information for Candidates

Calculators may be used.
The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 12 questions in this question paper. The total mark for this paper is 100.
There are 24 pages in this question paper. Any 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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Answer ALL the questions.

1. Muscles are involved in many processes in the human body.

(a) Complete the table below by naming the process or the muscle involved in each process.

Process	Name of muscle
Focusing light	
	Heart
	Intercostal

(3)

(b) Explain how the diaphragm helps ventilation of the lungs when breathing in.

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(3)

Q1

(Total 6 marks)

Leave blank

2. The carbon cycle illustrates how molecules containing carbon move between living and non-living components of the ecosystem.

(a) (i) Name **two** processes in the carbon cycle that increase the amount of carbon dioxide in the atmosphere.

1 .....

2 .....

(2)

(ii) Name **one** process in the carbon cycle that decreases the amount of carbon dioxide in the atmosphere.

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(1)

(b) Explain how increasing levels of carbon dioxide in the atmosphere might have harmful ecological consequences.

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(4) **Q2**

(Total 7 marks)

Leave blank

3. The table lists different cells. Complete the table by describing the function of each cell.

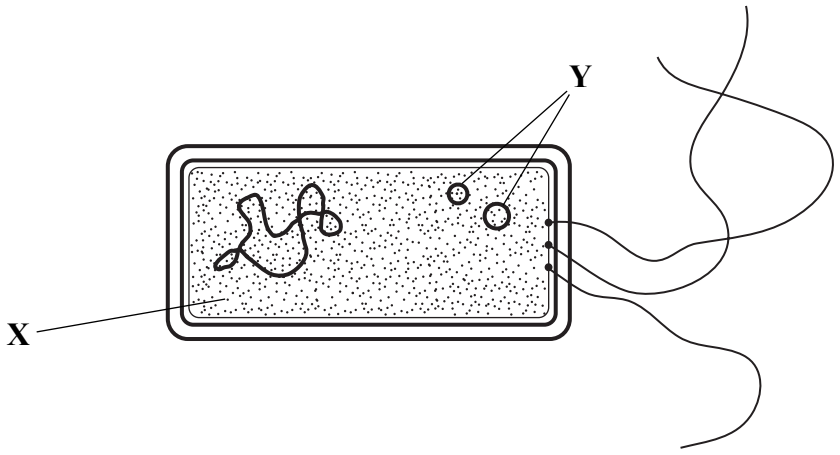
Cell	Function
Red blood cell	
Guard cell	
Neurone	
Root hair cell	

Q3

(Total 4 marks)

Leave blank

4. The diagram below shows a typical bacterium.



(a) Name the parts labelled **X** and **Y**.

X .....

Y .....

(2)

(b) The table below lists some activities carried out by bacteria. Complete the table by describing these activities.

Activity of bacteria	**Description of activity**
Nitrifying	
Denitrifying	
Nitrogen fixing	
Decomposing	
Pathogenic	

(5)

Q4

(Total 7 marks)

Turn over

Leave blank

5. The table below shows the diploid number of chromosomes found in the nuclei of some animal cells.

Animal	Diploid number
Human	46
Donkey	62
Horse	64

(a) Explain what is meant by **diploid number**.

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(1)

(b) Where in the human body would you find cells that do not contain the diploid number of chromosomes?

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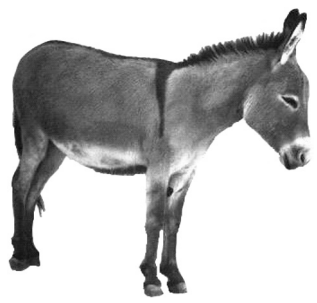
(1)

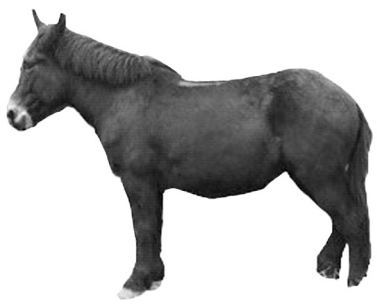
Leave blank

(c) A donkey and a horse are similar in structure. If they mate they can produce a hybrid organism called a mule.

Horse



Donkey



Mule

(i) What would be the number of chromosomes found in the body cells of a mule? Give a reason for your answer.

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(2)

(ii) When two mules are mated they are unable to produce offspring and are described as infertile. Suggest an explanation for this infertility.

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(2)

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(d) An amoeba is a single-celled organism and it contains 13 chromosomes. What does its chromosome number suggest about its method of reproduction?

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(2)

(e) Explain why the genetic variation that results from meiosis is different from the variation that results from mitosis.

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(2)

Q5

(Total 10 marks)

Leave blank

6. Some diet supplements are designed to replace a meal. This diet may help people to lose weight.

Kieran's teacher set up a biology investigation for the class to carry out. She wanted the class to test the supplement to find out what it contained. Kieran carried out some food tests using the supplement and recorded his results in the table below.

Tested for	Reagent	Colour of reagent		Result
		at start	at end	
Glucose		blue		present
Starch			yellow	
	Biuret	blue		present

(a) Complete the table by writing a correct word in each empty box.

(5)

(b) In the test for glucose, Kieran heated the reagent and sample in a test tube. Explain how you could carry out this procedure safely.

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(2)

(c) The diet supplement is being used to replace a meal. Suggest **two** other components that are needed to ensure a balanced diet. For each component you give describe its role in the body.

1 .....

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(2)

2 .....

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(2)

Leave blank

(d) Starch and glucose are both carbohydrate molecules.

(i) State **one** difference between the properties of these molecules.

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(1)

(ii) Describe how this difference relates to their function in plants.

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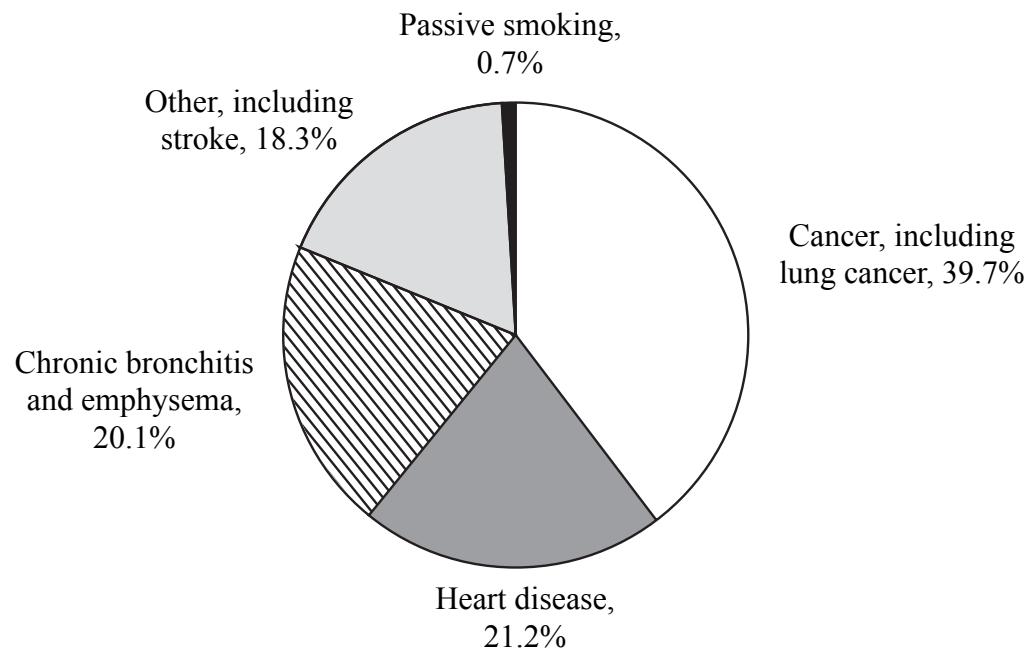
(2)

Q6

(Total 14 marks)

Leave blank

7. In one year in Australia, 19 019 people died from different diseases linked to cigarette smoking. The pie chart below shows the percentage of these people dying from the different diseases.



(a) (i) Which disease caused most deaths?

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(1)

(ii) Calculate how many of the 19 019 Australians died from heart disease. Show your working.

Answer .....

(2)

Leave blank

(b) Cigarette smoking is not the only factor that can increase the risk of heart disease.

(i) Name **two** other factors that can increase the risk of heart disease.

1 .....

2 .....

(2)

(ii) Explain how heart disease may lead to death.

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(3) **Q7**

(Total 8 marks)

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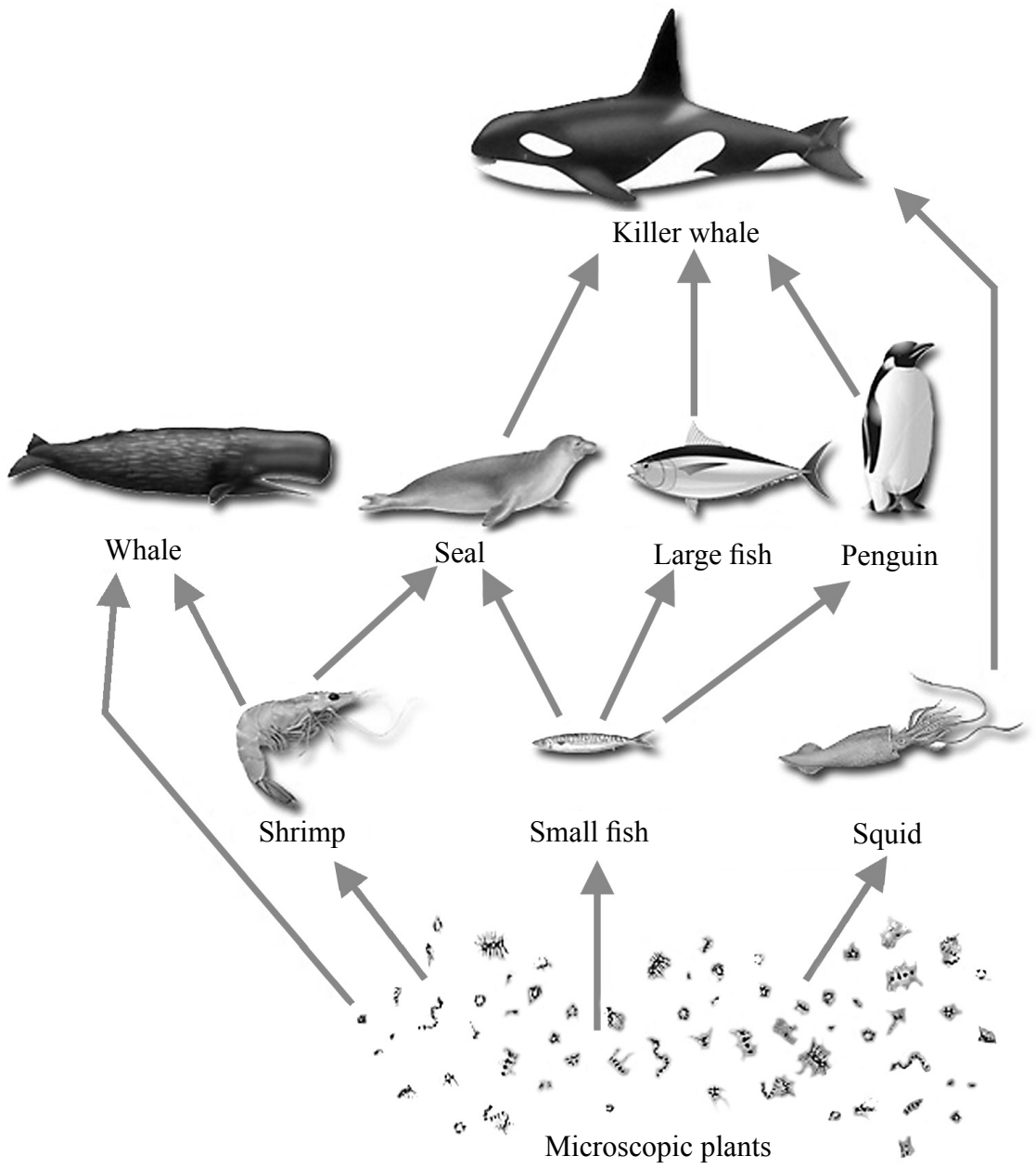
8. The food web below shows feeding relationships between some organisms in the Antarctic Ocean near the South Pole.



(a) Name the primary consumers in the food web.

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(1)

Leave blank

(b) From the food web draw a food chain that has four trophic levels and includes seals.

(2)

(c) In winter there is very little light at the South Pole. Explain how this would affect the food web during the winter.

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(3)

Leave blank

(d) In the ocean, the temperature is relatively constant throughout the year. On land animals have to survive changes in temperature. Describe how animals on land are able to survive changes in temperature.

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(3) **Q8**

(Total 9 marks)

Leave blank

9. The table below lists some effects of different hormones on the body.

Complete the table using a tick (✓) to show which hormone causes each effect.

Effect on body	Adrenaline	Progesterone	Testosterone	Insulin	Oestrogen
Increases heart rate					
Deepens voice at puberty					
Converts blood glucose to glycogen					
Maintains lining of uterus					
Repairs lining of uterus					

Q9

(Total 5 marks)

Leave blank

10. Mineral ions are needed for plants to grow. The table below describes the function of some mineral ions.

(a) Complete the table by naming a correct mineral ion in each empty box. The first one has been done for you.

Function of mineral ion	Name of mineral ion
Making DNA	phosphate
Making amino acids	
Making chlorophyll	

(2)

(b) (i) Plants can absorb mineral ions by active transport. Describe this process.

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(2)

(ii) Give **two** factors that can affect the rate of movement of mineral ions into the roots of crop plants.

1 .....

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2 .....

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(2)

Leave blank

(c) Salinisation can occur when hot temperatures cause water in the soil to evaporate. Salinisation can be a major problem for farmers in semi-desert areas, such as the Indus valley in Pakistan.

Suggest how salinisation would affect the mineral concentration in the soil and the growth of crops.

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(3)

Q10

(Total 9 marks)

Leave blank

11. A teacher wanted to measure the reaction times for the students in her class. She used a computer programme to do this.

The computer shone a light and recorded the time (in seconds) for the student to press the mouse key. The computer was used to record the reaction time five times for all of the students. The programme then calculated the average reaction time for each of the students. The data collected are shown in the table below.

Student	Average reaction time in seconds
JG	0.172
RS	0.184
AC	0.187
BY	0.194
KL	0.187
FG	0.238
TD	0.219
MS	0.246
LP	0.209
RE	0.297
WV	0.320
LP	0.234
SB	0.191
NO	0.178
JL	0.184

(a) (i) Calculate the average reaction time for the class. Show your working.

Answer.....

(2)

(ii) Give the range of average reaction times.

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(1)

Leave blank

(b) Explain why the reaction time was measured five times for each student.

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(1)

(c) The teacher showed the students how to measure the distance from their eye to their right index finger. She said that they could use this to estimate the distance that the nerve impulse travels from the retina to a muscle in the finger.

The distance measured by pupil JG was 78 cm. Use this and the information about her reaction time to calculate the speed of nerve transmission in metres per second. Show your working.

Answer ..... metres per second

(3)

(d) List, in sequence, the structures that make up the pathway from the retina to the muscle of the finger clicking the mouse.

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(4)

Leave blank

(e) Suggest why having a fast reaction time can be an advantage to an animal.

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(2)

(f) State **one** factor that could influence reaction time and describe its effect on reaction time.

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(2)

Q11

(Total 15 marks)

Leave blank

12. The kidney is the organ that carries out excretion and osmoregulation in the body.

As a result of processes in the kidney, under different conditions, the volume and concentration of urine may be different. This is achieved by the secretion of different amounts of ADH into the blood.

(a) Explain what is meant by **excretion**.

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(2)

(b) The table below lists some situations and their effects in the body.

Complete the table using the words **high** or **low** to show how the availability of water in the blood, the amount of ADH released and the volume and concentration of urine released alters with the situations. Some have been done for you.

Situation	Water in blood	ADH in blood	Volume of urine	Concentration of urine
After exercise in a hot dry environment		high		
After drinking 1 litre of water			high	
After a meal rich in salt and protein	low		low	

(4) **Q12**

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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