Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	0	4	2	/	0	1	Signature	

Paper Reference(s)

7042/01

London Examinations GCE

Human Biology

Ordinary Level

Paper 1

Tuesday 19 January 2010 – Morning

Time: 1 hour 15 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

Materials required for examination
Ruler

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.
Answer **ALL** questions in the spaces provided in this question paper.

Information for Candidates

Calculators may be used.
The total mark for this paper is 100. The marks for parts of questions are shown in round brackets: e.g. **(2)**.
This paper has 9 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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Answer ALL the questions.

1. The table below shows the masses of different food materials (per 100 g sample) and the energy content of potatoes prepared in different ways.

Treatment of potato	Protein in g	Fat in g	Carbohydrate in g	Vitamins in µg	Energy in kJ
Raw	2.1	0	18.0	10.42	318
Boiled in water	1.4	0	19.7	6.23	331
Thick-cut chips fried in oil	3.8	9.0	37.3	8.4	989

(a) (i) Describe how boiling affected the vitamin content of the potatoes.

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(1)

(ii) Suggest **two** reasons for this effect.

1 .....

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2 .....

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(2)

(b) Describe a test that you could do to show that starch is one of the carbohydrates found in potatoes.

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(2)

Leave blank

(c) (i) Explain why a person who is overweight would be advised to eat boiled potatoes rather than chips.

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(3)

(ii) If this overweight person still decides to eat chips, suggest why it would be better to eat 100 g of thick-cut chips rather than 100 g of thin-cut chips.

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(3)

(d) Describe the process of chemical digestion of the potato that takes place in the mouth.

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(2)

Q1

(Total 13 marks)

Leave blank

2. Red blood cells, phagocytes, lymphocytes, platelets and plasma are all components of the blood.

The table below lists features of the blood that are shown by these different components. In the table place a tick (✓) in the appropriate box if the feature is correct for that component.

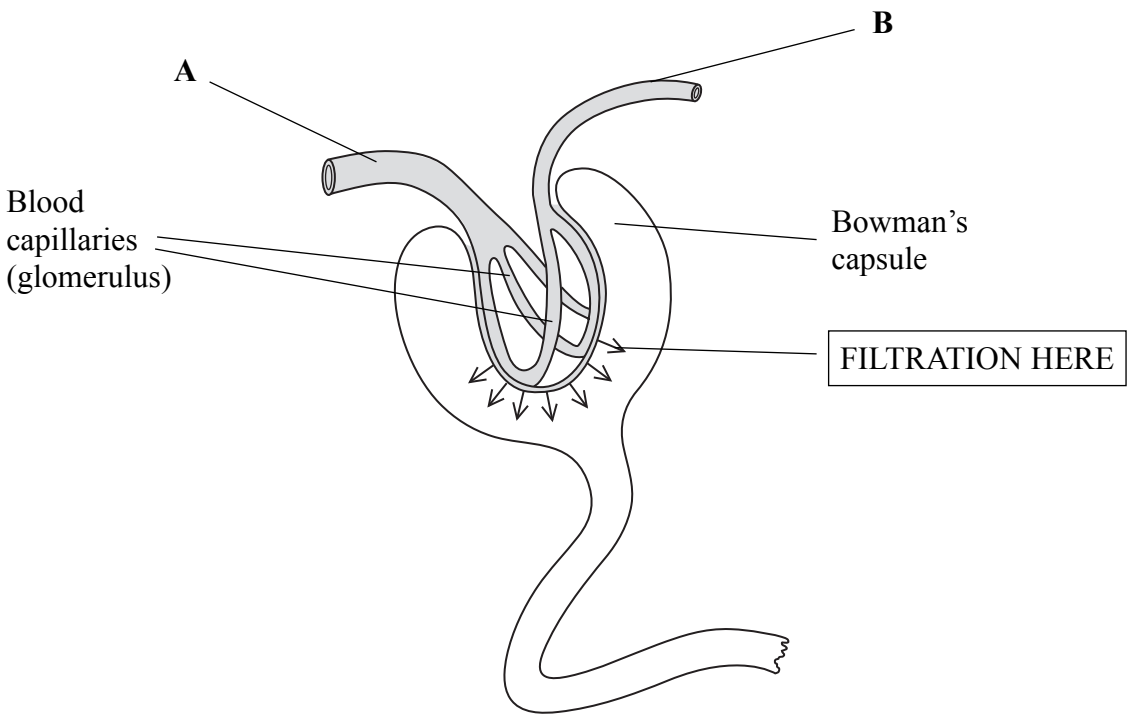
Feature	Red blood cell	Phagocyte	Lymphocyte	Platelet	Plasma
Contains haemoglobin					
Has a nucleus					
A fluid consisting mostly of water					
Engulfs pathogens					
Produces antibodies					
Involved in blood clotting					

(Total 6 marks)

Q2

Leave blank

3. The diagram below shows a part of a kidney tubule. **A** is a blood vessel that carries blood to the tubule and **B** is a blood vessel taking blood from the tubule. The blood is filtered in this part of the tubule.



(a) Explain the importance of the difference in the diameters of the blood vessels labelled **A** and **B** in the process of filtration.

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(2)

Leave blank

(b) The table below shows the percentages of water, protein, glucose and urea in three different fluids.

Substance	Percentage of substance		
	In the plasma in A	**In the filtrate in Bowman's capsule**	**In the urine**
Water	90	90	95
Protein	7.0	0	0
Glucose	0.1	0.1	0
Urea	0.03	0.03	2.0

(i) Explain why glucose is not present in the urine even though it is present in the filtrate.

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(2)

(ii) Explain why protein is not present in the filtrate or in the urine.

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(3)

Leave blank

(c) (i) State where urea is formed.

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(1)

(ii) Explain why the concentration of urea is greater in the urine than in the filtrate.

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(2)

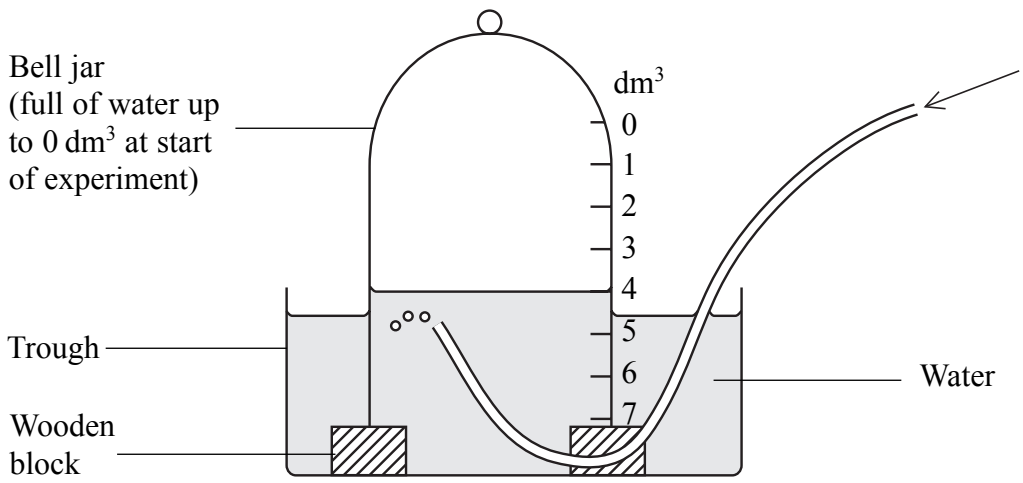
Q3

(Total 10 marks)

Leave blank

4. The maximum amount of air that a person can breathe out in one breath is known as the vital capacity.

The diagram below shows apparatus that can be used to measure the vital capacity. A man has just breathed out as much as he could into the tube that passes into the apparatus. The man is a non-smoker.



(a) (i) From the diagram, determine the vital capacity of this non-smoker.

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(1)

(ii) Suggest why this value might be lower for a smoker.

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(1)

(b) The tidal volume is the volume of air breathed in and out during normal breathing at rest. It is usually about 10% of the vital capacity.

Calculate the tidal volume of this non-smoker. Show your working.

Answer .....

(2)

Leave blank

(c) Explain how an increase in the rate of breathing would benefit a person during vigorous exercise.

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(3)

(d) Describe **three** ways in which the air breathed out by a person would differ from the air breathed in.

1 .....

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2 .....

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3 .....

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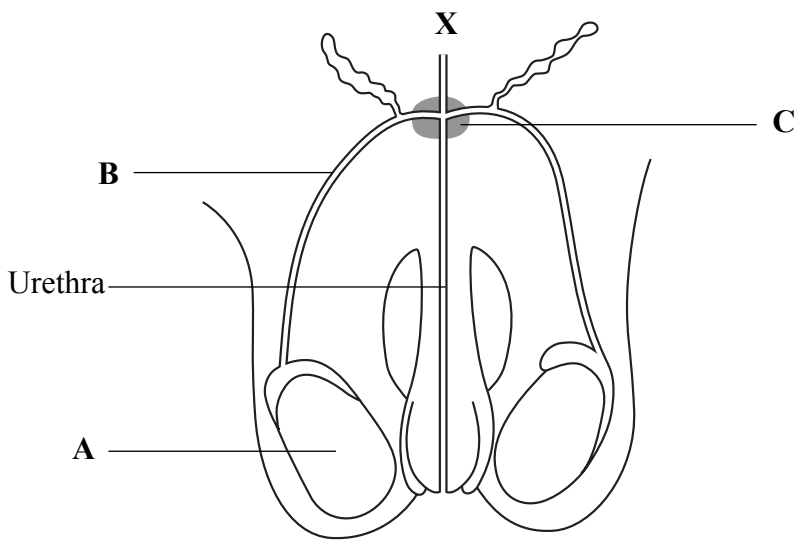
(3)

Q4

(Total 10 marks)

Leave blank

5. The diagram below shows a front view of the male reproductive system.



(a) Name the structures labelled **A**, **B** and **C**.

A .....

B .....

C .....

(3)

(b) (i) Name the organ at point **X** to which the urethra is joined.

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(1)

(ii) Describe the functions of this organ.

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(2)

Leave blank

(c) The urethra is a tube that is found in both males and females. Give **two** differences between the male urethra and the female urethra.

1 .....

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2 .....

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(2)

(d) (i) On the diagram, by means of an arrow labelled **T**, show where the hormone testosterone is produced.

(1)

(ii) Give **two** functions of the hormone testosterone.

1 .....

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2 .....

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(2)

(e) Explain the importance of structure **C** during sexual intercourse.

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(2)

Q5

(Total 13 marks)

Leave blank

6. A group of 10 students (A to J) carried out an investigation into the use of two of their senses: taste and smell. Each of the students had 20 pieces of onion or apple placed on their tongue, one after the other, in a random sequence.

In Experiment 1, the students closed their eyes. In Experiment 2, they closed their eyes and pinched their nose.

The number of correct identifications of onion or apple for each student is recorded in the table below.

Student	Number of correct identifications (out of 20)	
	Eyes closed (Experiment 1)	**Eyes closed and nose pinched (Experiment 2)**
A	19	12
B	17	9
C	14	10
D	14	16
E	17	8
F	16	9
G	14	12
H	13	6
I	15	8
J	15	7

(a) Which of the senses were being used to identify the foods in the two experiments?

Experiment 1 .....

Experiment 2 .....

(2)

Leave blank

(b) (i) Using the results in the table, explain why it is important to use more than one student for the investigation.

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(3)

(ii) State **three** conclusions that can be drawn from this investigation.

1 .....

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2 .....

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3 .....

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(3)

(c) Name **one** sense, other than taste or smell, that the pupils could be using to identify the food during the investigation.

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(1)

Q6

(Total 9 marks)

Leave blank

7. A reflex action involves a nerve impulse passing through a reflex arc.

(a) Give **three** characteristics of a reflex action.

1 .....

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2 .....

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3 .....

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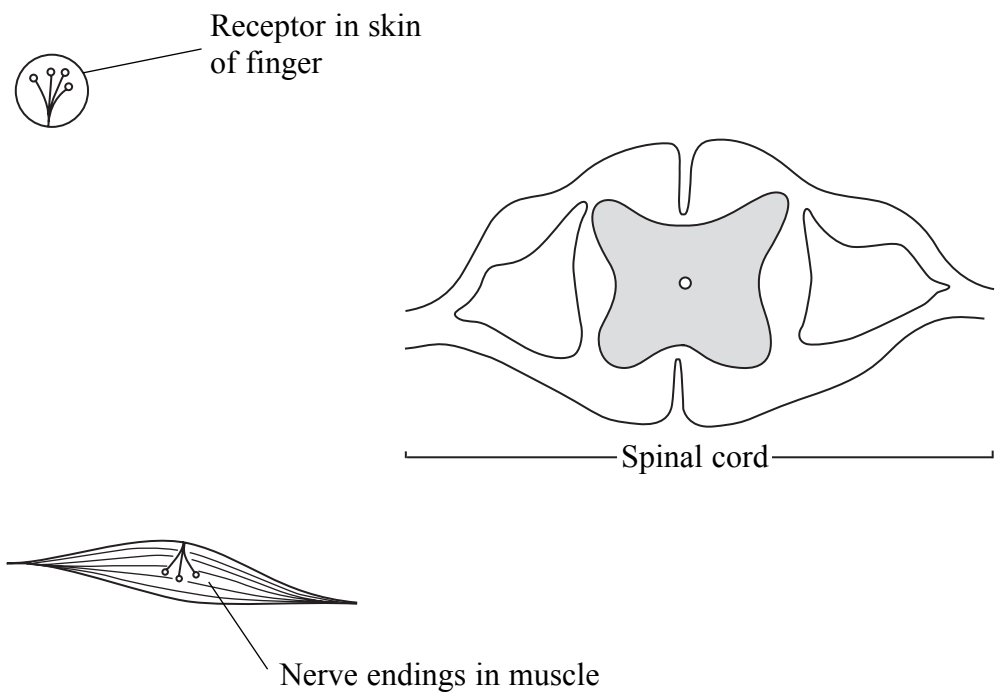
(3)

(b) The diagram below shows some of the structures that make up a reflex arc, but it is incomplete.



(i) On the diagram, label the grey matter and the white matter.

(2)

(ii) On the diagram, draw and label the positions of the sensory, motor and relay neurones to complete the reflex arc.

(4)

Leave blank

(c) A large number of mitochondria are found in neurones. Explain their role in the transmission of a nerve impulse.

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(2)

(d) Describe a reflex action found in the eye.

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(2)

Q7

(Total 13 marks)

Leave blank

8. A condition known as albinism arises in humans as a result of a mutation. This condition results in a lack of pigment in both the skin and the eye. The allele for albinism is recessive.

(a) (i) Explain what is meant by the term **mutation**.

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(2)

(ii) Name **two** factors that could cause this mutation.

1 .....

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2 .....

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(2)

(b) A man and a woman, neither of whom shows the condition of albinism, produced a child who was an albino.

What is the chance that their second child will also be an albino? Use a genetic cross diagram to show how you reached your answer. Use **A** as the allele for normal pigmentation and **a** as the allele for albinism.

Chance of second child being albino .....

(5)

Leave blank

(c) Suggest the harmful effects that may occur because of a lack of pigmentation in the skin and in the eyes.

Skin .....

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Eyes .....

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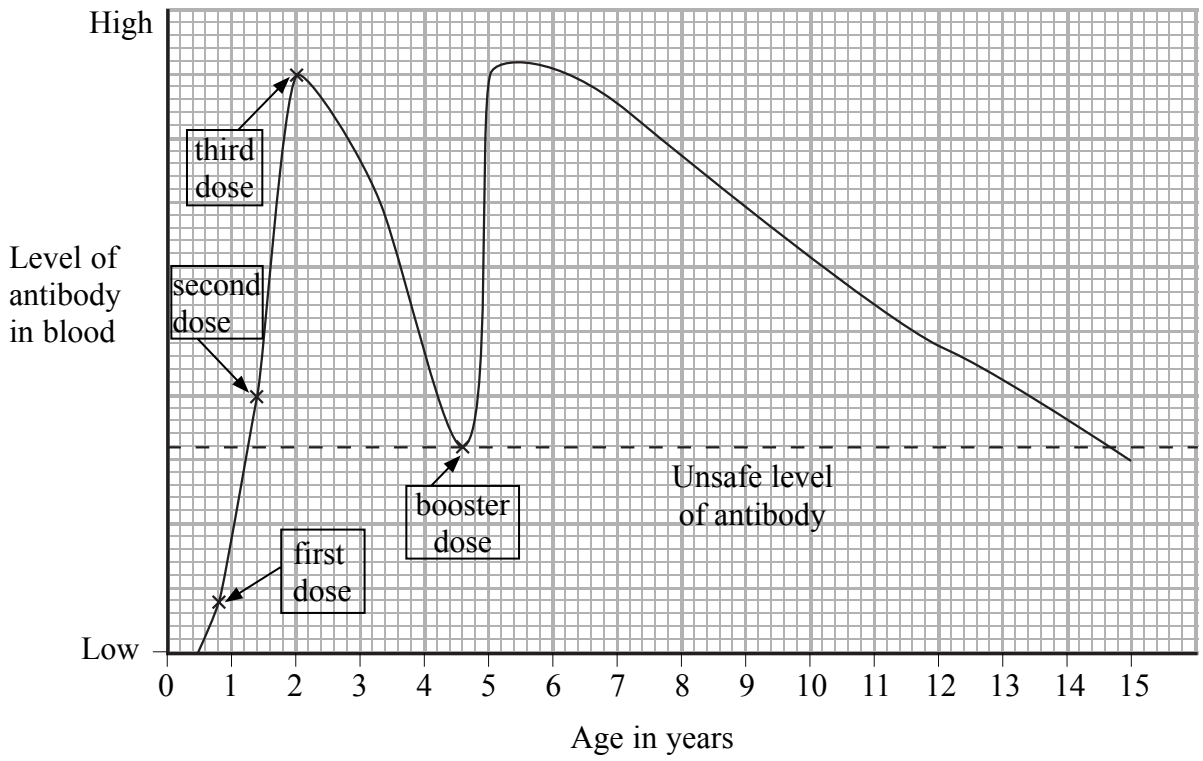
(4)

Q8

(Total 13 marks)

Leave blank

9. A vaccine is used to protect people against poliomyelitis (polio). The graph below shows the level of polio antibodies in the blood of a child being given the vaccine. Three doses of the vaccine were given during the first two years and these were followed by an additional ('booster') dose around the age of five years.



(a) Name the type of organism that causes polio.

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(1)

(b) (i) With reference to the graph, state when the second dose of the vaccine was given.

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(1)

(ii) Suggest why it is necessary for the child to be given a 'booster' dose.

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(3)

Leave blank

(c) When the child became 20 years old, she wanted to travel to a country where polio was endemic.

(i) Suggest the advice her doctor might give after studying her vaccination record.

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(2)

(ii) Describe how polio is transmitted.

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(2)

(d) (i) Suggest **two** active components that might be present in vaccines.

1 .....

2 .....

(2)

(ii) State the full name of the type of immunity given as a result of vaccination.

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(2)

Q9

(Total 13 marks)

TOTAL FOR PAPER: 100 MARKS

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