

**ADVANCED SUBSIDIARY GCE
 HUMAN BIOLOGY**

2858/01

Case Studies

WEDNESDAY 10 JANUARY 2007

Morning

Time: 45 minutes



Candidate
 Name

Centre
 Number

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Candidate
 Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED.**
ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	23	
2	22	
TOTAL	45	

This document consists of **10** printed pages, **2** blank pages and an insert.

Answer **all** the questions.

This question is based on the article ‘**TESTING THE HEART**’ (Case Study 1).

- 1 Fig. 1.3 shows a normal ECG trace. The time interval between Q and T is called the contraction time. The time interval between T and the next Q is called the filling time. These time intervals can be determined from the ECG trace. The QT interval or contraction time does not vary significantly and is fairly constant at any heart rate.

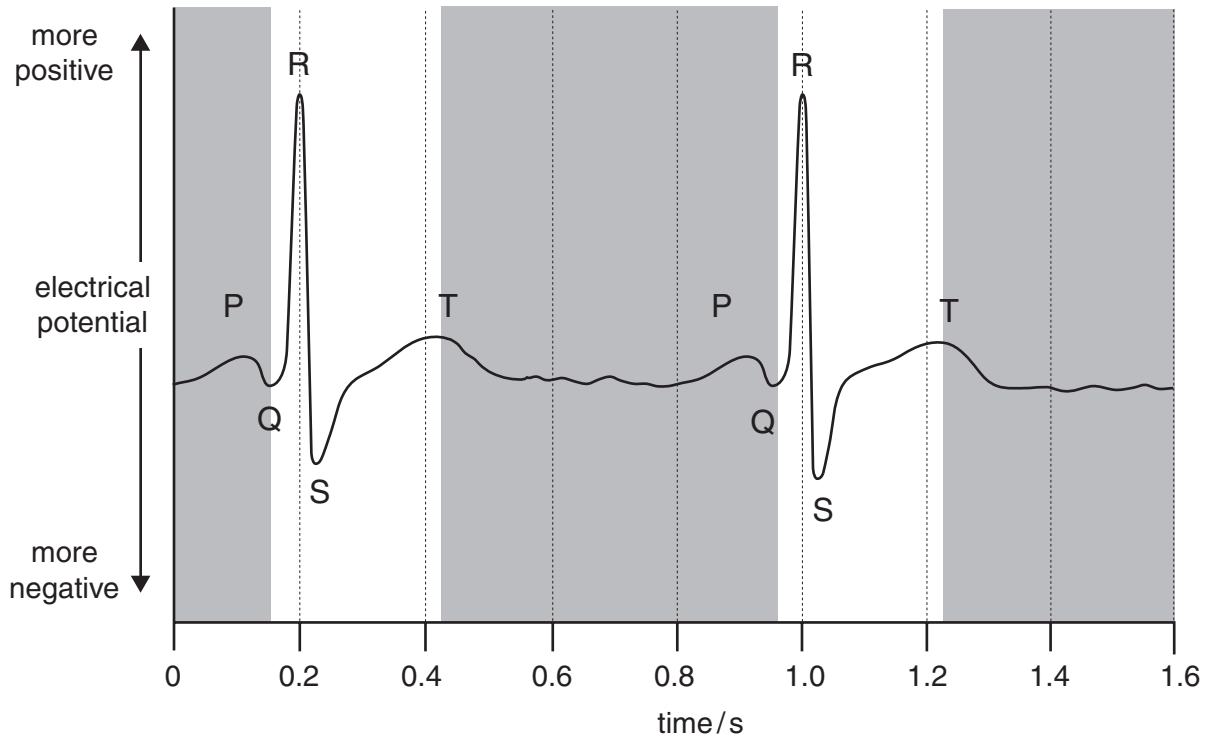


Fig. 1.3

- (a) (i) Suggest why the QT interval is called the *contraction time*.

.....
 [1]

- (ii) State what the effect on the filling time would be when the heart rate is increased.

..... [1]

- (e) You were told in Case Study 1 that streptokinase is sometimes given to patients who have a partial blockage in a coronary artery. Following this treatment, patients are given a card indicating that a second dose of streptokinase should not be given due to the possibility of an immune response.

Explain why a **second** dose of streptokinase could lead to an immune response.

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..... [3]

- (f) In Case Study 1 you are given the recommended blood cholesterol concentrations for patients with coronary heart disease and also the recommended concentrations of triglycerides.

- (i) What do the letters HDL and LDL mean?

HDL

LDL [1]

- (ii) Suggest why concentrations of **both** HDL and LDL are measured.

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..... [2]

(iii) Describe the structure of a triglyceride.

You may use labelled diagrams to illustrate your answer.

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[3]

(g) You were told in Case Study 1 that lactic dehydrogenase (LDH) concentrations are measured and that raised concentrations of this enzyme can be an indicator that a myocardial infarction has occurred.

LDH is an enzyme which breaks down lactic acid. Lactic acid is produced during anaerobic respiration in human cells.

Suggest why the blockage of a coronary artery can lead to increased concentrations of LDH in the blood.

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..... [2]

[Total: 23]

This question is based on the article ‘**SLAPPED CHEEK**’ (Case Study 2).

- 2 (a) In Case Study 2, you were told that Lisa had her blood tested for the presence of antibodies to rubella before becoming pregnant. This is one example of pre-conceptual care.

State **one** other example of pre-conceptual care **and** give a reason for the provision of this care.

example

reason

..... [2]

- (b) The genetic material in slapped cheek virus is single-stranded DNA.

Comment on the **similarities** and **differences** between the slapped cheek viral DNA and the DNA in the nucleus of a human cell.

similarities

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differences

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..... [8]

- (c) In Case Study 2, the midwife describes how an infection with the slapped cheek virus can lead to a very small drop in blood haemoglobin concentrations.

Outline **one** method for measuring the haemoglobin concentration of a blood sample.

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..... [3]

- (d) Children who have inherited red blood cell disorders, such as sickle cell anaemia, are badly affected by the slapped cheek virus.

- (i) Explain how the substitution of the viral DNA into the nuclei of blood stem cells may lead to a reduction in blood haemoglobin concentrations.

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..... [2]

- (ii) Suggest why children who have an inherited red blood cell disorder, such as sickle cell anaemia, are so badly affected by the slapped cheek virus.

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..... [1]

- (e) You were told in Case Study 2 that the virus multiplies in the stem cells in the bone marrow. The following passage refers to stem cells.

Complete the passage by selecting an appropriate word from the list below.

- chloroplast differentiate haploid meiosis
- mitosis mutate nucleus pluripotent

A stem cell can divide and produce new cells that can then into many kinds of specialised cells. In the early stages of embryo development, the cells are said to be and can become any of the different kinds of cell in the human body. The stem cells in the bone marrow are known as hematopoietic cells and can only give rise to blood cell types such as erythrocytes. A stem cell has several characteristic features such as a large to cytoplasm ratio. It can divide repeatedly by to make large numbers of new cells. [4]

- (f) In Case Study 2, Lisa is offered a further ultrasound scan. Ultrasound scans are used to monitor foetal growth and to detect some foetal abnormalities. Amniocentesis can also be offered during pregnancy.

Suggest why it would **not** be appropriate to recommend amniocentesis to Lisa **after** her discussion with the midwife.

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..... [2]

[Total: 22]

END OF QUESTION PAPER

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