

Candidate Name	Centre Number	Candidate Number
		2



GCE AS/A level

1072/02

New AS

BIOLOGY/HUMAN BIOLOGY – HB2

P.M. MONDAY, 1 June 2009

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	12	
3	9	
4	8	
5	14	
6	11	
7	10	
Total	70	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

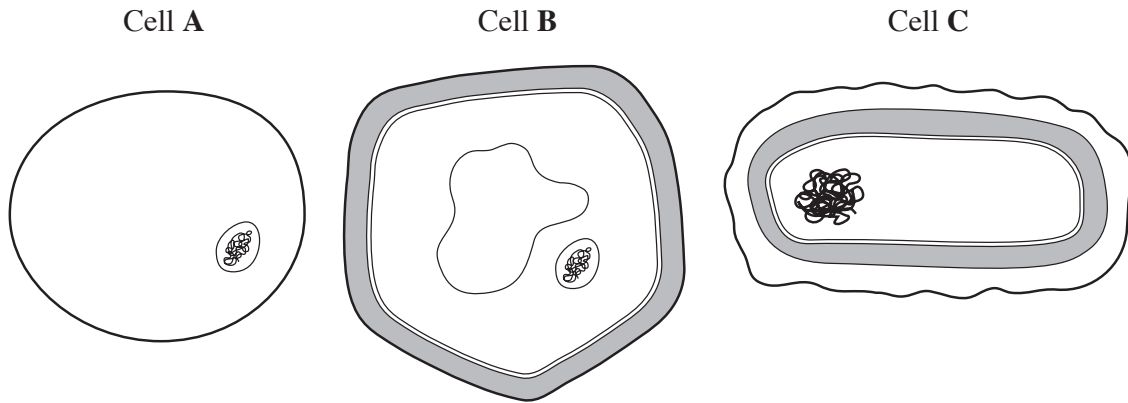
INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. The diagram shows the simplified structure of three different cell types **A**, **B** and **C**.
(Not drawn to scale.)

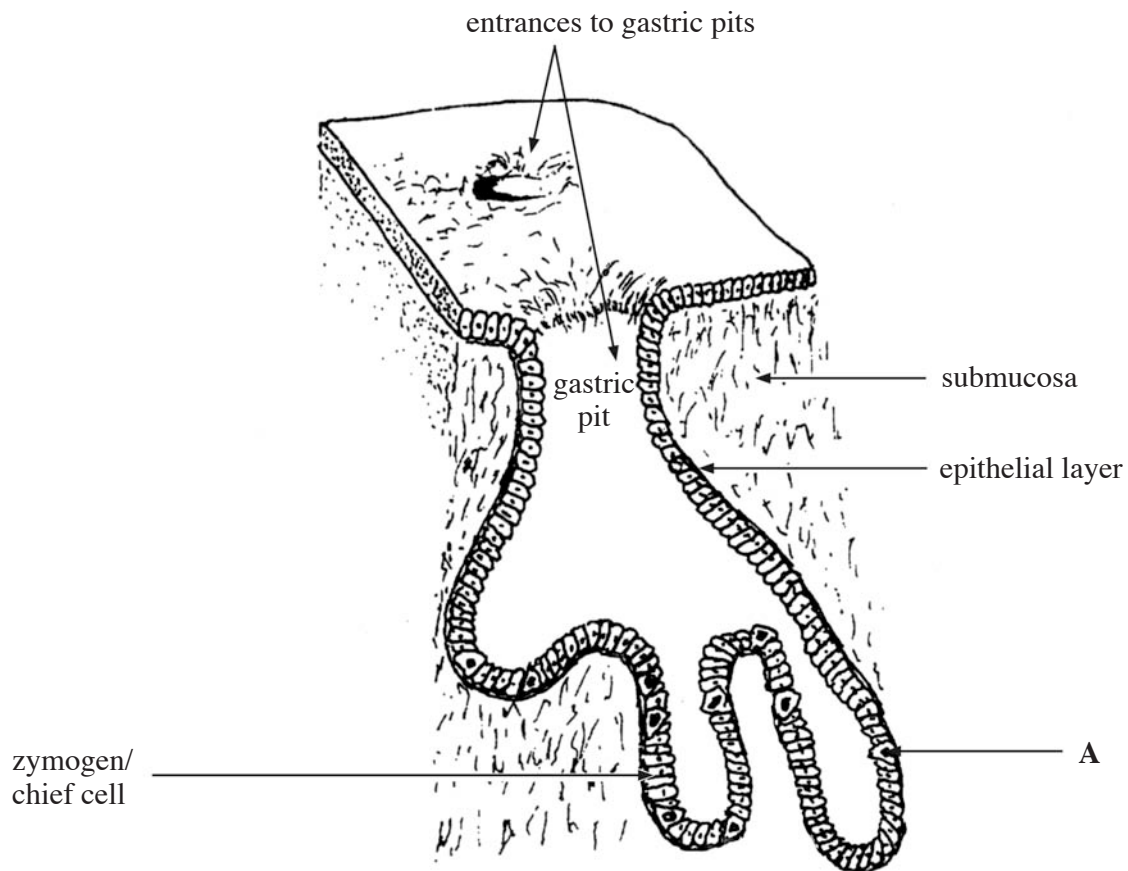


- (a) State **one** feature **that can be seen in the diagrams** that enables you to decide that
- (i) cell **B** is a plant cell; [1]
-
- (ii) cell **C** is a prokaryotic cell. [1]
-
- (b) The antibiotic penicillin inhibits the formation of bacterial cell walls.
- (i) Explain how penicillin inhibits the formation of the bacterial cell wall. [1]
-
-
- (ii) Explain how this results in the destruction of the bacteria. [2]
-
-
- (iii) Explain why penicillin destroys bacterial cells but not human cells. [1]
-
-

(Total 6 marks)

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2. The diagram below shows part of the wall of a human stomach.



(a) The epithelial layer secretes mucus. State **two** functions of mucus. [2]

.....

.....

(b) (i) A zymogen or chief cell secretes an inactive precursor of a protease. Name this precursor. [1]

.....

(ii) Explain why the protease is secreted in this form. [1]

.....

(c) (i) Cell A secretes hydrochloric acid into the stomach. Name the cell labelled A. [1]

.....

(ii) State **two** functions of hydrochloric acid. [2]

.....

.....

(d) A peptic ulcer is an erosion of the lining of the wall of the stomach.

(i) State **one** major cause of peptic ulcers. [1]

.....

(ii) Explain how erosion of the stomach wall occurs. [2]

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.....

(iii) State **one** factor which may aggravate a stomach ulcer. [1]

.....

(iv) State **one** form of treatment for a stomach ulcer. [1]

.....

(Total 12 marks)

3. (a) Define the term *parasite*. [2]

.....

.....

(b) The tapeworm, *Taenia solium*, is a parasite of humans. Its life cycle includes a secondary host.

(i) Name the secondary host. [1]

.....

(ii) Describe how the parasite is transmitted from a human to its secondary host. [1]

.....

.....

(iii) Explain how humans may become infected with the tapeworm. [1]

.....

(c) *Taenia* is a parasite which lives in the human digestive tract or gut.

(i) Give **one** adaptation of *Taenia* which ensures that it stays in place in the gut of the host. [1]

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(ii) Explain why *Taenia* is not destroyed by the secretions of the human host. [2]

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(d) *Taenia* has a very high rate of reproduction. Explain the advantage of this to the parasite. [1]

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(Total 9 marks)

4. The introduction of an antigen into the blood triggers an immune response.

(a) What is meant by the following terms:

[2]

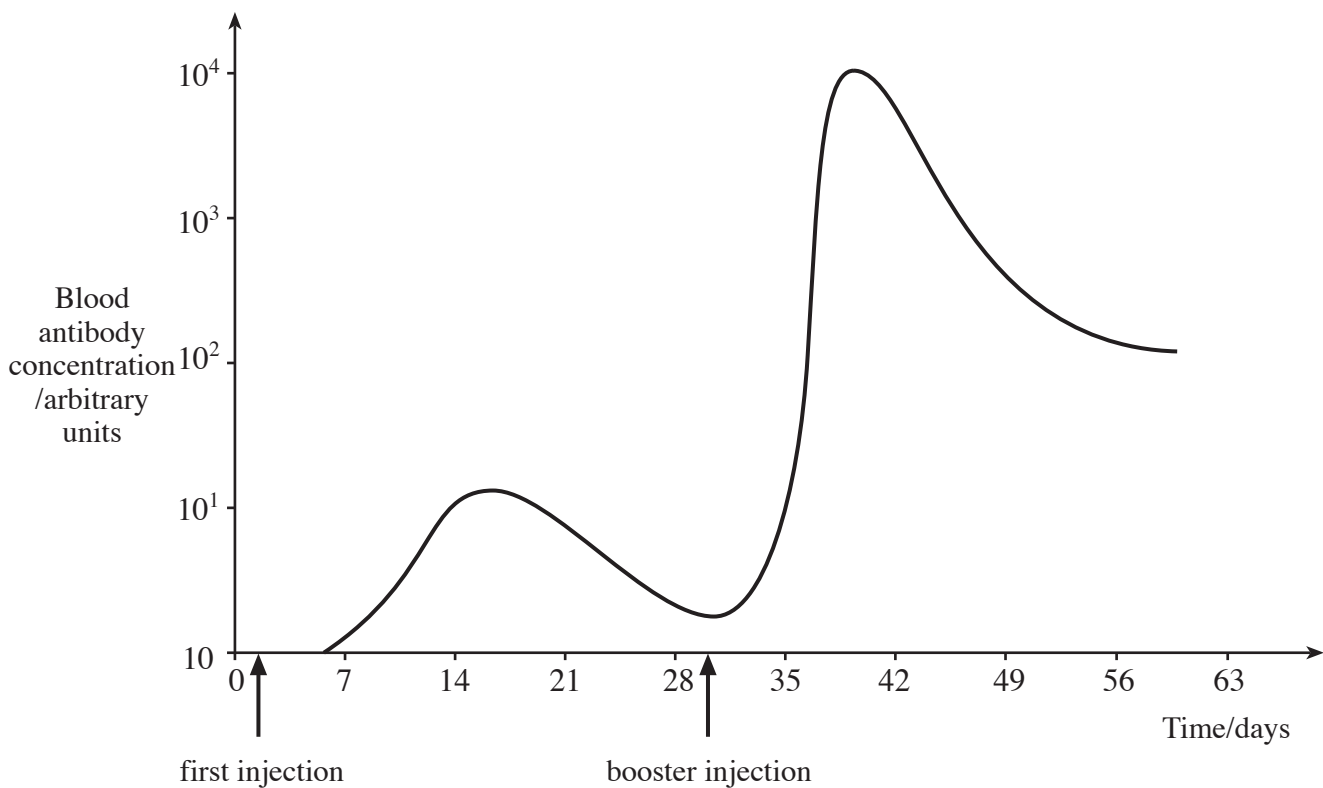
(i) Antigen,

.....

(ii) Antibody.

.....

(b) The *Rubella* (German measles) virus infects human cells. The graph shows the effect of immunising a child against *Rubella*. An initial injection is given and this is followed by a booster injection four weeks later.



(i) Use the information from the graph to describe **two** differences in the response to the first and second exposure to the antigen. [2]

1.

.....

2.

.....

(ii) Explain why there is a difference in the response. [1]

.....

.....

- (c) (i) The *Rubella* virus can be particularly dangerous during pregnancy. Explain why it is necessary to ensure that boys as well as girls are immunised against the virus. [1]

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- (ii) Vaccination against smallpox has been effective in eliminating the disease but this method of protection against the influenza virus has only limited success. Explain this difference. [2]

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(Total 8 marks)

5. (a) (i) Define the term *species*. [2]

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- (ii) Complete the following table to show the classification of the human, *Homo sapiens*. [6]

<i>Kingdom</i>	<i>Animalia</i>
Phylum	
Class	
	Primates
	Hominidae
Genus	
Species	

- (b) Immunology provides a method of detecting differences in proteins, and so quantifying how closely related humans are to other primates such as gorillas, orang-utans and gibbons.

- (i) The protein, albumin, is found in the blood plasma of all primates including humans. Explain how differences in the albumin of primates are useful in working out how closely related primates are. [2]

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- (ii) Antibodies for human albumin will precipitate human albumin from blood plasma and also the albumin of closely related primates.

The table shows the results of mixing antibodies for human albumin with the blood plasma of humans and three other primates.

<i>Primate</i>	<i>% precipitation of albumin</i>
gibbon	82
gorilla	95
human	100
orang-utan	85

- I. List the primates above in order of the closeness of their evolutionary relationship with humans and explain your choice. [2]

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- II. Using your knowledge of antibody-antigen interaction, explain the results. [2]

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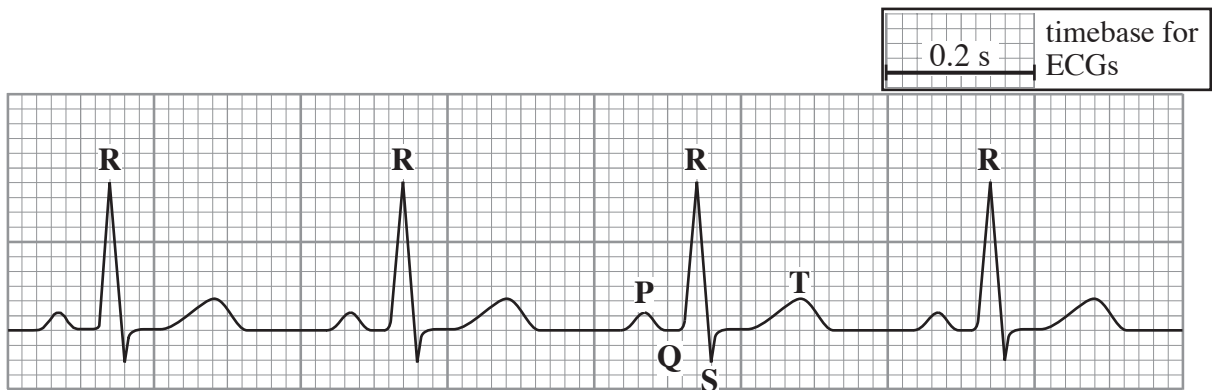
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(Total 14 marks)

6. An electrocardiogram (ECG) records the electrical activity which takes place in the heart muscle as the heart beats.

(a) The recording below shows an ECG from a healthy person.



(i) Calculate the time interval between the **R** waves. [1]

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(ii) What is detected and shown by the **Q**, **R** and **S** part of the ECG trace? [1]

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(iii) What part of the cardiac cycle is shown by **P**? [1]

.....

(iv) What happens to the ventricles immediately after the **QRS** 'spike'. [1]

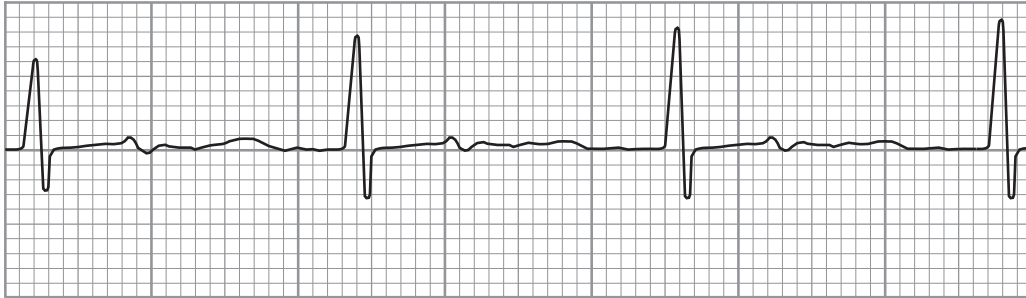
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(v) What part of the cardiac cycle is shown by **T**? [1]

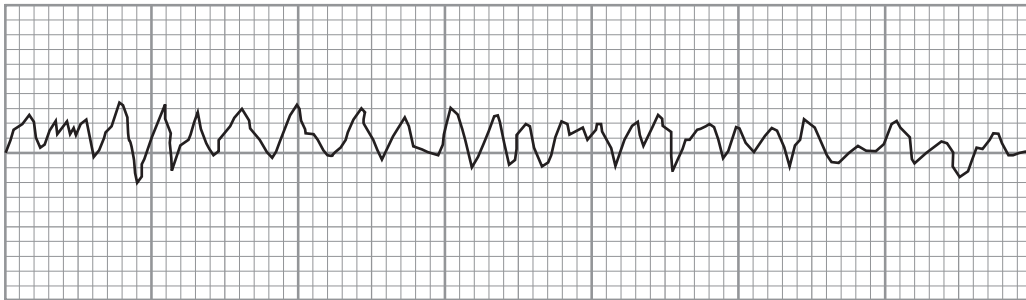
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- (b) Two patients, **A** and **B**, were brought into the Accident and Emergency (A&E) department of Maelor hospital. Each showed symptoms of abnormal heart rate. The doctor arranged for both patients to have an ECG. Both patients were found to have abnormal traces.

Patient A



Patient B



- (i) Complete the table which provides information about the ECG traces and diagnosis for patients **A** and **B**. [4]

<i>Patient</i>	<i>Heart malfunction shown by ECG trace</i>	<i>Condition Diagnosed</i>
A		
B		

- (ii) State **two** forms of treatment for a heart attack. [2]

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(Total 11 marks)

