



ADVANCED SUBSIDIARY GCE
HUMAN BIOLOGY
 Case Studies

2858/01

Candidates answer on the question paper

OCR Supplied Materials:

- Insert 1 (inserted)
- Insert 2 (inserted)

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

Thursday 8 January 2009
Morning

Duration: 45 minutes



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **45**.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **12** pages. Any blank pages are indicated.

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

Answer **all** the questions.

This question is based on the article ‘**TUBERCULOSIS – THE GREATEST KILLER IN HISTORY?**’ (Case Study 1).

- 1 You are told in the case study that Robert Koch demonstrated that tuberculosis (TB) is caused by bacteria.

(a) (i) Name the **category** of disease caused by organisms such as bacteria.

..... [1]

(ii) Give **one** further example of a disease in this category **and** name the pathogen that causes it.

example

name of pathogen [2]

(b) Fig. 1.1, on **Insert 2**, shows an electron micrograph of the bacteria that cause TB taken using a transmission electron microscope.

(i) Using the information given in Fig. 1.1, calculate the actual length of the bacterial cell as given by the line **XY**. Show your working.

Answer = μm [2]

(ii) State **three** differences, **other than size and shape**, between these cells and eukaryotic cells.

1

2

3 [3]

(c) You are told in the case study that Paul Ehrlich displayed one of the symptoms of TB in the form of a persistent cough.

(i) State **two** other symptoms of pulmonary TB.

1

2 [2]

(ii) Comment on the role of a **radiographer** in the diagnosis of TB.

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.....

..... [2]

QUESTION ONE CONTINUES ON PAGE 4

- (d)** You are told in the case study that, if anti-TB drugs are mismanaged or misused, drug resistant strains of the TB bacterium may develop.

Describe the ways in which anti-TB drugs can be potentially mismanaged or misused **and** explain how this can lead to the development of drug resistant strains of the TB bacterium.

Credit will be given if you refer to named anti-TB drugs in your answer.

[6]

- (e) You are told in the case study that the **rate** at which people developed TB in 2005 was equal to, or even slightly less than, the **rate** in 2004.

The number of recorded cases of TB in 2005 was 8 787 000 compared to 8 718 000 in 2004.

Explain why the rate of TB development was equal or less in 2005 compared to 2004, even though the actual number of cases was higher in 2005.

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..... [2]

- (f) You are told in the case study that, of the 1.6 million people who died of TB in 2005, 195 000 had also been diagnosed with HIV.

Outline the reasons why TB is a major cause of death among people who have HIV/AIDS.

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..... [3]

[Total: 23]

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

- 2 (a) You are told in the case study that the doctor listens to Frank’s chest and measures his blood pressure.

State the instrument used to:

- (i) listen to the chest [1]
 (ii) measure blood pressure. [1]

- (b) Fig. 2.1 is a schematic diagram representing an alveolus and a capillary.

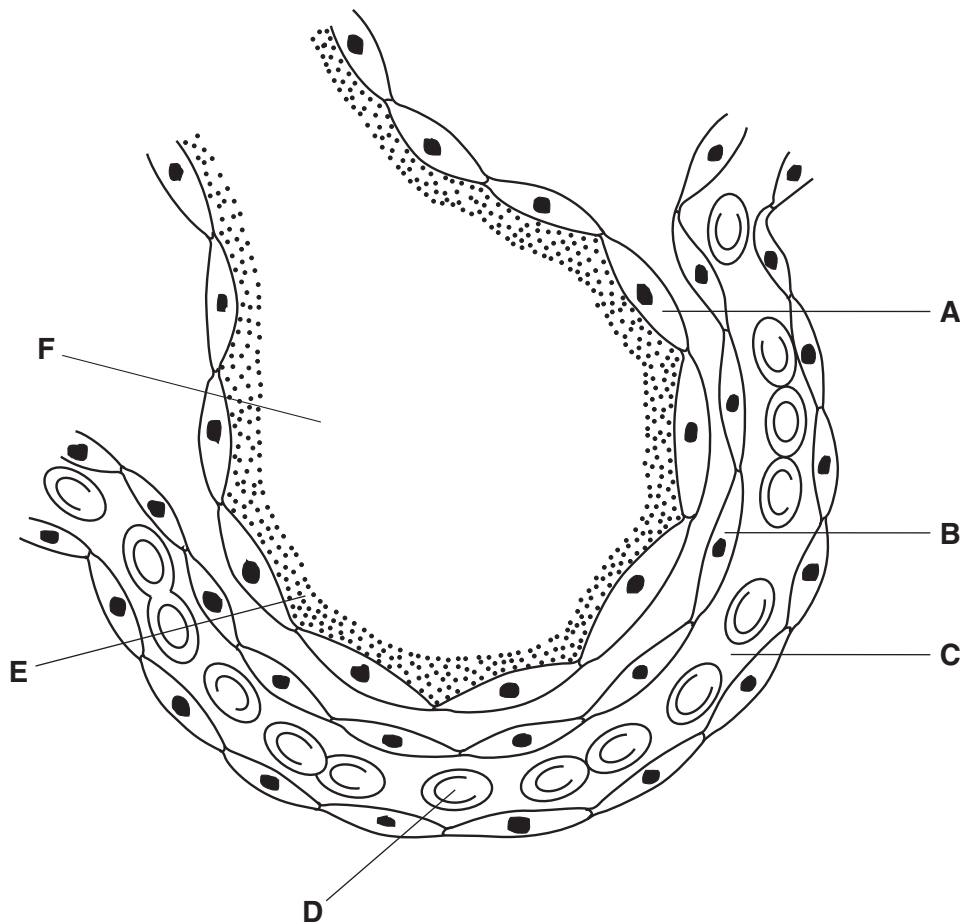


Fig. 2.1

- (i) The symptoms of pulmonary oedema are due to osmosis occurring in the lungs as a result of salt water being inhaled and entering the alveoli.

Complete the table below using an appropriate letter from Fig. 2.1.

red blood cell	
location of squamous epithelial cells	
region of highest (least negative) water potential	
region of lowest (most negative) water potential	

[4]

- (ii) Describe **and** explain what would happen **in the lungs** if fresh water had been inhaled rather than salt water.

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..... [2]

- (iii) Inhaling salt water can result in surfactant in the lungs being removed.

Using the appropriate letter from Fig. 2.1, indicate the position of surfactant **and** outline the role of surfactant in the lungs.

letter indicating position of surfactant

role of surfactant in the lungs

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..... [3]

- (c) (i) Outline the process of gas exchange in the alveoli.

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..... [3]

- (ii) You are told in the case study that Frank has 'no energy at all'.

Suggest a reason for the feeling of tiredness experienced by Frank.

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..... [2]

- (d) The **elasticity** of the lungs is measured by calculating the compliance.

Compliance is calculated from the relationship between the pressure in the lungs and the volume of the lungs. In normal lungs, as the volume increases, the lungs stretch. Where compliance is reduced, the lungs are unable to stretch as much and so the pressure in the lungs is greater.

One further symptom of secondary drowning is a reduction in compliance.

Suggest one **disease** of the lungs that also leads to a loss of compliance as a result of a decrease in elasticity. Explain the reasons for your suggestion.

disease

explanation

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..... [3]

- (e) Secondary drowning can also result in ventricular fibrillation and heart failure.

Outline how ventricular fibrillation would be treated by paramedics.

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..... [3]

[Total: 22]

END OF QUESTION PAPER

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