

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

HUMAN BIOLOGY

2858/01

Case Studies

Monday

5 JUNE 2006

Morning

45 minutes

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Ruler (cm/mm)

Candidate
Number

Candidate Name

Centre Number

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TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

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

This question paper consists of 10 printed pages, 2 blank pages and an insert.

Answer **all** the questions.

This question is based on the article '**MISTLETOE IN MEDICINE**' (Case Study 1).

1 Cells from the mistletoe plant have been used as a source of medicines.

(a) Give **three** ways in which the structure of a plant cell, such as a cell from mistletoe, differs from an animal cell such as a leucocyte.

1

2

3[3]

(b) Plant extracts, such as Iscador from mistletoe plants, have been widely used as part of complementary or alternative medicine in the treatment of cancers.

Give **one** example of complementary or alternative therapy **other than** plant extracts, which can be used in cancer treatment.

.....[1]

(c) You were told in the case study that, in a report into the use of complementary or alternative medicine (CAM) by 453 cancer patients, 69% used at least one form of CAM treatment.

(i) Calculate the number of patients in this study who used at least one form of CAM treatment.
Show your working.

Answer = patients [2]

(ii) Suggest **one** reason why the results of trials on the success of CAM therapies may be unreliable.

.....

.....[1]

(d) In the case study, you were told that lectins purified from mistletoe extract were shown to inhibit protein synthesis at the ribosome.

(i) Describe the role of **ribosomes** in protein synthesis.

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.....[4]

(ii) Suggest why inhibition of protein synthesis may lead to cell death and a reduction in the mass of solid tumours.

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.....[1]

(e) The case study suggests that one possible role of lectins in fighting cancer is to stimulate the immune system by activating cells such as macrophages and lymphocytes.

(i) State precisely where macrophages originate.

.....[1]

(ii) State **two** differences between macrophages and lymphocytes.

macrophages	lymphocytes
1
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[2]

(iii) Explain how cancer develops **and** describe the role of lymphocytes in preventing the development of cancer.

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.....[7]

[Total: 22]

This question is based on the article ‘EARLY WARNING SCORES’ (Case Study 2).

2 (a) (i) A patient who is awake and responsive in hospital, has the following ‘observations’ taken.

- Heart rate = 66
- Systolic Blood Pressure = 88 mmHg
- Respiration = 20 breaths per minute
- Oxygen Saturation = 86%

Use the **Early Warning Scoring System** on page 6 of the Insert to calculate the EWS for this patient.

EWS = [1]

(ii) State the correct name for the mercury manometer which would be used to measure blood pressure.

.....[1]

(iii) State the units used to measure **heart rate**.

.....[1]

(iv) Outline a method for measuring heart rate.

.....
.....
.....[2]

(b) Blood pressure may be measured using a mercury manometer attached to a cuff. The cuff is inflated and a stethoscope is placed over an artery in the arm. As the cuff is deflated, a sequence of sounds can be detected called Korotkov sounds. These sounds progress through phases which are given in Table 2.1.

Table 2.1

phase	description of sound
1	faint, clear tapping sounds become loud knocking sounds
2–4	sounds gradually become quieter and generally softer
5	all sounds cease

Fig. 2.1 shows a graph of the pressure changes in the artery and the deflating cuff. The intensity of the shading indicates the loudness of the Korotkov sounds.



Fig. 2.1

- (i) Using the cuff pressure on Fig. 2.1, complete the table below by inserting the reading for the systolic and diastolic pressures.

systolic pressure		diastolic pressure	
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[2]

- (ii) Describe what is happening to the blood flow in the artery during the sequence of the Korotkov sounds.
Marks will be given for using the data in Fig. 2.1 and the information in Table 2.1.

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[4]

- (c) In the case study, you were told that when *'haemoglobin in your red blood cells is carrying as much oxygen as it can then it will be 100% saturated'*.

State the maximum number of oxygen **molecules** that can be transported by one molecule of **haemoglobin** at any one time.

.....[1]

- (d) In the case study, you were told that increasing levels of carbon dioxide would increase the acidity of the blood. A rise in acidity would be measured as a fall in the pH.

Suggest how a fall in pH would lead to a change in the shape of the haemoglobin molecule.

.....

[2]

- (e) State the meaning of the following abbreviations used in Case Study 2.

- (i) **COPD**
[1]

- (ii) **PEFR**
[1]

- (f) You were told in the case study that, because of emphysema, Mr Green finds it an effort to breathe.

Outline the changes that occur in the lungs in a case of emphysema and **explain** why breathing requires more effort than normal.

.....

[4]

(g) In the case study, you were told that the bronchodilator *'will get the airways back to normal'*.

Explain how the bronchodilator gets the airways back to normal.

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..... [3]

[Total: 23]

END OF QUESTION PAPER

Copyright Acknowledgements:

Fig. 2.2. From Royal Marsden Hospital Manual of Clinical Nursing Procedures Blackwell Publishing ISBN 0-632-05235-X

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