



**Answer ALL questions in the spaces provided**

1. The table below shows when particular groups of organisms are found on a human body after death.

Group	Time after death / days									
	1	2	3	4	5	6	7	8	9	10
A	✓	✓	✓							
B			✓	✓	✓	✓				
C					✓	✓	✓	✓	✓	✓
D							✓	✓	✓	
E									✓	✓

✓ = group present

- (a) Explain how succession could account for the changes in the types of organisms found on the body.

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(2)

- (b) Describe how a key could be used to identify the organisms on the body.

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(2)



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(c) A forensic entomologist was asked to determine the time of death of a person found dead in a wood. No clothing or personal belongings were found. Organisms from groups C, D and E were found on the body.

(i) Use the data to estimate the number of days since the person died.

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(1)

(ii) Explain why this estimate may be inaccurate.

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(2)

(d) Describe **one** technique that could be used to identify the person.

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(2)

**(Total 9 marks)**

Q1



2. A transect can be used to study trends in the abundance and distribution of organisms.

(a) Describe **one** method you could use to estimate the abundance of an organism at intervals along a transect line.

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**(3)**

(b) State **one** biotic factor that could be measured at each interval.

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**(1)**

(c) (i) State **one** abiotic factor of soil that could determine the distribution of plants.

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**(1)**

(ii) Describe how you could measure this soil factor.

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**(2)**



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(d) Discuss how primary producers are adapted to a **named** habitat.

Habitat.....

Adaptation(s)

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**(3)**

**Q2**

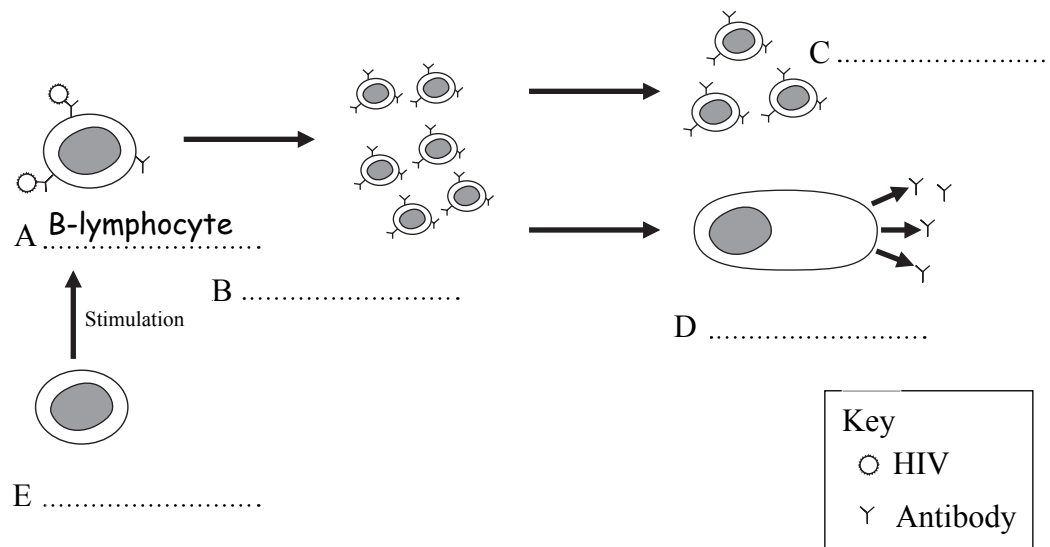
**(Total 10 marks)**

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3. A common test for HIV infection (which can lead to AIDS) looks for the presence of antibodies against the virus in the blood.

The diagram below shows how HIV stimulates the immune system to produce antibody molecules.



- (a) Label cells A–E in the spaces provided on the diagram. The first one has been done for you. (4)

- (b) Suggest how counting the numbers of one type of lymphocyte can provide a measure of the progress of AIDS in a person with HIV.

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 ..... (2)



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(c) HIV infects human cells by binding to specific proteins on their surface. The gene which codes for one of these surface proteins has two alleles. Allele **a** causes susceptibility to one strain of HIV. Allele **A** gives protection against this strain of HIV.

The gene for a second surface protein also has two alleles. Allele **b** causes susceptibility to a second strain of HIV. Allele **B** gives protection against this second strain.

A person with the genotype **Aabb** had a child with a person of the genotype **aaBb**. Using a genetic diagram, find the probability that the child was protected against **both** strains of HIV.

(4)

(d) Give **two** common symptoms of HIV/AIDS.

1 .....

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2 .....

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(2)

(Total 12 marks)

Q3

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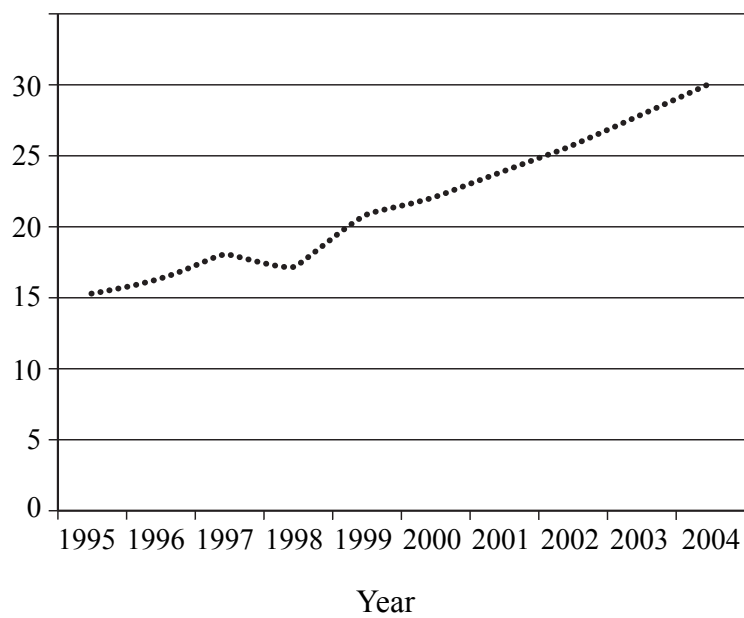
4. The orang-utan is an endangered species found in Indonesia. Some estimates suggest that its population is falling by 5000 animals each year.



Much of the forest area inhabited by the orang-utans has a suitable climate for the production of palm oil, and the demand for palm oil is increasing for use in food production and biofuels. Orang-utans avoid palm oil plantations. Demand is predicted to be double the 2004 value by 2020 as biofuels become more widely used, replacing fossil fuels.

The graph below shows changes in world palm oil production between 1995 and 2004. 85% of this palm oil is produced in Indonesia and Malaysia.

World palm oil production /millions of tonnes





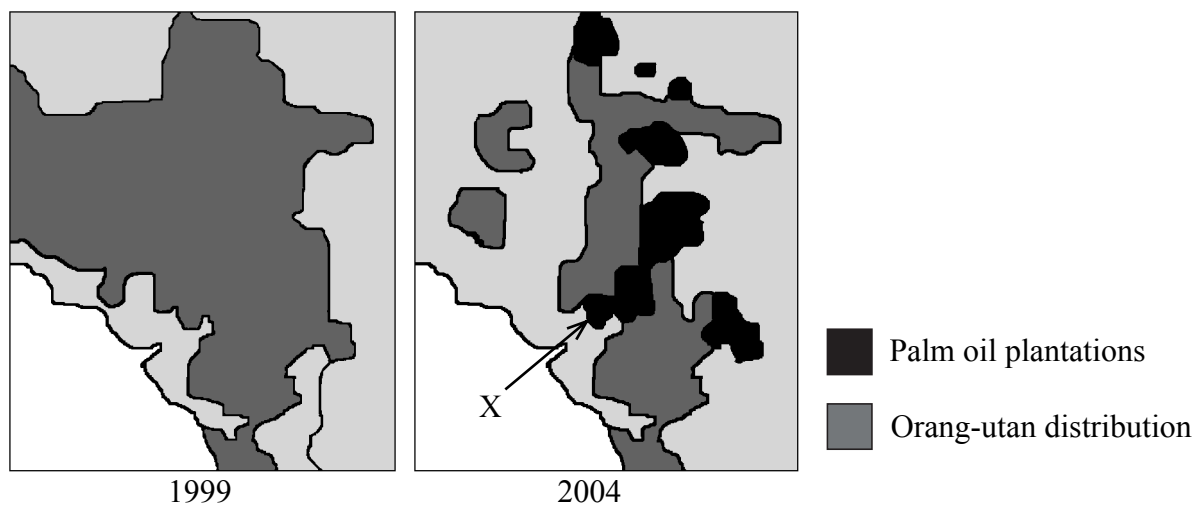
(a) (i) Describe the changes in palm oil production between 1995 and 2004.

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(1)

(ii) If Indonesia and Malaysia continue to produce 85% of the world supply of palm oil, calculate how many tonnes of palm oil they will produce in 2020 if predictions are correct.

Answer .....  
(2)

(b) The map below shows some areas of Borneo where orang-utans were found in 1999 and in 2004. It also shows areas where palms have been planted to produce palm oil.



(i) Describe the changes in the distribution of orang-utans between 1999 and 2004 shown by the map.

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(2)





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N 2 4 7 1 7 A 0 1 1 1 6

5. The antibiotic penicillin acts on a bacterium by weakening its cell wall so that it bursts. The antibiotic tetracycline interferes with a bacterium's protein synthesis, preventing the production of new proteins by the bacterium.

(a) Suggest **one** reason why each antibiotic is **not** effective against viruses.

Penicillin

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Tetracycline

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**(2)**

(b) Describe and explain how each of these antibiotics would affect the numbers of living bacterial cells in a laboratory culture.

Penicillin

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Tetracycline

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**(4)**



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(c) Suggest how tetracycline helps a person to overcome a bacterial infection.

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(3)

Q5

(Total 9 marks)



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6. (a) Discuss the ways in which the findings of Malthus were important for Darwin's development of the theory of evolution by natural selection.

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**(3)**

(b) Explain how Darwin and Lamarck differed in their explanation of how evolutionary change occurs.

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**(3)**



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(c) Suggest how the discovery of the role of DNA provided more support for Darwin's theory than for that of Lamarck.

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(2)

Q6

(Total 8 marks)

**TOTAL FOR PAPER: 60 MARKS**

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