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Student Number

Write your Student Number at the top of this Part A Answer Sheet.

Select the alternative A, B, C or D that best answers the question and, using ink, fill in the response circle completely.

- 1. A ○ B ○ C ○ D ○
- 2. A ○ B ○ C ○ D ○
- 3. A ○ B ○ C ○ D ○
- 4. A ○ B ○ C ○ D ○
- 5. A ○ B ○ C ○ D ○
- 6. A ○ B ○ C ○ D ○
- 7. A ○ B ○ C ○ D ○
- 8. A ○ B ○ C ○ D ○
- 9. A ○ B ○ C ○ D ○
- 10. A ○ B ○ C ○ D ○
- 11. A ○ B ○ C ○ D ○
- 12. A ○ B ○ C ○ D ○
- 13. A ○ B ○ C ○ D ○
- 14. A ○ B ○ C ○ D ○
- 15. A ○ B ○ C ○ D ○

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Student Number

Section I (continued)

Part B – 60 marks

Attempt Questions 16 - 28

Allow about 1 hour and 45 minutes for this part

Answer the questions in the spaces provided

Question 16 (3 marks)

Marks

In some emergency situations doctors use drugs to control a patient's ventilation (breaths taken per minute). These drugs, however, can create an imbalance in the amount of oxygen and carbon dioxide causing too much carbon dioxide in the blood and not enough oxygen.

- (a) Compare the technologies that allow the doctor to measure the oxygen saturation and carbon dioxide concentrations in the blood.

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- (b) Describe the form in which most carbon dioxide is transported in mammalian blood.

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Questions continue on next page →

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Student Number

Question 17 (5 marks)

During your course you investigated the effects of various factors on the activity of an enzyme.

(a) State one factor you investigated.

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(b) Describe how the investigation was carried out and give reasons for the procedure you used.

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Question 17 continued

(c) Explain your experimental results.

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Question 18 (6 marks)

(a) Describe the differences between active and passive transport.

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Question 18 continued

Marks

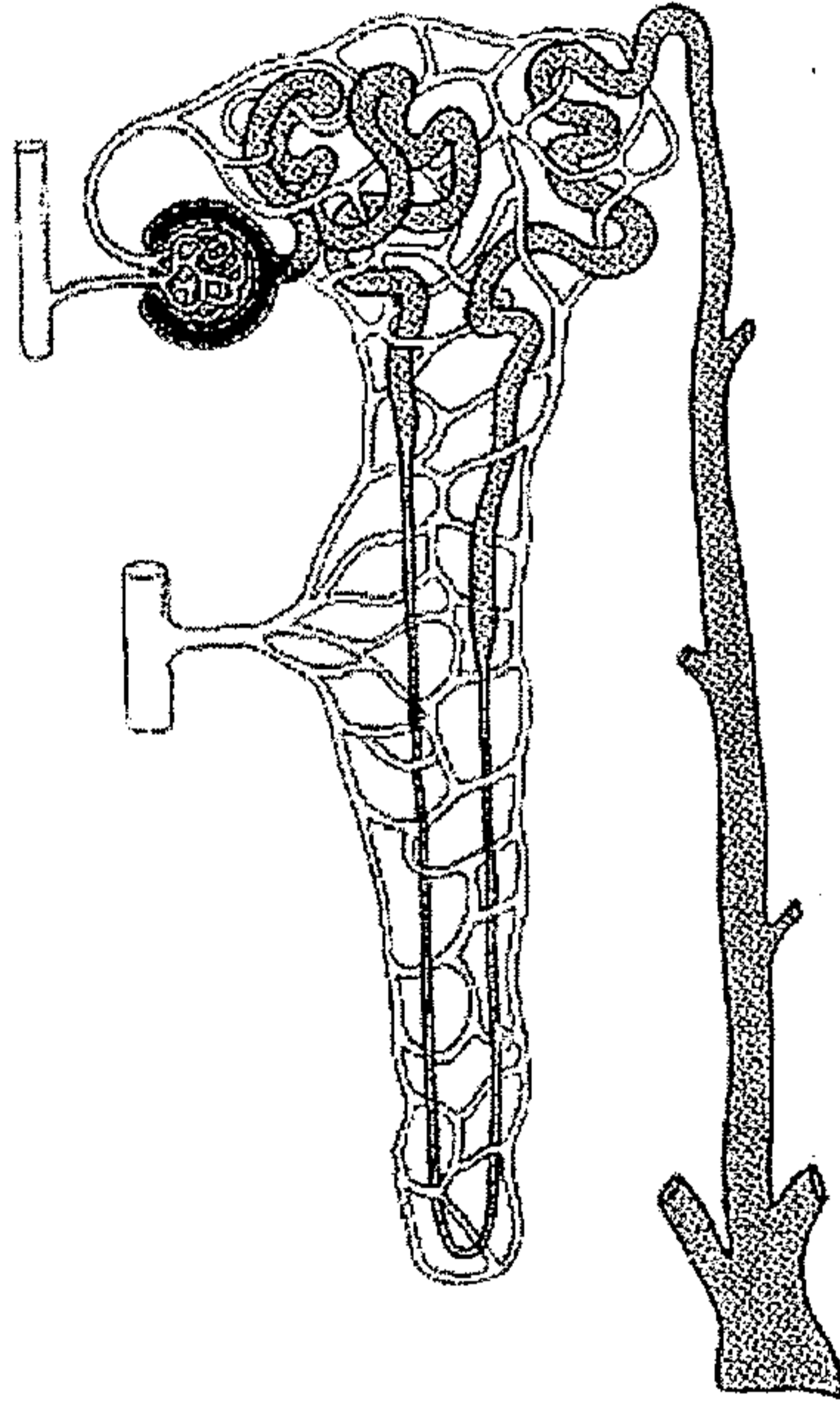
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Student Number

(b) On the diagram of the kidney nephron (the loop of Henle section):

- (i) Indicate with 'X' one region where active transport occurs.
- (ii) Name a substance that is actively transported at 'X'.

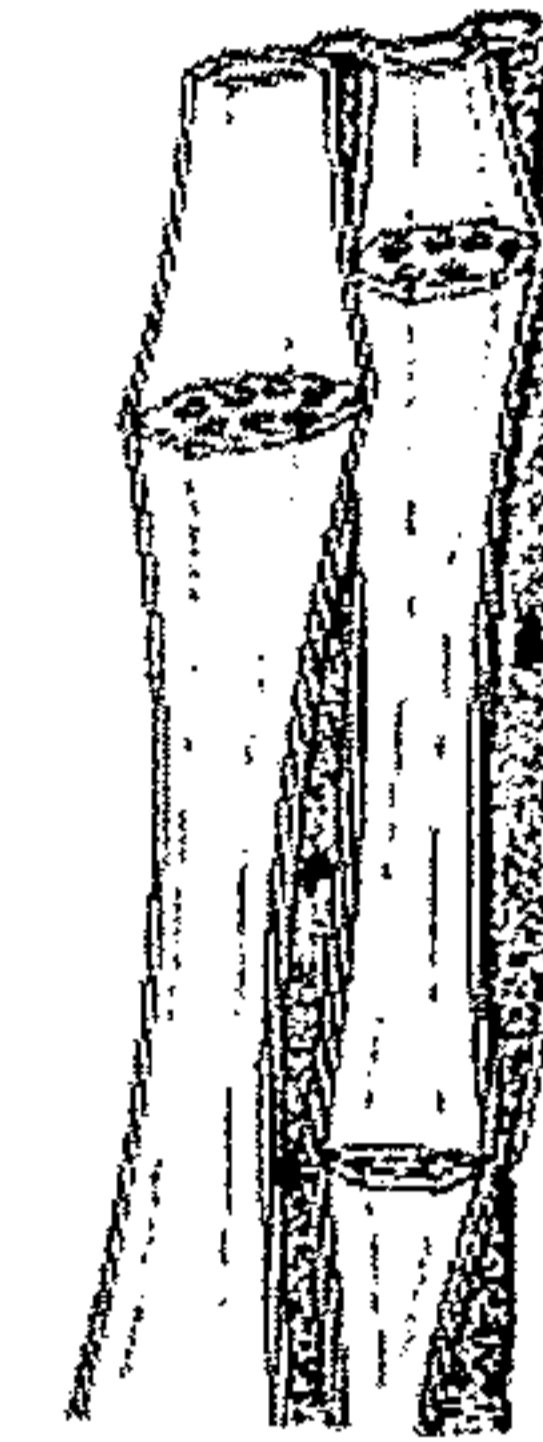
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Question 18 continued

Marks

The diagram is a longitudinal section of part of a plant transport system.



(c) State the name of the plant structure shown in the diagram and describe one theory about the movement of materials in it.

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Question 19 (3 marks)

Marks

(a) Outline the use of hormone replacement therapy in people who cannot secrete aldosterone.

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(b) Explain why this therapy is important for these people.

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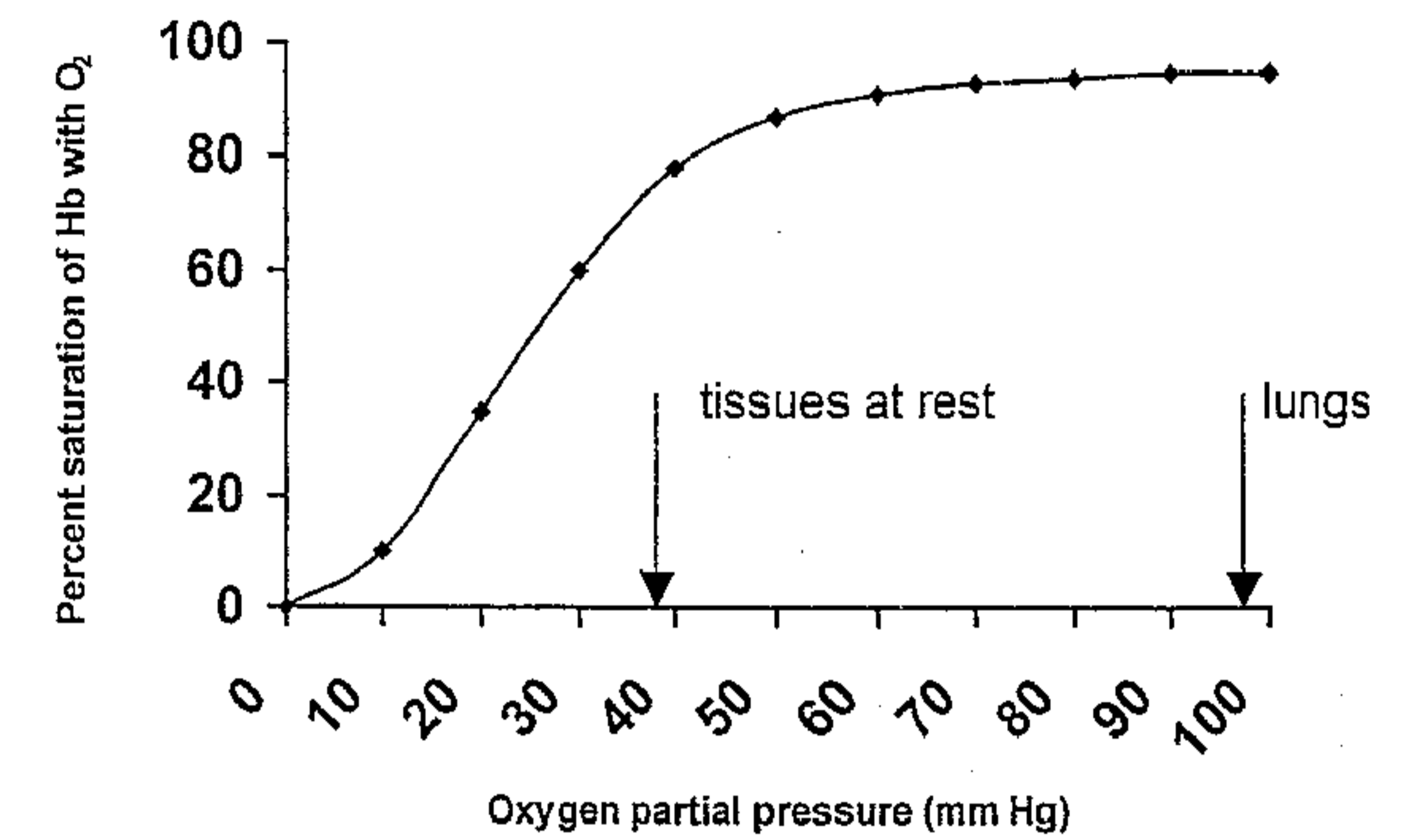
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Student Number

Question 20 (4 marks)

Marks

(a) The graph shows the oxygen-haemoglobin association-dissociation curve for normal adult human haemoglobin.



Explain the implications this graph has for the offloading of oxygen in tissues and the picking up of oxygen in the lungs.

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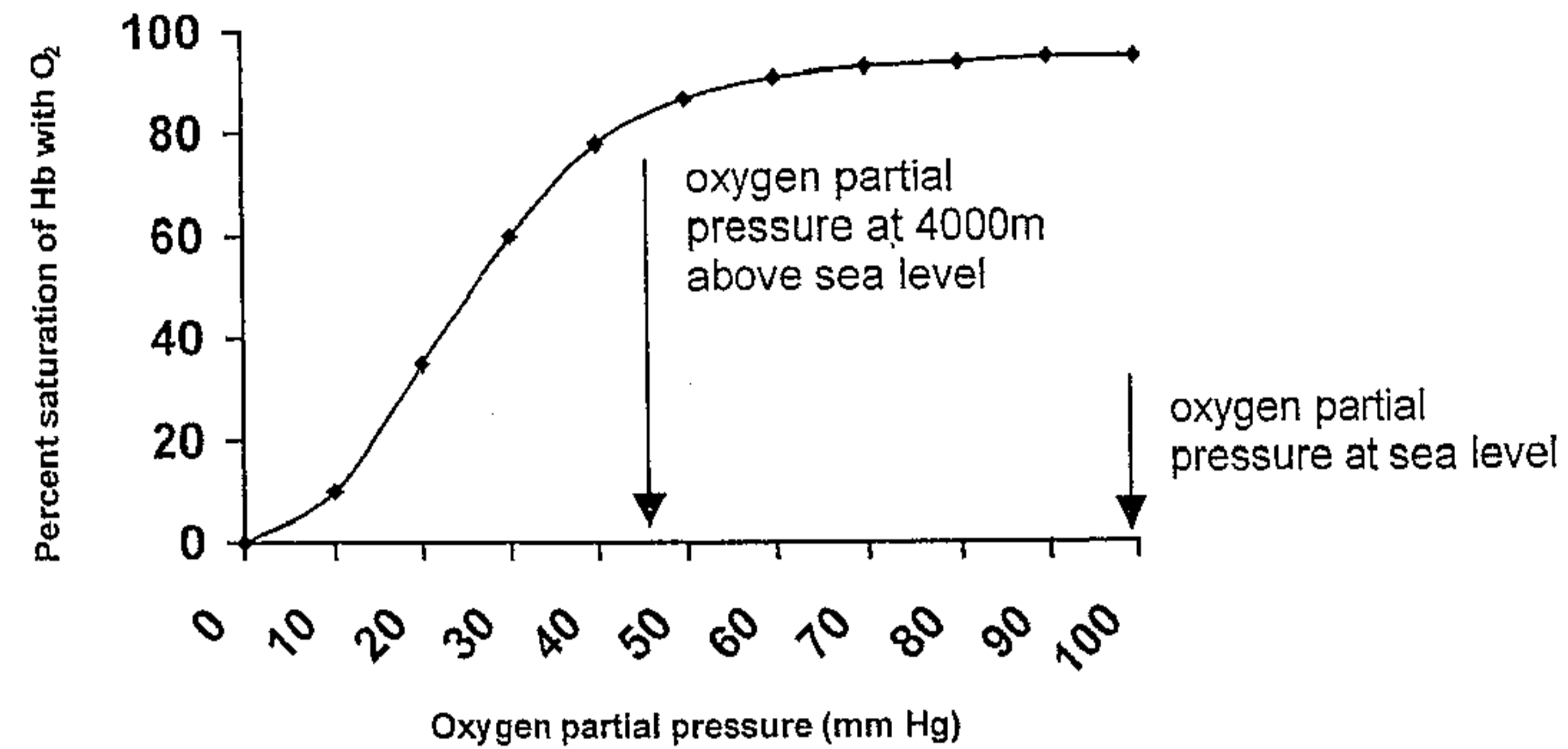
Question 18 continued

Marks

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Student Number

(b) The graph shows the amount of oxygen-saturated haemoglobin in relation to the altitude.



Explain how this information relates to the physiological responses of humans to high altitudes.

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Marks

Question 21 (3 marks)

(a) Using the theory of evolution, explain how the vertebrates that exist today came about.

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(b) Describe one piece of evidence for the evolution of vertebrates.

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(c) Describe the role of Darwin/Wallace in developing the theory of evolution.

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Question 27 (5 marks)

Marks

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Student Number

In your course you studied an infectious disease.

(a) State the name of this disease and give the cause of the disease.

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(b) Describe how the disease is transmitted.

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(c) Describe response of the host.

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Question 27 continued

Marks

(d) Outline an appropriate treatment for the disease.

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(e) Describe how the disease can be controlled.

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(a) One strand of a DNA molecule has the sequence of bases CGGCTTACG (read left to right).

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Amino acid	Possible codons
Alanine (Ala)	GCU, GCG, GCC, GCA
Arginine (Arg)	CGU, CGG, CGC, CGA, AGG, AGA
Asparagine (Asn)	AAU, AAC
Aspartic acid (Asp)	GAC, GAU
Cysteine (Cys)	UGC, UGU
Glutamic acid (Glu)	GAA, GAG
Glutamine (Gln)	CAA, CAG
Glycine (Gly)	GGA, GGC, GGG, GGU
Histidine (His)	CAC, CAU
Isoleucine (Ile)	AUA, AUC, AUU
Leucine (Leu)	UUA, UUG, CUA, CUC, CUG, CUU
Lysine (Lys)	AAA, AAG
Methionine (Met)	AUG
Phenylalanine (Phe)	UUC, UUU
Proline (Pro)	CCA, CCC, CCG, CCU
Serine (Ser)	AGC, AGU, UCA, UCC, UCG, UCU
Threonine (Thr)	ACA, ACC, ACG, ACU
Tryptophan (Trp)	UGG
Tyrosine (Tyr)	UAC, UAU
Valine (Val)	GUA, GUC, GUG, GUU
Stop	UAA, UAG, UGA

Given the information, what is the sequence of amino acids in the polypeptide formed from this DNA strand?

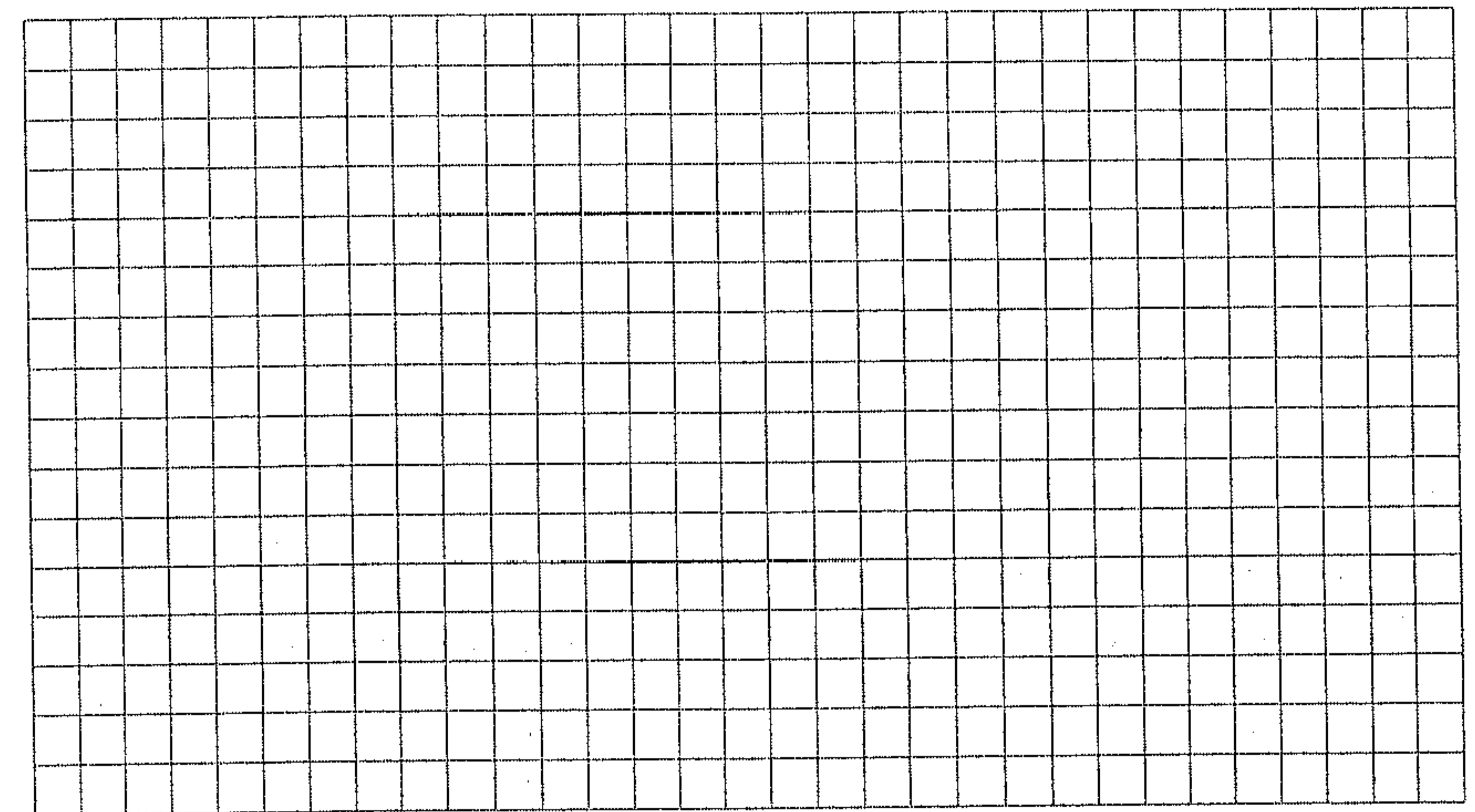
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Marks

(b) (i) On the grid provided, construct two graphs, one graph depicting polygenic inheritance, the other graph depicting inheritance determined by multiple alleles. Label the axes of each graph with the appropriate information for the trait you are using as an example for each type of inheritance. Label the polygenic graph 'P' and the multiple allele graph 'Q'.

2



(ii) Explain the differences between your graphs.

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