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Answer ALL questions in the spaces provided.

1. Read through the passage below on the heart, and then write on the dotted lines the most appropriate word or words to complete the passage.

Contraction of the atria (atrial systole) is stimulated by an impulse generated by
the, situated in the wall of the right atrium.

The impulse reaches the walls of the by means of the
bundle of His and Purkyne (Purkinje) fibres.

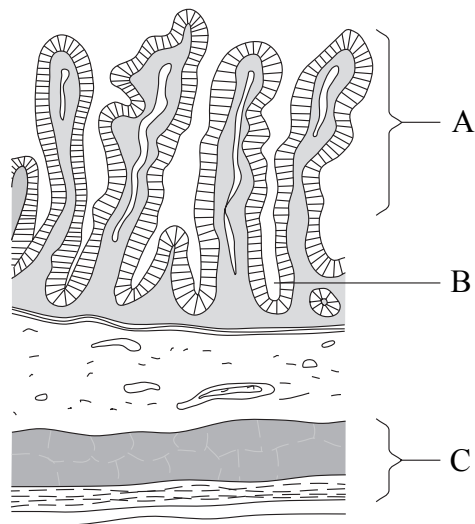
Oxygenated blood is supplied to the heart muscle by the
which branch directly from the aorta. Heart muscle contains a dense network
of, from which oxygen diffuses to the muscle.

(Total 4 marks)

Q1



2. The diagram below shows the structure of part of the ileum wall, as seen using the low magnification of a light microscope.



Magnification $\times 40$

(a) Name the parts labelled **A**, **B** and **C**.

- A
- B
- C

(3)

(b) Explain how the part labelled **A** assists in the absorption of glucose.

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(3)

(Total 6 marks)

Q2



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3. (a) Explain how the properties of a haemoglobin molecule make it an efficient respiratory pigment.

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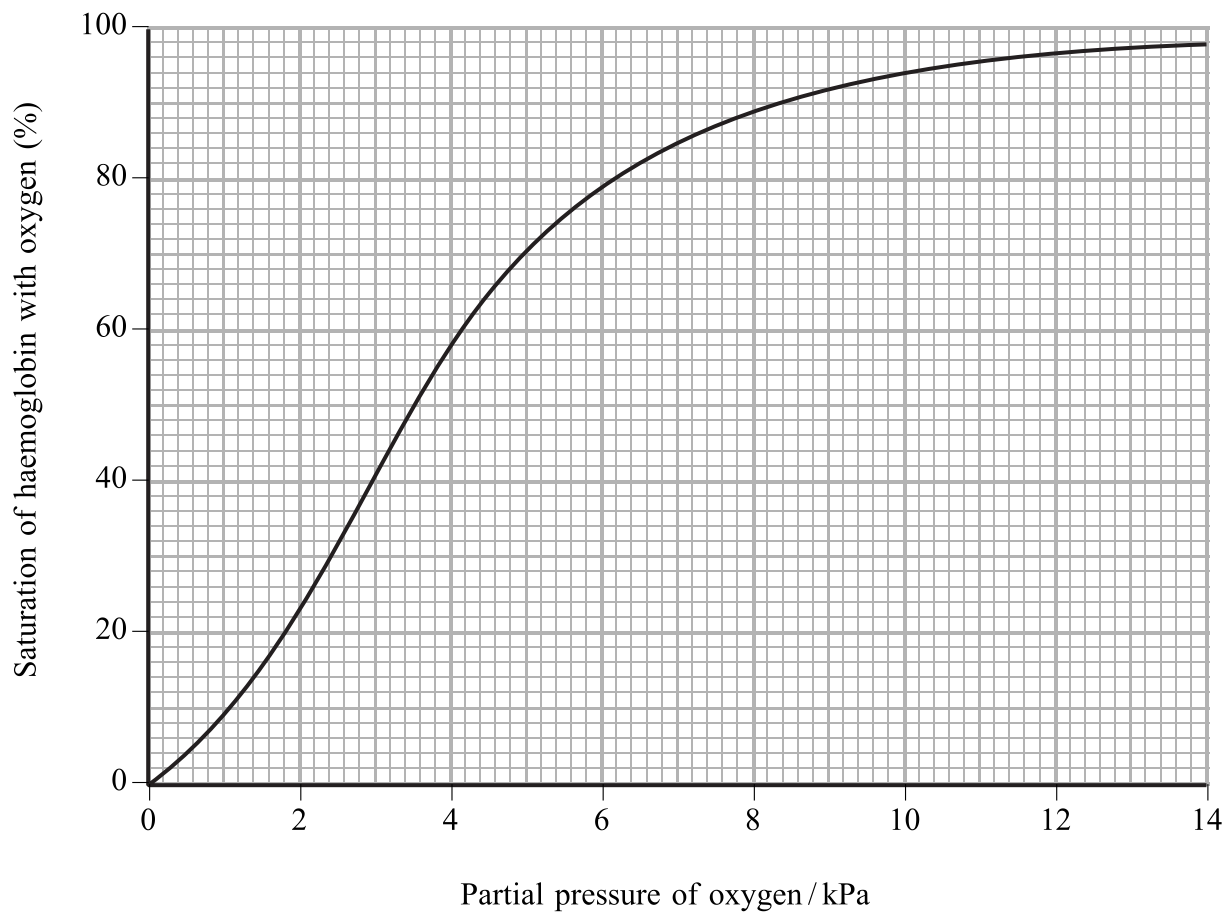
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(3)



(b) The graph below shows an oxygen dissociation curve for adult human haemoglobin.



(i) From the graph, find the partial pressure of oxygen at which the haemoglobin is 50% saturated with oxygen.

.....kPa

(1)

(ii) The dissociation curve for fetal haemoglobin is situated to the left of the dissociation curve for adult haemoglobin. Explain the importance of this to the developing fetus.

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(2)

(Total 6 marks)

Q3



4. (a) Describe the functions of each of the following hormones.

(i) Oestrogen.....

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(3)

(ii) Oxytocin.....

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(3)



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(b) The table below shows changes in the concentration of progesterone in the blood, during the first 36 weeks of pregnancy.

Time / weeks	0	4	12	20	28	36
Concentration of progesterone / arbitrary units	7	8	10	13	20	55

(i) Describe the changes in the concentration of progesterone as shown in the table.

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(2)

(ii) Give **two** functions of progesterone.

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2

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(2)

(Total 10 marks)

Q4

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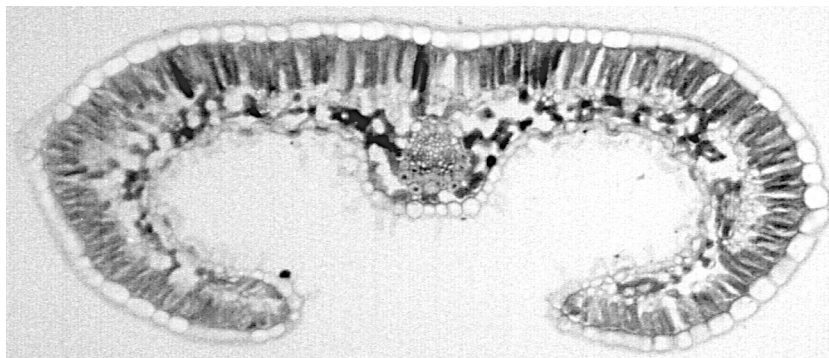


5. (a) Explain what is meant by the term **transpiration**.

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(2)

(b) The photograph below shows a cross-section through a leaf of *Erica*, as seen using the low magnification of a light microscope. *Erica* is adapted to living in dry conditions.



Magnification $\times 60$

(i) Suggest **two** ways in which the structure of this leaf is adapted to reduce transpiration.

1

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2

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(2)



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(ii) Suggest **three** ways in which the leaf of a hydrophyte (a plant that lives in or on water) differs from the leaf of *Erica*.

1

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(3)

Q5

(Total 7 marks)



6. (a) The table below shows the effect of temperature on the volume of oxygen dissolved in freshwater, in equilibrium with atmospheric air.

Temperature / °C	Volume of oxygen dissolved / cm ³ of oxygen per dm ³ of water
0	10.29
10	8.02
15	7.22
20	6.57
30	5.57

(i) Describe the relationship between temperature and the volume of oxygen dissolved in water, as shown in the table.

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(2)



(ii) Suggest why many species of fish found in tropical areas come to the surface of water to obtain oxygen directly from the air.

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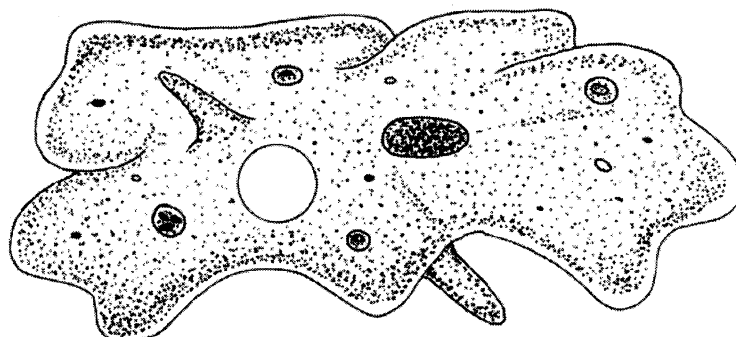
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(3)

(b) The diagram below shows *Amoeba*, a single-celled organism found living in freshwater.



Magnification $\times 80$

Describe how gas exchange occurs in *Amoeba*.

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(2)

Q6

(Total 7 marks)

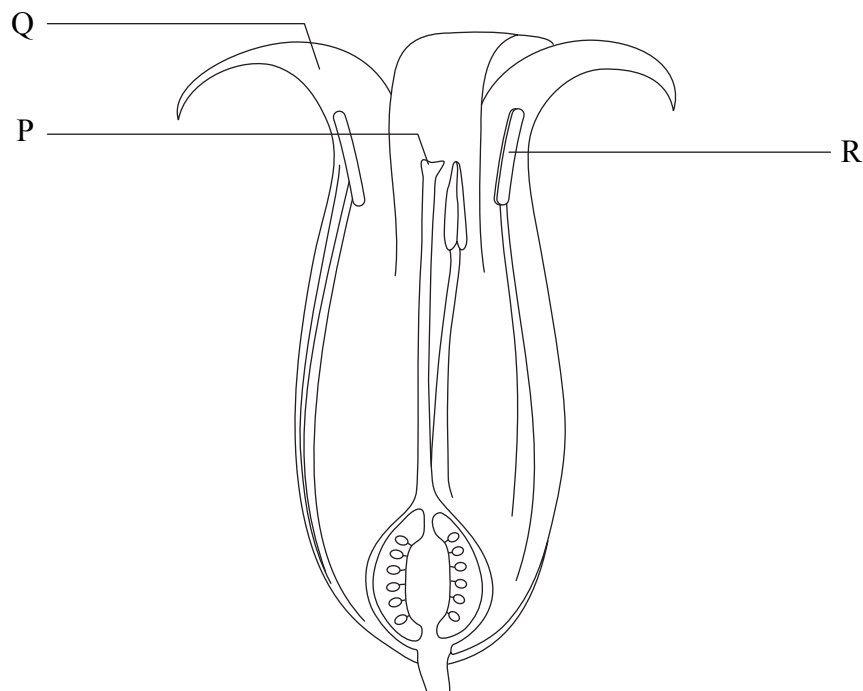


7. (a) Explain what is meant by the term **pollination**.

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(2)

(b) The diagram below shows a vertical section through a bluebell flower.



Magnification $\times 4$

(i) Name the parts labelled **P** and **Q**.

P

Q

(2)



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(ii) Suggest how the parts labelled **Q** and **R** are involved in the pollination of this flower.

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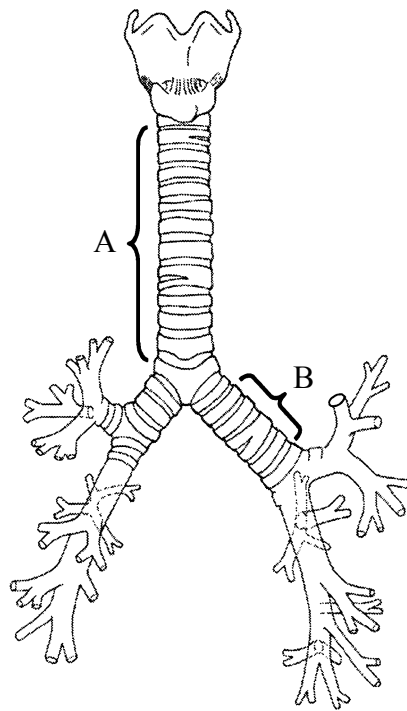
(4)

Q7

(Total 8 marks)



8. (a) The diagram below shows the structure of part of the human breathing system.



Name the parts labelled A and B.

A

B

(2)

(b) Describe how the process of inspiration (breathing in) is brought about.

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(3)



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(c) The table below shows the percentage of oxygen in inspired air and in alveolar air.

Air	Percentage of oxygen (%)
Inspired	20.71
Alveolar	13.20

Suggest an explanation for the difference in the percentage of oxygen in inspired air and in alveolar air.

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(2)

QUESTION 8 CONTINUES ON THE NEXT PAGE



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(d) Describe how **alveoli** are adapted for the function of gas exchange.

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(5)

(Total 12 marks)

Q8

TOTAL FOR PAPER: 60 MARKS

END

