

AQA, OCR, Edexcel

A Level

A Level Biology

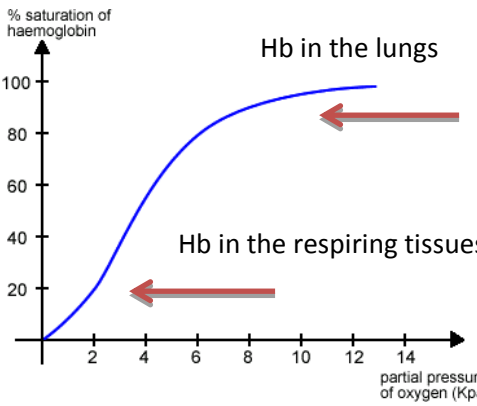
Haemoglobin Answers

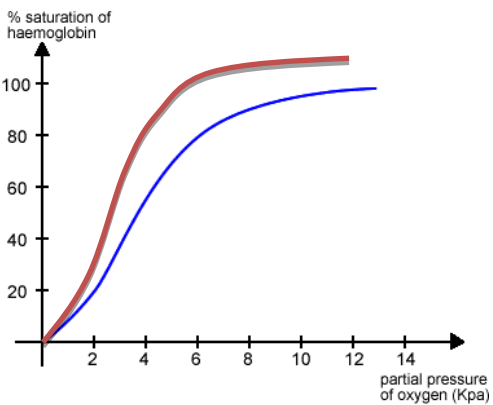
Name:

M M E

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Total Marks: /33

Answer	Marks
<p>1.</p> <p>a)</p> <p>i) There are four polypeptide chains - each has a haem group attached - 4 oxygen molecules can be carried</p> <p>ii)</p> $\text{Hb} + 4\text{O}_2 \rightleftharpoons \text{HbO}_8$ <p>iii) Haemoglobins affinity to bind with oxygen</p> <p>b)</p> <p>i) In the lungs the PO_2 is high so oxygen binds/associates readily In the respiring cells the PO_2 is low so oxygen is released/dissociates</p>	<p>2 marks</p> <p>2 marks</p> <p>1 mark</p> <p>4 marks</p>
<p>2.</p> <p>a)</p> <p>i)</p>  <p>ii) – it is hardest for the first O_2 molecule to bind. - binds, then alters the shape of the haemoglobin -making it easier for the next two O_2 molecules to bind - the graph is shallower at the top because it is hard to bind the final O_2 molecule as most binding sites are occupied.</p>	<p>2 marks</p> <p>4 marks</p>

<p>iii)</p>  <p>iv) Foetal haemoglobin has a higher affinity for oxygen so is shifted to the left.</p> <p>b)</p> <p>i) Haemoglobin has a lower affinity for oxygen - Oxygen more readily dissociates from haemoglobin at the respiring cells</p> <p>ii)- Shifted to the left - Higher affinity for oxygen - Binds more readily at a lower partial pressure in the lungs</p>	<p>1 mark</p> <p>1 mark</p> <p>2 marks</p> <p>2 marks</p>
<p>3.</p> <p>a)</p> <p>i) - An increase in CO₂ in the blood causes the pH to decrease/ more acidic.</p> <p>ii) Oxygen affinity decreases</p> <p>iii) As the carbon dioxide concentration increases, the curve moves to the right.</p> <p>b)</p> <p>i) Carbonic anhydrase</p> <p>ii) $\text{H}_2\text{CO}_3 \rightleftharpoons \text{H}^+ + \text{HCO}_3^-$</p> <p>iii) – the negative HCO_3^- diffuses out of the cell - This is balanced by the influx of Cl^- ions</p>	<p>2 marks</p> <p>1 mark</p> <p>2 marks</p> <p>1 mark</p> <p>1 mark</p> <p>3 marks</p>

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<p>-The charge on either side of the membrane isn't affected</p> <p>iv) Dissociation released hydrogen ions - H^+ ions are acidic and reduce the pH</p> <p>v) Low partial pressure of oxygen</p>	<p>2 marks</p> <p>1 mark</p>
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