

Answers to examination-style questions

Answers**Marks Examiner's tips**

1 (a) the way in which polypeptide chains fit together;	1 Quaternary structure only applies to a protein molecule that has more than one chain, so you must put chains to show more than one.
(b) each polypeptide has a specific 3D shape; haemoglobin has hydrophilic groups that allow it to mix with blood;	2 The specific shape allows the oxygen molecules to fit into the proteins. The hydrophilic groups are on the outside of the molecule and can access the oxygen in the blood.
2 (a) (i) 62 (<i>ignore units</i>);	1 Draw a vertical line on the diagram in pencil at 3 kPa on the x-axis. Where the line crosses each curve, draw a horizontal line back to the y-axis and note the values. The value is 18 for adult haemoglobin and 80 for fetal haemoglobin. $80 - 18 = 62$.
(ii) foetal haemoglobin has higher affinity for oxygen/takes up oxygen (becomes saturated) at lower partial pressure; at partial pressures when adult haemoglobin dissociates fetal haemoglobin takes up oxygen;	2 You are comparing so remember to use words like 'higher' and 'more'.
(b) (i) new S-shaped curve drawn to the right of the adult curve;	1 You need to learn this part and the S-shaped curve must be similar in shape to the original. It is moved to the right because, as the carbon dioxide concentration increases, the affinity of haemoglobin for oxygen decreases.
(ii) haemoglobin dissociates/unloads more readily/more oxygen delivered to cell/muscles/respiring tissue; at a particular partial pressure more oxygen is released;	2
3 (a) haemoglobin (in A) has greater affinity for oxygen; becomes saturated at lower partial pressure oxygen; is able to supply enough oxygen to its tissues;	3 You must answer in terms of a comparison, so use 'greater', or 'more', to show you understand this.

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(b) fish B has a greater rate of <u>respiration</u> <i>(accept more O₂ needed for respiration);</i> haemoglobin dissociates more readily (than A); <u>more</u> oxygen supplied;	2	
4 (a) glucose (<i>reject alpha glucose</i>);	1	Glucose is the most simple answer you need to give. When you add an incorrect idea as well you will not be awarded the mark.
(b) hydrolysis (<i>accept catabolic</i>);	1	
(c) (long) straight/unbranched chains; chains lie side by side/form (micro)fibrils; (<i>idea of</i>) hydrogen bonds holding chains together;	3	You need to give the idea of more than one so you must put chains.
5 (a) cell wall; chloroplasts; permanent vacuole.	1	These are easy marks and you should know them. You may be asked to identify them on a diagram.
(b) water enters by osmosis; because the water potential of the cell is lower than the soil surrounding it;	2	Water moves down a water potential gradient. Pure water has a water potential of 0. Any solution has a lower water potential, i.e. a negative water potential.