

A level Chemistry A

H432/01 Periodic table, elements and physical chemistry

Question Set 16

1. (a)*

Healthy human blood needs to be maintained at a pH of 7.40 for the body to function normally.

Carbonic acid, H_2CO_3 , is a weak acid which, together with hydrogencarbonate ions, HCO_3^- , acts as a buffer to maintain the pH of blood.

The $\text{p}K_a$ value for the dissociation of carbonic acid is 6.38.

Explain, in terms of equilibrium, how the carbonic acid–hydrogencarbonate mixture acts as a buffer in the control of blood pH, and calculate the $[\text{HCO}_3^-] : [\text{H}_2\text{CO}_3]$ ratio in healthy blood.

[6]

(b)

Red blood cells contain haemoglobin.

Explain using ligand substitutions:

- how haemoglobin transports oxygen around the body
- why carbon monoxide is toxic.

[3]

Total Marks for Question Set 16: 9

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