Question			Answer	Marks	Guidance
4	(a)	(i)	2.8 (kPa)	1	**ALLOW** answer in the range of 2.8–3.0 kPa
		(ii)	(llama) haemoglobin needs higher affinity for oxygen (so) can pick up oxygen at lower partial pressure (of oxygen)	2	
	(b)*		**Level 3 (5–6 marks)** Describes differences and similarities of llama and camel haemoglobin at all four levels of protein structure with correct reference to bonding. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Describes differences and similarities of llama and camel haemoglobin in some levels of protein structure with some reference to bonding. *There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.* **Level 1 (1–2 marks)** Describes a difference or similarity of llama and camel haemoglobin at a level of protein structure. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.*	6	**Indicative scientific points include:** • difference in primary structure • different amino acid / polypeptide sequence • one amino acid changed. • amino acid change could cause change to secondary structure • initial coiling or folding of polypeptide chain • α-helix • β-pleated sheet • hydrogen bonding. • amino acid change could cause change to tertiary structure • further coiling of secondary structure • ionic bonding • disulphide bonds • hydrophilic/hydrophobic bonds • 3D shape.

Question			Answer	Marks	Guidance
			0 marks No response or no response worthy of credit.		• amino acid change has not changed quaternary structure • alpha and beta subunits still able to form haemoglobin in both camel and llama.
	(c)		insoluble strong / AW unreactive / AW	**3**	**IGNORE** flexible.
	(d)		*two from* add biuret / NaOH and $CuSO_4$, solution / reagent to urine observe colour change (from blue to purple) compare with, control / blank (urine containing no protein)	**2**	**IGNORE** biuret test unqualified.
			Total	**14**	