

Question number	Answer	Marks	Guidance
1 a	Homeostasis	B1	
1 b	Ectotherm	B1	
1 c	Positive feedback	B1	
1 d	Hypothalamus	B1	
1 e	Ornithine cycle	B1	
2 a	Receptors detect, change/physical and chemical parameters, but effectors cause change Receptors are sensory, neurones/structures, but effectors are, muscles/glands	B2	
2 b	Excretion is getting rid of waste products of metabolism plus named example Osmoregulation is homeostatic control of water potential of body fluids	B2	ACCEPT carbon dioxide, water, urea and nitrogenous waste as examples
2 c	<i>Three from:</i> <i>Renal artery blood has:</i> More oxygen Less carbon dioxide More urea Less optimal water potential Less optimal salt concentration ORA	B3	
3 a i	Vein/venule	B1	IGNORE hepatic/central DO NOT ACCEPT hepatic portal
3 a ii	Hepatocytes/hepatic cells	B1	
3 b	Deamination Carbon dioxide/CO ₂ Urea/CO(NH ₂) ₂ Water/H ₂ O	B4	

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3 c i	<p>(Testing for) human chorionic gonadotrophin/hCG</p> <p>Hormone small so can pass from blood into filtrate (at Bowman's capsule)</p> <p>Monoclonal/immobilised, antibodies/immunoglobulin, on stick</p> <p>Antibodies attached to, marker/dye</p> <p>Hormone, binds/complementary, to antibody</p> <p>(triggers) appearance of colour/line becomes visible</p> <p>AVP</p>	B4	
3 c ii	<p><i>Three from:</i></p> <p>Fairness/giving unfair advantage/does not give an 'even playing field'</p> <p><i>Idea of health</i> risks/dangerous/unhealthy/fatal/side effects</p> <p>Specified health risk</p> <p><i>Idea of distrust of 'outstanding' performances/does not reflect athlete's natural talent/sport should reflect athlete's natural talent</i></p> <p><i>Idea of pressure to keep up with rival competitors</i></p> <p><i>Idea that can train for longer (without tiring)/can respire longer (without tiring)/can recover from injury quicker/can build up muscle mass</i></p> <p>AVP</p>	B3	
4 a i	<p>In blood plasma = $\left(\frac{80}{989}\right) \times 100$</p> <p>8.1%</p> <p>In glomerular filtrate = 0%</p>	M3	ACCEPT 8.09%

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4 a ii	<p>Proteins in plasma with RMM above 68 000 cannot pass through to, Bowman's capsule/nephron/form filtrate</p> <p>Do pass through, pores/fenestrations, of glomerular, capillaries/endothelium</p> <p>But basement membrane, forms filtration barrier/limits size of molecules that pass</p>	B3	
4 a iii	Kidney cortex	B1	
4 b i	<p>In glomerular filtrate: $(\frac{60}{180000}) \times 1000$</p> <p>= 0.3 g dm⁻³</p> <p>In urine = $(\frac{35}{1500}) \times 1000$</p> <p>= 23.3 g dm⁻³</p>	M4	<p>ACCEPT 0.33 g dm⁻³</p> <p>Penalise incorrect units, rounding or more than 2 d.p. once.</p> <p>ACCEPT 23.33 g dm⁻³</p>
4 b ii	<p>Mass decreases from, Bowman's capsule/filtrate, to, ureter/urine</p> <p>Due to reabsorption of nearly half by diffusion (in proximal convoluted tubule)</p> <p>Concentration increases from, Bowman's capsule/filtrate, to, ureter/urine</p> <p>Due to relatively more water reabsorbed so urea dissolved in smaller volume</p>	B4	
5 a	<p>To ensure enough O₂ for respiration (in all cells)</p> <p>Because CO₂ is acidic and change in pH, affects/denatures, enzymes</p> <p>To ensure enough glucose for respiration</p> <p>Because too high a temperature denatures enzymes and too low slows down their activity</p>	B4	<p>Accept enzymes work best at body temperature/37 °C</p>

Question number	Answer	Marks	Guidance
5 b	If temperature rises sweating causes body to lose water (and salts) Kidneys compensate by, producing a more concentrated urine/reabsorbing more water from distal convoluted tubule Due to effects of, ADH/anti-diuretic hormone	B3	