

Question			Answer	Marks	Guidance
22	(a)	(i)	A ✓	1	<i>mark the first letter only</i> IGNORE name unless contradicts a stated letter
	(a)	(ii)	B , D ✓	1	<i>If more than two letters given, 0 mark</i> IGNORE names unless contradicts a stated letter
22	(b)	(i)	<p><i>similarities</i></p> <p>S1 both use <u>active transport</u> ✓</p> <p>S2 both involve , co-transport / described ✓</p> <p>S3 both involve <u>selective</u> reabsorption ✓</p> <p>S4 both involve use of , sodium ions / Na⁺ ✓</p> <p><i>differences</i></p> <p>D1 DCT involves use of , calcium ions / Ca²⁺ ✓</p> <p>D2 (co-transport in) DCT involves ions only ✓</p> <p>D3 PCT involves ions and (named) molecules ✓</p>	3 max	<p><i>maximum two marks for similarities or differences</i></p> <p>IGNORE sodium / Na</p> <p>IGNORE calcium / Ca</p> <p>e.g. glucose / amino acid(s)</p>
	(b)	(ii)	<p><i>symptom</i></p> <p>high volume of / excess , urine</p> <p>OR</p> <p>always thirsty / AW ✓</p> <p><i>explanation</i></p> <p>fewer / AW , aquaporins in the (plasma) membrane (of collecting duct cells) ✓</p>	2	<p>ALLOW large amount / lots , of urine</p> <p>IGNORE reference to , dilute urine / water potential / frequency of urination</p> <p>ALLOW <u>protein</u> water channels for aquaporins</p>

Question			Answer	Marks	Guidance
22	(c)	(i)	<p>1 have already / are , differentiated / specialised (so cannot divide) ✓</p> <p>2 are in , G₀ (phase of cell cycle) / resting phase ✓</p> <p>3 <i>idea that</i> shape is (too) , irregular / asymmetrical (so cannot divide) ✓</p> <p>4 cytoskeleton cannot function / spindle (fibres) cannot form ✓</p> <p>5 (if mitosis occurred) it would alter , number / size , of the , gaps / fenestrations ✓</p> <p>6 <i>idea that it</i> would alter an aspect of ultrafiltration ✓</p>	3 max	<p>ALLOW cannot pass G1 checkpoint / cannot go into S phase / remains in G₁</p> <p>e.g. (podocyte) has projections (so cannot divide)</p> <p>ALLOW for aspect of ultrafiltration e.g. different sized molecules can pass through e.g. no / less , ultrafiltration e.g. changes rate of ultrafiltration e.g. changes composition of filtrate</p>
	(c)	(ii)	<p>(adult stem cells) are <u>multipotent</u> ✓</p> <p>(differentiate to) become any <u>cell</u> type within , kidney / nephron (tissue) ✓</p>	2	<p>DO NOT ALLOW totipotent / pluripotent ALLOW (adult stem cells) can , differentiate / specialise</p>
			Total	12	