

Question	E Answer	Marks	Additional Guidance
1 (a) (i)	plasma ;	[1]	
(ii)	excretion ;	[1]	
(b) 1 2 3 4 5 6	<p>A (ultra)filtration ; small molecules, from blood or glomerulus/into (Bowman's/renal) capsule ; are forced/pushed (out)/under (high) pressure ;</p> <p>B (selective) <u>re</u>absorption ; back into the blood/capillaries ; e.g. of any substance that is filtered or reabsorbed ;</p>	[max 4]	A small particles/examples of relevant small molecules instead of 'small molecules'
(c) (i)	protein ;	[1]	
(ii)	glucose ;	[1]	
(iii)	urea ;	[1]	
(d)	water has been reabsorbed ; by osmosis ; (in/by) collecting duct/nephron/(proximal convoluted) tubule ; <i>idea that</i> by Z there is no change in, sodium ions/urea/solutes, but volume of water is less ;	[max 2]	A loop of Henle

<p>1 (e) (i)</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p>	<p><i>either</i></p> <p>0.35 (g per 100 cm³) ;</p> <p>same concentration as the blood/to be in equilibrium with the blood/to prevent loss or gain, of sodium ions ;</p> <p>prevents/reduces, osmosis ;</p> <p><i>or</i></p> <p>any figure greater than 0 and less than 0.35 (g per 100 cm³) ;</p> <p>excess, sodium/salt, in the blood ;</p> <p>diffusion, from blood/into dialysis fluid ;</p>	<p>[max 2]</p>	<p>Note: Mpts 2 or 3 linked to correct answer for Mpt 1</p> <p>Note: Mpts 5 or 6 linked to correct answer for Mpt 4</p>
<p>(e) (ii)</p>	<p>red blood cells/erythrocytes ;</p> <p>white blood cells/lymphocytes/phagocytes ;</p> <p>platelets/thrombocytes ;</p> <p>(named) plasma protein(s) e.g. fibrinogen, antibodies ;;</p> <p>(named) hormones ;;</p> <p>urea/uric acid ;</p> <p>amino acids/(named) vitamins/cholesterol/fats/fatty acids/glycerol/bacteria/virus ;;</p>	<p>[max 2]</p>	<p>Ignore protein, cells, plasma, (named) gases, iron, (named) toxins, (named) drugs</p> <p>R glucose, (mineral) salt, minerals, sodium, (named) ions, water, carbohydrate, starch, blood, ammonia</p>
<p>(f)</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p>	<p>ref to platelets (in correct context of clotting) ;</p> <p>fibrinogen converted to <u>fibrin</u> ;</p> <p>soluble to insoluble/ fibrin is insoluble ;</p> <p>thrombin/enzyme, in context ;</p> <p>mesh/network/web, to trap blood (cells) ;</p> <p>AVP ; e.g. ref to prothrombin or involvement of, calcium ions/clotting factors</p>	<p>[max 3]</p>	<p>A ref to thrombocytes</p>
		<p>[Total:18]</p>	

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2	(a)	E – cortex ; F – medulla ; G – <u>ureter</u> ;		[3]												
	(b)	(i)	<table border="1"> <thead> <tr> <th>process</th> <th>letter</th> <th></th> </tr> </thead> <tbody> <tr> <td>diffusion of oxygen</td> <td>H ;</td> <td><i>idea that</i> (oxygen) diffuses, from high concentration/to low concentration/down concentration gradient (into the cell) ;</td> </tr> <tr> <td>active uptake of sodium ions</td> <td>L ;</td> <td><i>idea that</i> (sodium ions) are moved against their concentration gradient/from low to high concentration ;</td> </tr> </tbody> </table>	process	letter		diffusion of oxygen	H ;	<i>idea that</i> (oxygen) diffuses, from high concentration/to low concentration/down concentration gradient (into the cell) ;	active uptake of sodium ions	L ;	<i>idea that</i> (sodium ions) are moved against their concentration gradient/from low to high concentration ;	[4]	<i>mark the columns independently</i>		
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				[Total: 13]												

3	(a)	<p>removal from the body / organism / cell R 'excreted from body' 2 poisons / toxins / harmful substances 3 named example OR waste products / of metabolism / respiration / deamination / chemical reactions in cells or in the body 4 substances in excess (of requirements) / AW</p>	[max 3]	<p>lg faeces, egestion, defecation, digestion AW A 'substances that cause harm' / 'harmful' <i>toxic waste products of metabolism / AW = 2 marks</i> ignore routes from body Mpt 3. A named examples, e.g. CO₂, urea, salt, named ions, amino acids</p>										
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4 (a)	A – B 1 urea (concentration) decreases ; 2 water (content) increases / decreases ; 3 salt (concentration), decreases ; 4 ref to, glucose / sugar ; <i>could be increase, decrease or stays the same</i>	[max 2]	A 'passes out of blood' / 'passes into blood' / removed / taken out / diffuses in / diffuses out A minerals / any named salt or ion
(b)	<i>advantages of transplants</i> 1 long term solution / person no longer needs (regular) dialysis ; 2 an example of a disadvantage of dialysis ; A pain / tiring / discomfort / takes a long time / fails eventually 3 increased freedom / better quality of life / ora ; 4 better / more efficient, control of composition of blood ; 5 can have wider diet / ora ; 6 ref. to cost or economic benefit – to health service or to individual ;	[max 3]	A 'doesn't need to go to clinic / hospital' MP2 is medical issue A any appropriate blood borne disorder MP3 is social issue MP6 R cost unqualified A 'dialysis machine available for others'
(c) (i)	$I^A I^O \times I^B I^O$; $I^A , I^O + I^B , I^O$; $I^O I^O$, (blood group) O ; (allele) I^O recessive to I^A <u>and</u> I^B ; parents must both, have I^O / O / be heterozygous ;	accept: $AO \times BO$; $A , O + B , O$; OO , (blood group) O ; (allele) O recessive to A <u>and</u> B ;	R one I for the genotypes, e.g. I^{AO} gametes must be derived correctly from the parental genotypes written explanation may be written in terms of parents pass on the allele I^O ignore gene for allele
(ii)	25% / 0.25 / ¼ / 1 in 4 ;	[1]	R a ratio e.g. 1:3
		[Total: 10]	