

Excretion in Humans

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Excretion in Humans
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 1

Time Allowed: 54 minutes

Score: /45

Percentage: /100

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1	(a) (i)	1 removal from the, body/organism/cell ; 2 (of) poisons/toxins/harmful substances ; 3 named example (or) waste products of, metabolism/respiration/deamination/chemical reactions in cells ; 4 substances in excess (of requirements) / AW ;	[max 3]	
	(ii)	carbon dioxide/water (vapour) ;	[1]	
	(iii)	1 deamination (of amino acids) ; 2 removal of nitrogen-containing part of amino acids ; 3 to produce urea ; 4 urea/AW, passes into blood ; 5 breakdown of, hormones/toxins/drugs/excess vitamins ; 6 breakdown of, worn out red blood cells ; 7 excretory products put in bile ; e.g. cholesterol	[max 3]	

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Question	E Answers			Marks	Additional Guidance																		
1 (b)	<table><tr><td>Function</td><td>Name</td><td>letter from Fig.4.1</td></tr><tr><td>blood is filtered</td><td>cortex</td><td>K ;</td></tr><tr><td>concentration of urine is determined</td><td>medulla</td><td>L</td></tr><tr><td>urine flows to the bladder</td><td>ureter</td><td>N ;</td></tr><tr><td>blood is carried into the kidney</td><td>renal artery</td><td>P ;</td></tr><tr><td>blood flows out of the kidney</td><td>renal vein</td><td>O ;</td></tr></table>			Function	Name	letter from Fig.4.1	blood is filtered	cortex	K ;	concentration of urine is determined	medulla	L	urine flows to the bladder	ureter	N ;	blood is carried into the kidney	renal artery	P ;	blood flows out of the kidney	renal vein	O ;	[4]	one mark for each correct name and matching letter
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(c) (i)	urea ; ammonia ; uric acid ; creatinine ; (named) salt / ions ; e.g. Na ⁺ , Cl ⁻ , Mg ²⁺ , Ca ²⁺ , HCO ₃ ⁻ water ; (named) toxins ; hormones ;			[max 2]	ignore glucose / sugar / urine / amino acids																		
(ii)	1 2 3 4 5 6 7 8	advantage patients do not need to return to clinic for dialysis / AW ; can eat normally / do not need to eat a restricted diet / AW ; periods of feeling unwell reduced / absent ; disadvantage need, immunosuppressant / AW, drugs ; risk of death / infection, during / after, the operation ; rejection of kidney ; finding a compatible donor ; AVP ; e.g. water retention		[max 2]	one mark for an advantage and one mark for a disadvantage																		
Total:			[15]																				

2 (a)	E – cortex ; F – medulla ; G – ureter ;	[3]	
(b)	<div>1 (ultra)filtration ;</div> <div>2 high blood pressure assists filtrate to pass through glomerulus / capsule ;</div> <div>3 proteins / blood cells, too big to move out of capsule / glomerulus ;</div> <div>4 filtrate / named example, small enough to move through ;</div> <div>5 filtrate consists of water and dissolved salts / ions / named ion / glucose / urea ;</div> <div>6 ref to capillaries ;</div>	[ma 3]	
(c)	movement of (ions / large molecules) through the cell membrane ; (ions/large molecules) against a concentration gradient ; using energy (from respiration) ; use of protein / carrier in membranes ;	[ma 2]	R along the concentration gradient
(d)	water ; salt(s) / ions / minerals / named ion ;	[ma 1]	

2 (e) (i)	<table border="1"> <thead> <tr> <th>Substance</th><th>Blood before dialysis</th><th>Concentration in used dialysis fluid</th><th>Concentration in fresh dialysis fluid</th></tr> </thead> <tbody> <tr> <td>glucose</td><td>normal</td><td>same</td><td>same ;</td></tr> <tr> <td>salt</td><td>high</td><td>high</td><td>low ;</td></tr> <tr> <td>urea</td><td>high</td><td>high</td><td>none ;</td></tr> <tr> <td>toxins</td><td>high</td><td>high</td><td>low</td></tr> </tbody> </table>	Substance	Blood before dialysis	Concentration in used dialysis fluid	Concentration in fresh dialysis fluid	glucose	normal	same	same ;	salt	high	high	low ;	urea	high	high	none ;	toxins	high	high	low	[max 3]	
Substance	Blood before dialysis	Concentration in used dialysis fluid	Concentration in fresh dialysis fluid																				
glucose	normal	same	same ;																				
salt	high	high	low ;																				
urea	high	high	none ;																				
toxins	high	high	low																				
(ii)	<p>1 dialysis membrane is partially permeable ; 2 minerals / salts / ions / urea, move by diffusion ; 3 from high concentration to low concentration / down a concentration gradient ; 4 water, moves by osmosis ; 5 (osmosis is the movement of water) from high water potential to low water potential across membrane ; 6 proteins / blood cells too large to move across membrane ; 7 glucose is not removed by dialysate (same concentration) ; 8 fresh dialysate maintains a concentration gradient ;</p>	[ma 4]																					
(f)	<p>fewer diet / fluid intake restrictions ; no need for regular visits to hospital ; less unwell / tired / nausea / headaches / less pain (after surgery) ; no needles / no fistula, permanently in arm ;</p>	[max 3]																					
(g)	<p>avoid rejection ; stop immune system attacking new kidney ;</p>	[max 1]																					
		[Total: 20]																					

Question		Marks	Additional Guidance
3 (a)	removal from the, body / organism / cell; poisons / toxins / harmful substances; waste product(s), of metabolism / respiration / deamination / chemical reactions; substances in excess (of requirements) / AW;	max 3	A 'substances that cause harm' / 'harmful' A named example e.g. CO ₂ , urea, salt, named ions, amino acids toxic waste products of metabolism / AW = 2 marks
(b) (i)	protein;	1	
(ii)	glucose;		
(iii)	urea and salts;	1	A sodium / ions
(c)	any three from: pelvis; ureter; bladder; urethra;	max 3	
(d)	homeostasis;	1	
		[Total: 10]	

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