

# Excretion in Humans

## Mark Scheme 3

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Excretion in Humans
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 3

Time Allowed: 57 minutes

Score: /47

Percentage: /100

Question	E	Answers	Marks	Additional Guidance
1 (a)		removal from the, body / organism ; R 'from cell' / 'excreted from body' poisons / toxins ; waste products of, metabolism / respiration / deamination / chemical reactions in cells or in the body ; substances in excess (of requirements) / AW ;	[max 3]	A 'substances that cause harm' / 'harmful' toxic waste products of metabolism / AW = 2 marks I routes from body
(b) (i)		too large to go through membrane / pores in membrane too small ;	[1]	I semi-permeable / AW
(ii)		dialysing solution / dialysate, contains <u>glucose</u> ; glucose / sugar, diffuses / moves ; (until blood is) at, correct / normal, concentration ; A amount / level	[max 2]	I refs. to insulin / glucagon, etc. A dialysate has, correct / normal, concentration R 'machine has ....'
(c) (i)		9 ;	[1]	
(ii)		(240 – 40 =) 200 mg per dm <sup>3</sup> ;	[1]	<b>must have units – A</b> 200 mg/dm <sup>3</sup> or mg dm <sup>-3</sup>
(iii)	1 2 3 4 5 6 7 8	decreases during, dialysis / treatment / 'time on machine' ; increases, over next day / until next dialysis / after dialysis ; maximum concentration(s) decreases (over time) ; minimum concentration(s) (after dialysis) decreases (over time) ; difference between max and min decreases ; increase after dialysis is less steep after, day 9 or 10 / treatment 5 ; any comparative data quote giving days and urea concentration(s) ; AVP ;	[max 3]	do not allow 'urea conc decreases over 17 days' allow fluctuates if MP1 or MP2 not given  MP7 A decreases by, 200 mg per dm <sup>3</sup> / 83%, over 17 days A 'at first' and 'at end' for days look carefully at how 4s and 7s are written

Question	E	Answers	Marks	Additional Guidance
1 (iv)	1 2 3 4 5 6 7	<i>increase</i> (urea) produced in liver ; deamination ; amino acids ; <i>decrease</i> <u>diffuses</u> , out of blood / into dialysate; through (dialysis) membrane ; ref to concentration gradient / no urea in dialysate ; AVP ; e.g. diet changes after day 9 / treatment 5 (less steep increase)	[max 4]	I 'of protein'  A diffusion gradient
			[Total: 15]	

CHEMISTRY ONLINE  
— TUITION —

- 2 (a) *balanced diet*  
provides, sufficient energy / energy for needs ;  
provides, molecules / materials, for metabolism / equivalent ; **A** substances  
provides, nutrients / named nutrients ; CPFVM H<sub>2</sub>O fibre  
**A** minimum of any three named nutrients  
**A** contains (all the) food, groups / types / classes **R** 'substances'  
in correct / right, quantities / proportions / amounts ;  
**A** adequate / sufficient **R** 'equal'

**R** 'balanced' as it is in the question

[max 2]

(b) (i) liver ;

[1]

(ii) glucose ; **R** if two compounds are given

[1]

(iii) aerobic ;  
carbon dioxide / water / no lactic acid, produced ;

anaerobic = 0 for the whole of (iii)

[2]

(c) dissolved / in solution / soluble ;  
in plasma ;

[2]

CHEMISTRY ONLINE  
— TUITION —

(d) mark name and function independently

read the functions of **A** and **B** together before awarding marks

part	name of part	function
<b>A</b>	glomerulus ; <b>A</b> knot of capillaries <b>R</b> capillaries	filtration / filtering (blood) ; <b>A</b> increase in (blood) pressure / ref to high pressure <b>A</b> 'substances forced out' <b>R</b> diffusion
<b>B</b>	capsule ; <b>R</b> cup	collects filtrate / allows filtration ;
<b>C</b>	tubule ; <i>distal is neutral</i> <b>R</b> nephron / tube	(selective) <u>re</u> absorption ; reabsorbs, water / glucose / salts / minerals / ions / amino acids ; <i>ignore</i> nutrients <b>A</b> description of reabsorption, e.g. active uptake of glucose absorption back into blood
<b>D</b>	collecting duct ;	(re)absorbs water / passes urine to pelvis or ureter ; <b>R</b> urea unless with water <b>A</b> waste substances

[8]

- 2 (e) (i) *award two marks if correct answer (1699 / 1699.2 / 1700) is given*  
*award one mark if no answer or incorrect answer but correct working is shown*

$$1.18 \times 60 \times 24 / 1.18 \times 1440$$

$$1699 / 1699.2 / 1700 \text{ (dm}^3\text{) ;;}$$

[2]

- (ii) *award two marks if*
- *correct answer (0.1) is given*
  - *allow ecf from (e)(i) – so check calculation*

*if no answer or incorrect answer award one mark for dividing 1.7 by something and multiplied by 100*

$$1.7 / 1700 \times 100$$

$$0.1 \text{ (%) ;;}$$

[2]

[Total: 20]

CHEMISTRY ONLINE  
— TUITION —

3 (a) removal of waste (products) of, metabolism / chemical reactions ;

**A** 'made within cells' as alternative to metabolism

harmful / toxic / poisonous / AW ;

substance(s) in excess of requirements ;

[3]

(b) (i) *accept statements from the question instead of letter  
accept letter written on the structure (no label line) or nearby if clear  
reject if letter used on two or more areas and one is incorrect*

**F** on cortex / white area between fibrous capsule and stippled medulla ; *allow on glomerulus but not anywhere else on tubule*

**R** on renal artery *including after it divides* ;

**U** on ureter ;

[3]

(ii) ref to blood pressure ;  
due to the heart / AW ;  
ref to capillaries ; **A** glomerulus  
small molecules forced out (of blood) ;  
two examples ;

urea, water, amino acids, glucose / sugar, salts / ions / minerals, uric acid, ammonia,  
any named hormone / spent hormone

**A** any two named, ions / hormones as the two examples

[max 3]

(iii) *glucose mark only the first two answers if more than two given*

diffusion ;

active uptake / active transport ;

**A** selective , reabsorption / uptake ; [max 2]

*water mark only the first answer if more than one given*

osmosis ; **A** diffusion

[3]

**[Total: 12]**