

Human Nutrition

Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Nutrition
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 2

Time Allowed: 63 minutes

Score: /52

Percentage: /100

	Answers	Marks	Guidance for Examiners
1 (a) (i)	<p>provides, sufficient energy / energy for needs ;</p> <p>provides, molecules / materials, for metabolism / equivalent ;</p> <p>provides, nutrients / named nutrients i.e. CPFVM H₂O fibre ;</p> <p>in correct / right, quantities / proportions / amounts ;</p>	[max 3]	<p>A substances</p> <p>fibre – accept roughage and non-starch polysaccharide.</p> <p>A minimum of any three named nutrients</p> <p>A contains (all the) food, groups / types / classes</p> <p>R ‘substances’</p> <p>A adequate / sufficient R ‘equal’</p>
(ii)	<p>age ;</p> <p>sex / gender ;</p> <p>activity / exercise;</p> <p>pregnancy / lactation ;</p> <p>growth / body building ;</p> <p>ambient temperature / climate / weather ;</p> <p>disease / medical condition / illness ;</p> <p>allergy / food intolerance ;</p> <p>size / body mass / build ;</p>	[max 3]	A weight I height
(b) (i)	horizontal line at 180 mg per 100 cm ³ ;	[1]	A tolerance of half-square up or down
(ii)	60 to 300 minutes <i>Units essential</i>	[1]	A 240 minutes / 4 hours
(iii)	increases after time when glucose is ingested, decreases, but stays below or touches 180 / line from b(i) throughout ;	[1]	
(c)	<p>insulin secreted / produced / released ;</p> <p>by pancreas ;</p> <p>glucose absorbed (by liver / muscles) ;</p> <p>stored as / converted to , glycogen ;</p>	[max 3]	
		[Total:12]	

Question	E Answers	Marks														
2 (a)	<table border="1" data-bbox="427 347 1234 703"> <thead> <tr> <th data-bbox="427 347 1016 400">function</th> <th data-bbox="1016 347 1234 400">letter</th> </tr> </thead> <tbody> <tr> <td data-bbox="427 400 1016 453">peristalsis</td> <td data-bbox="1016 400 1234 453">B</td> </tr> <tr> <td data-bbox="427 453 1016 505">protein digestion</td> <td data-bbox="1016 453 1234 505">C / H / E ;</td> </tr> <tr> <td data-bbox="427 505 1016 558">insulin production</td> <td data-bbox="1016 505 1234 558">D ;</td> </tr> <tr> <td data-bbox="427 558 1016 611">deamination</td> <td data-bbox="1016 558 1234 611">J ;</td> </tr> <tr> <td data-bbox="427 611 1016 663">partially digested food is mixed with bile</td> <td data-bbox="1016 611 1234 663">H ;</td> </tr> <tr> <td data-bbox="427 663 1016 703">most water is reabsorbed</td> <td data-bbox="1016 663 1234 703">E ;</td> </tr> </tbody> </table>	function	letter	peristalsis	B	protein digestion	C / H / E ;	insulin production	D ;	deamination	J ;	partially digested food is mixed with bile	H ;	most water is reabsorbed	E ;	[5]
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(b) (i)	<table border="1" data-bbox="427 805 1025 1066"> <thead> <tr> <th data-bbox="427 805 665 868">large molecule</th> <th data-bbox="665 805 1025 868">nutrients absorbed</th> </tr> </thead> <tbody> <tr> <td data-bbox="427 868 665 936">protein</td> <td data-bbox="665 868 1025 936">acids ;</td> </tr> <tr> <td data-bbox="427 936 665 1005">glycogen</td> <td data-bbox="665 936 1025 1005">/ C₆H₁₂O₆ ;</td> </tr> <tr> <td data-bbox="427 1005 665 1066">fat</td> <td data-bbox="665 1005 1025 1066">fat acids and glycerol ;</td> </tr> </tbody> </table>	large molecule	nutrients absorbed	protein	acids ;	glycogen	/ C ₆ H ₁₂ O ₆ ;	fat	fat acids and glycerol ;	[3]						
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(ii)	calcium / Ca ²⁺ ; iron / Fe ²⁺ ;	[2]														
(iii)	vitamins / named vitamin ;	[1]														

(c)	MP1 platelets ; MP2 promote / cause / stimulate, clotting ; MP3 thrombin / enzyme ; MP4 (converts) fibrinogen to fibrin ; MP5 soluble to insoluble / fibrin is insoluble ; MP6 mesh / network / web, to trap blood (cells) / prevent blood loss ; MP7 forms scab / hardens ; MP8 phagocytes, engulf / destroy / AW, bacteria / pathogens ; MP9 cells divide by mitosis ; MP10 identical cells ; MP11 (tissues form to) make / grow, epidermis / capillary / new skin ;	[max 5]
		[Total: 16]

Question	E Answers	Marks	Additional Guidance
3 (a)	microvilli ;	[1]	
(b)	water ; glucose ; ions ; amino acids ; vitamins ; oxygen ;	[max 3]	
(c) 1 2 3 4 5	(microvilli) give large surface area ; (large surface area) for diffusion ; (large surface area / mitochondria) for active transport ; ref to, carriers / proteins, (in membranes) ; mitochondria, to provide energy ;	[max 2]	
(d)	small intestine / duodenum / ileum ;	[1]	
		[Total: 7]	

Question	Answers	Mark	Additional Guidance
4 (a)	<p>from the top capillary ; epithelium / goblet cell(s) ;</p> <p>lacteal / lymph(atic) vessel / lymph(atic) capillary ;</p>	[3]	<p>ignore blood vessel ignore any qualification of epithelium e.g. ciliated epitheli R lymph unqualified</p>
(b)	<p>1 (contracts to) move villus ; <i>MP 2, 3 and 4 must be linked to the idea of movement</i></p> <p>2 <i>idea that</i> exposes villus to more food / changes surface area ;</p> <p>3 increases / helping / AW, absorption ;</p> <p>4 increase / maintain, diffusion / concentration, gradient ;</p> <p>5 (helps to) empty lacteal / move blood / move lymph ;</p>	[max 2]	<p>A side to side / up and down / waves about R 'push the food along', 'support', 'keeps it in place'</p> <p>A change the shape</p> <p>absorption must be qualified in some way ignore assimilation</p>
(c)	<p><i>either</i> active transport ; A absorption</p> <p>against concentration gradient / uses energy / needs ATP / ref. to carrier molecules / ref. to protein pumps ;</p> <p><i>or</i> respiration ;</p> <p>used for energy / release of energy ; R produce energy</p>	[max 2]	<p><i>one mark for the process and one mark for the explanation</i></p> <p><i>allow idea that the concentrations are the same (initially) so can't be diffusion / must be active transport</i></p>

Question	E answers	Mark	Additional Guidance
4 (d)	<p><i>small intestine</i></p> <p>1 <i>idea that <u>glucose</u>, taken up by cells / moved outside bag ;</i></p> <p>2 <i>lower water potential outside bag ; A ora</i></p> <p>3 <i>water, moves / diffuses, out of bag ;</i></p> <p>4 <i>by osmosis ;</i></p> <p><i>Visking tubing</i></p> <p>5 <i>no difference in, water potential / concentration ;</i></p> <p>6 <i>no (net), osmosis / diffusion of water ; R 'no diffusion'</i></p>	[max 3]	<i>if bag not identified assume 'it' is the small intestine</i>
(e) (i)	stomach ;	[1]	
(ii)	small intestine / ileum / duodenum ;	[1]	
(iii)	<p>1 <i>for breakdown of (large / insoluble) food (molecules) / hydrolysis ;</i></p> <p>2 <i>(used in) <u>chemical digestion</u> ;</i></p> <p>3 <i>solvent / for dissolving, enzymes / named secretion ;</i></p> <p>4 <i>solvent / for dissolving, food ; A named small food molecule(s)</i> <i>could be either soluble components of food or products of digestion</i></p> <p>5 <i>softens food ;</i></p> <p>6 <i>makes it easier to move food (in alimentary canal) / AW ;</i></p> <p>7 <i>makes it easier to, chew / swallow / egest ;</i></p>	[max 3]	<p>A alkali / bile (salts) / named enzyme(s)</p> <p>glucose / sugar / amino acids / fatty acids / glycerol / vitamins / minerals / ions</p> <p>A acts as a lubricant</p>
(iv)	<p><i>prevents</i></p> <p>1 <i>loss of, large volume of / lots of water ;</i></p> <p>2 <i>loss of, ions / salts (in solution) ;</i></p> <p>3 <i>diarrhoea ;</i></p> <p>4 <i>dehydration / ora ;</i></p>	[max 2]	<p>if none of the expected answers accept</p> <p>5 any function of water in the body for max 1</p> <p>e.g. transport / sweating / excretion</p> <p>solvent / medium for reactions / reactant</p> <p>R 'turgidity of cells' / respiration</p>
[Total: 17]			