

Human Nutrition

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Nutrition
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 1

Time Allowed: — 58 minutes —

Score: /48

Percentage: /100

Question		Mark	Guidance
1 (a)	V stomach ; W large intestine / colon / rectum ;	[2]	I intestine unqualified
(b)	breaks up food into small(er) pieces ; without chemical change ; by teeth / muscles ; to mix (with digestive juice) ; increases surface area ; for enzyme action ; speeds up <u>chemical</u> digestion ; easier to swallow ;	[3]	R molecules A without enzymes A mastication / chewing / churning A easier / more effective
(c)	<i>for:</i> positive correlation / as (relative) body mass increases, time in digestive system increases ; any two or more figures from the graph ; <i>against: max 3 from</i> two / one / few / some (species), are outliers / anomalies ; any figure(s) from the graph ; (description of) some mammals do not fit the, pattern / trend ; any example from the graph ; only information about 26 species of mammal / small sample size ; idea about unknown validity ;	[max 4]	units must be quoted at least once e.g. either outlier quot
		[Total: 9]	

Question				Mark	Additional Guidance																		
2 (a) (i)	G oesophagus / esophagus / gullet ; H diaphragm ; M large intestine / large bowel / colon ;			[3]	R intestine unqualified / rectum																		
(ii)	<table><tr><td>function</td><td>name</td><td>letter from Fig. 3.1</td></tr><tr><td>conversion of glucose to glycogen</td><td>liver</td><td>P ;</td></tr><tr><td>secretion of insulin and glucagon</td><td>pancreas</td><td>K</td></tr><tr><td>absorption of products of digestion</td><td>ileum / small intestine</td><td>L ;</td></tr><tr><td>storage of bile</td><td>gall bladder</td><td>O ;</td></tr><tr><td>chemical digestion of protein in an acidic pH</td><td>stomach</td><td>J ;</td></tr></table>	function	name	letter from Fig. 3.1	conversion of glucose to glycogen	liver	P ;	secretion of insulin and glucagon	pancreas	K	absorption of products of digestion	ileum / small intestine	L ;	storage of bile	gall bladder	O ;	chemical digestion of protein in an acidic pH	stomach	J ;				ignore bile duct
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Question		Mark	Additional Guidance									
2 (b) (i)	emulsification / emulsifying (fat) / producing an emulsion ;	[1]	R 'emulsion' unqualified									
(ii)	increases surface area ; for action of, lipase / enzyme(s) ;	[2]	A speeds up, enzyme reaction / breakdown of fat / absorption of fat A makes it easier to absorb									
(c) (i)	<table><tr><td>hormone</td><td>uptake by liver cells</td><td>concentration of glucose in the blood</td></tr><tr><td>insulin</td><td>inc</td><td>decreases ;</td></tr><tr><td>glucagon</td><td>de</td><td>increases / stays the same ;</td></tr></table>	hormone	uptake by liver cells	concentration of glucose in the blood	insulin	inc	decreases ;	glucagon	de	increases / stays the same ;	[2]	one mark per correct row
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(ii)	adrenaline ;	[1]	A epinephrine, cortisol, ACTH, growth hormone, somatostatin, thyroxine, GLP-1, GIP									
(d)	glucose concentration is kept, (near) constant / within narrow limits / AW ; any change (in concentration), is detected / acts as a stimulus ; correct ref to, glucose → glycogen / glycogen → glucose / increasing glucose concentration / decreasing glucose concentration ; <i>idea that it returns concentration to normal ;</i> <i>idea that release of correctly named hormone, stops / switches off ;</i> ref to <u>homeostasis</u> ;	max [3]	R hormones carrying out conversions directly									
		[Total: 16]										

3 (a)	<p>1 <u>peristalsis</u> ;</p> <p>2 circular muscles contract (to push to food) ;</p> <p>3 muscle contraction <u>above</u> food pushes it forward ;</p> <p>4 circular and longitudinal muscles work antagonistically / AW ;</p>	max [2]	
(b) (i)	<p>P – epithelium / epithelial cell ;</p> <p>Q – (blood) capillary ;</p> <p>R – lacteal / lymphatic vessel ;</p>	[3]	<p>Reject <u>ciliated</u> epithelium, epidermis, goblet cell</p> <p>Accept epithelium with brush border</p>
(ii)	hepatic portal (vein) ;	[1]	
(iii)	<p>give a large surface area (of membrane) ;</p> <p>to increase / maximise, absorption ;</p> <p>by diffusion / by active transport ;</p>	max [2]	
(iv)	<p>enzymes / proteases / lipases ;</p> <p>(stomach) acid ;</p> <p>physical damage / AW ;</p> <p>parasites / (named) pathogens / toxins ;</p>	max [2]	
		[Total:10]	

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4 (a)	<p>chemical digestion (max 2)</p> <p>1 ref to breakdown of <u>molecules</u> ;</p> <p>2 breaking bonds ;</p> <p>3 using enzymes ;</p> <p>4 insoluble to soluble ;</p> <p>mechanical digestion (max 2)</p> <p>5 ref to breakdown of, particle / molecule ;</p> <p>6 ref to increase surface area (for chemical digestion) ;</p> <p>7 to, mix /churn ;</p>																				
		[max 3]																			
(b)	<table><tr><th>function</th><th>name of the part</th><th>letter from Fig. 1.1</th></tr><tr><td>produces bile</td><td>liver</td><td>J</td></tr><tr><td>most soluble food is absorbed into the blood</td><td>small intestine / ileum</td><td>E ;</td></tr><tr><td>indigestible food is egested</td><td>anus / anal canal</td><td>F ;</td></tr><tr><td>hydrochloric acid is produced</td><td>stomach</td><td>C ;</td></tr><tr><td>protease, lipase and amylase are produced</td><td>pancreas</td><td>D ;</td></tr></table>	function	name of the part	letter from Fig. 1.1	produces bile	liver	J	most soluble food is absorbed into the blood	small intestine / ileum	E ;	indigestible food is egested	anus / anal canal	F ;	hydrochloric acid is produced	stomach	C ;	protease, lipase and amylase are produced	pancreas	D ;		one mark per correct row
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4 (c)	<ol style="list-style-type: none"> 1 less/no bile, secreted/released ; 2 (so) no/less, bile salts ; 3 enter small intestine/duodenum ; 4 no/less, <u>emulsification</u> of fat ; 5 less/no, increased surface area of fat (globules/AW) 6 for lipase ; 7 slower/harder, digestion ; 	[max 3]	R no digestion
(d)	<ol style="list-style-type: none"> 1 coronary heart disease/CHD/heart attack/cardiac arrest/angina/myocardial infarction ; 2 reduced blood flow/blockage of artery <i>or</i> arteries ; 3 damaged/hardened artery wall/atheroma/atherosclerosis ; 4 (blood) clot/thrombus/thrombosis/(coronary) aneurysm ; 5 causes high blood pressure ; 6 reduced supply of, oxygen/nutrients, to heart tissue/muscle ; 7 muscle respire anaerobically ; 	[max 3]	Ignore cardiovascular disease/CVD A narrowing of artery reduces blood flow
		[Total:13]	