

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 border="1" data-bbox="315 443 1238 1107"> <thead> <tr> <th data-bbox="315 443 636 544">function</th> <th data-bbox="636 443 960 544">name</th> <th data-bbox="960 443 1238 544">letter from Fig. 3.1</th> </tr> </thead> <tbody> <tr> <td data-bbox="315 544 636 676">conversion of glucose to glycogen</td> <td data-bbox="636 544 960 676">liver</td> <td data-bbox="960 544 1238 676">P ;</td> </tr> <tr> <td data-bbox="315 676 636 777">secretion of insulin and glucagon</td> <td data-bbox="636 676 960 777">pancreas</td> <td data-bbox="960 676 1238 777">K</td> </tr> <tr> <td data-bbox="315 777 636 909">absorption of products of digestion</td> <td data-bbox="636 777 960 909">ileum / small intestine</td> <td data-bbox="960 777 1238 909">L ;</td> </tr> <tr> <td data-bbox="315 909 636 1010">storage of bile</td> <td data-bbox="636 909 960 1010">gall bladder</td> <td data-bbox="960 909 1238 1010">O ;</td> </tr> <tr> <td data-bbox="315 1010 636 1107">chemical digestion of protein in an acidic pH</td> <td data-bbox="636 1010 960 1107">stomach</td> <td data-bbox="960 1010 1238 1107">J ;</td> </tr> </tbody> </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 ;	[4]	ignore bile duct
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 ;																					

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 border="1" data-bbox="324 544 1095 874"> <thead> <tr> <th data-bbox="324 544 568 643">hormone</th> <th data-bbox="568 544 792 643">uptake by liver cells</th> <th data-bbox="792 544 1095 643">concentration of glucose in the blood</th> </tr> </thead> <tbody> <tr> <td data-bbox="324 643 568 742">insulin</td> <td data-bbox="568 643 792 742">inc</td> <td data-bbox="792 643 1095 742">decreases ;</td> </tr> <tr> <td data-bbox="324 742 568 874">glucagon</td> <td data-bbox="568 742 792 874">de</td> <td data-bbox="792 742 1095 874">increases / stays the same ;</td> </tr> </tbody> </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
hormone	uptake by liver cells	concentration of glucose in the blood										
insulin	inc	decreases ;										
glucagon	de	increases / stays the same ;										
(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> ; 2 circular muscles contract (to push to food) ; 3 muscle contraction <u>above</u> food pushes it forward ; 4 circular and longitudinal muscles work antagonistically / AW ;</p>	max [2]	
(b) (i)	<p>P – epithelium / epithelial cell ; Q – (blood) capillary ; R – lacteal / lymphatic vessel ;</p>	[3]	<p>Reject <u>ciliated</u> epithelium, epidermis, goblet cell Accept epithelium with brush border</p>
(ii)	hepatic portal (vein) ;	[1]	
(iii)	<p>give a large surface area (of membrane) ; to increase / maximise, absorption ; by diffusion / by active transport ;</p>	max [2]	
(iv)	<p>enzymes / proteases / lipases ; (stomach) acid ; physical damage / AW ; parasites / (named) pathogens / toxins ;</p>	max [2]	
		[Total:10]	

<p>4 (a)</p> <p>1 ref to breakdown of <u>molecules</u> ; 2 breaking bonds ; 3 using enzymes ; 4 insoluble to soluble ;</p> <p><i>mechanical digestion (max 2)</i></p> <p>5 ref to breakdown of, particle / molecule ; 6 ref to increase surface area (for chemical digestion) ; 7 to, mix /churn ;</p>				[max 3]																			
<p>(b)</p>	<table border="1"> <thead> <tr> <th data-bbox="322 619 698 719"><i>function</i></th> <th data-bbox="698 619 1034 719"><i>name of the part</i></th> <th data-bbox="1034 619 1279 719"><i>letter from Fig. 1.1</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="322 719 698 820"><i>produces bile</i></td> <td data-bbox="698 719 1034 820"><i>liver</i></td> <td data-bbox="1034 719 1279 820">J</td> </tr> <tr> <td data-bbox="322 820 698 954"><i>most soluble food is absorbed into the blood</i></td> <td data-bbox="698 820 1034 954">small intestine / ileum</td> <td data-bbox="1034 820 1279 954">E ;</td> </tr> <tr> <td data-bbox="322 954 698 1054"><i>indigestible food is egested</i></td> <td data-bbox="698 954 1034 1054">anus / anal canal</td> <td data-bbox="1034 954 1279 1054">F ;</td> </tr> <tr> <td data-bbox="322 1054 698 1155"><i>hydrochloric acid is produced</i></td> <td data-bbox="698 1054 1034 1155">stomach</td> <td data-bbox="1034 1054 1279 1155">C ;</td> </tr> <tr> <td data-bbox="322 1155 698 1289"><i>protease, lipase and amylase are produced</i></td> <td data-bbox="698 1155 1034 1289">pancreas</td> <td data-bbox="1034 1155 1279 1289">D ;</td> </tr> </tbody> </table>			<i>function</i>	<i>name of the part</i>	<i>letter from Fig. 1.1</i>	<i>produces bile</i>	<i>liver</i>	J	<i>most soluble food is absorbed into the blood</i>	small intestine / ileum	E ;	<i>indigestible food is egested</i>	anus / anal canal	F ;	<i>hydrochloric acid is produced</i>	stomach	C ;	<i>protease, lipase and amylase are produced</i>	pancreas	D ;	[4]	one mark per correct row
<i>function</i>	<i>name of the part</i>	<i>letter from Fig. 1.1</i>																					
<i>produces bile</i>	<i>liver</i>	J																					
<i>most soluble food is absorbed into the blood</i>	small intestine / ileum	E ;																					
<i>indigestible food is egested</i>	anus / anal canal	F ;																					
<i>hydrochloric acid is produced</i>	stomach	C ;																					
<i>protease, lipase and amylase are produced</i>	pancreas	D ;																					

<p>4 (c)</p>	<p>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 ;</p>	<p>[max 3]</p>	<p>R no digestion</p>
<p>(d)</p>	<p>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 ;</p>	<p>[max 3]</p>	<p>Ignore cardiovascular disease/CVD A narrowing of artery reduces blood flow</p>
		<p>[Total:13]</p>	