01. 0610_m20_MS_42 Q: 4

	Answer	Mark	Partial Marks
(a)	*similarities, max 3 from:* both caused by protein (energy) deficiency ; both types of malnutrition / deficiency disease / caused by lack of a balanced diet ; primarily affects children ; diarrhoea ; low body mass / weight loss ; poor growth ; irritability / tiredness ; wastage of muscles ; dry skin / brittle nails ; brittle hair / change of hair colour ; fatty liver ; anaemia ; AVP ; *differences:* kwashiorkor has water retention / oedema / swelling of body parts / pot belly ; people suffering marasmus **also** deficient in, carbohydrates / fats / calories / energy ; AVP ;	4	
(b)(i)	18 (%) ;;;	3	MP1 selection of correct data i.e. 1419 and 1161 MP2 correct calculation MP3 correct rounding to whole number
(b)(ii)	any year between 1990 and 1994 or from 2000 onwards ; the number of children admitted to hospital decreases (after this year) ;	2	
(b)(iii)	**1** (described) hygienic food prep methods ; **2** washing hands / hand sanitisers ; **3** (description of use of) clean equipment ; **4** use of clean / boiled water / filtered water / pure water ; **5** (described examples of) disposal of waste correctly / *idea of* where defaecation occurs / defaecation in a toilet ; **6** monitor or identify infective individuals; **7** isolate infected individuals ; **8** AVP ;	3	

02. 0610_s16_MS_43 Q: 6

	Answer	Mark	Partial Marks
(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 chemical digestion ; easier to swallow ;	[3]	**R** molecules **A** without enzymes **A** mastication / chewing / churning **A** easier / more effective
(c)	*for:* positive correlation / as (relative) body mass increases, time in digestive system increases ; any two or more figures from the graph ; *against: max 3 from* 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 quoted
		[Total: 9]	

AceIGCSE Perfection, Crafted With Passion

03. 0610_s19_MS_43 Q: 6

	Answer	Mark	Partial Marks
(a)(i)	stores / contains, DNA / chromosomes / genes ; controls the cell ; AVP ;	1	
(a)(ii)	**P** – endoplasmic reticulum / (rough) ER / ribosome ; **R** – mitochondrion / mitochondria ;	2	
(b)	catalysts ; starch ; maltose / glucose ; pepsin ; liver ; neutralises ; emulsification ;	7	

---

04. 0610_m18_MS_42 Q: 6

	Answer	Mark	Partial Marks
(a)	breakdown of large to small molecules ; from insoluble to soluble ;	2	
(b)(i)	*test-tube 1* **1** (less cloudy), slower break down of egg white solution / protein ; **2** (no HCl so) pH of the solution is too high ; **ora** **3** high pH denatures pepsin / enzyme ; *test-tube 2* **4** hydrochloric acid causes a low pH ; **5** pepsin works best in / optimal activity, low pH / acidic conditions ; *test-tube 3* **6** pepsin / enzyme, unable to break down, protein / egg white solution ; **7** boiling denatures, pepsin / enzyme ; **8** ref to enzyme-substrate complex / fewer successful collisions ; **9** high pH / boiling, changes shape of active site ;	5	
(b)(ii)	as a control ; to show that pepsin is responsible for the protein digestion ; to show that hydrochloric acid does not digest the protein ;	2	
(b)(iii)	stomach ;	1	
(c)	maltose broken down ; to glucose ; on the membranes of the epithelial lining ; (acts) in the small intestine / duodenum ;	3	

AceIGCSE
Paper Perfection,Crafted With Passion

---

05. 0610_s18_MS_41 Q: 1

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)</td><td>A substrate ;
B active site ;
C enzyme-substrate complex ;
D product(s) ;</td><td>4</td><td></td></tr>
<tr><td>(b)</td><td>production of, small(er) / soluble / simple(r), <u>molecules</u> ;

(small molecules can be) absorbed / ref. to absorption ; ora

(moves through) cell membranes / wall of intestine / into blood / into cells ;</td><td>2</td><td></td></tr>
<tr><td>(c)</td><td>
<table>
<tr><th>function</th><th>letter from Fig. 2.1</th><th>name of structure</th></tr>
<tr><td>site of starch digestion</td><td>A
J / E</td><td>mouth / buccal cavity
small intestine</td></tr>
<tr><td>reabsorption of water</td><td>J / E
H
F</td><td>small intestine
colon / large intestine
rectum</td></tr>
<tr><td>secretion of pepsin</td><td>C</td><td>stomach</td></tr>
<tr><td>site of maltose digestion</td><td>J / E</td><td>small intestine</td></tr>
<tr><td>secretion of bile</td><td>K
L</td><td>liver
gall bladder</td></tr>
<tr><td>storage of faeces</td><td>F</td><td>rectum</td></tr>
<tr><td>secretion of lipase and trypsin</td><td>D</td><td>pancreas</td></tr>
</table>
;;;;;;
</td><td>6</td><td>one mark per row
the letter must agree with the name
if more than one letter or name mark first one only

A J/E small intestine</td></tr>
</table>

---

06. 0610_s18_MS_43 Q: 1

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)</td><td>(food) is broken down into smaller pieces (without chemical change) ;

sites of mechanical digestion:
mouth / buccal cavity (in context mechanical) ;
stomach (in context of mechanical) ;

chewing / mastication ;
role of a named teeth ;;
ref to involvement of tongue ;
ref to movement of the jaw ;
churning / muscular, action of the stomach ;</td><td>4</td><td></td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>part of the alimentary canal</th><th>enzyme</th><th>substrate</th><th>product(s)</th></tr>
<tr><td>mouth</td><td>amylase</td><td>starch</td><td>maltose</td></tr>
<tr><td>stomach</td><td>pepsin</td><td>protein</td><td>peptides</td></tr>
<tr><td>small intestine / duodenum / ileum</td><td>lipase</td><td>fat</td><td>fatty acids and glycerol</td></tr>
</table>
;;;
</td><td>3</td><td>one mark per row

A protease (for enzyme)

R pancreas (for part of the alimentary canal)</td></tr>
<tr><td>(c)(i)</td><td><u>glycogen</u> ;</td><td>1</td><td></td></tr>
<tr><td>(c)(ii)</td><td><u>antibody</u> ;</td><td>1</td><td></td></tr>
<tr><td>(c)(iii)</td><td>(thermal) insulation ;</td><td>1</td><td>A storage / protection</td></tr>
</table>

AceIGCSE
Perfection Crafted With Passion

07. 0610_s17_MS_42 Q: 4

	Answer	Mark	Partial Marks
(a)	**1** all, nutrients / components ; **2** nutrients in correct, proportions / amounts ; **3** at least three named 'components' ; **4** to maintain health ; **5** appropriate energy requirements / AW ; **6** different requirements according to, age / sex / lifestyle / pregnancy ;	3	**A** prevent (named) deficiencies
(b)	**1** lack of growth / low body weight / weight loss ; **2** (described) effect on, hair / skin / nails ; **3** diarrhoea / vomiting ; **4** fatigue ; **5** muscle wasting ; **6** (more) prone to, infections / disease ;	3	**A** dehydration **A** irritable / dizzy / weak / AW **A** muscle weakness **A** wounds heal slowly
(c)	*description* **1** marasmus child lower mass than healthy child, initially / AW ; **2** initial (rapid) increase in mass of child with marasmus ; **3** then trend almost follows increase of healthy children ; **4** later / AW, marasmus child is similar to / heavier than, healthy child ; **5** comparative data in children's mass with units stated at least once ; **6&7&8** comparative data of milk with units stated at least once ;;; *explanation* **9** protein required for, new cells / muscle / repair ; **10** carbohydrates / fats, required for, energy / respiration ; **11** fats required for, insulation / cell membranes / protecting organs / neurones ; **12** treatment for marasmus / AW, has more, (named) nutrients / energy ; **13** marasmus child encouraged to drink as much as possible ; **14** nutrients are required (for children) for, growth ;	6	**MP 4 A** masses of both children crossover / are the same at 16.6 months **MP 4 A** any stated time after 16.5 months
(d)	**1** emulsification ; **2** increased surface area of fats ; **3** for lipase ; **4** neutralises (stomach) acid / chyme / provide suitable pH (for lipase) ; **5** speeds up digestion (of fats) ;	3	**A** description **A** makes chyme alkaline / AW

---

08. 0610_w16_MS_41 Q: 3

	Answer	Mark	Partial Marks
(a)(i)	amino acids;	1	
(a)(ii)	stomach;	1	
(b)(i)	ref. to surface area; affecting enzyme / enzyme activity; allows comparison; make experiment valid; controlled variable;	2	
(b)(ii)	water-bath / in a beaker of water / incubator; insulate test-tube; allow solutions to equilibrate to temperature (before experiment); use a thermometer to check the temperature (is constant);	2	
(c)	(pH) 8 ± 1;	1	
(d)	enzymes are protein; enzymes can be reused / are unchanged in the reaction; enzymes are specific; (enzymes are)catalysts / speeds up reaction; lowers the energy needed for the reaction; successful collisions / enzyme-substrate complex / ESC; active site; (enzyme and substrate) fit together; complementary shape; (digestive enzymes perform) chemical digestion / hydrolysis / catabolic reactions; break down, large / insoluble, molecules into, small / soluble, molecules; amylase converts starch to sugars / maltose; lipase converts lipid / fats, to fatty acids and glycerol; maltase converts maltose to simple sugars / glucose; ref to pH; ref to denaturation;	6	
		Total: 13	

AceIGCSE
Paper Perfection, Crafted With Passion

09. 0610_w16_MS_42 Q: 1

	Answer	Mark	Partial Marks
(a)	*protein to max 1* for growth / making new cells / repair / replacement (of tissues) / making (named) tissue; provides amino acids (for making protein); *lactose* (provides) energy / (glucose for) respiration; *calcium to max 1* (strengthening) bones / teeth; needed for vitamin D to function; blood clotting; for muscle contraction; for nerve impulse conduction;	3	**R** 'produces energy' **I** ref. to deficiency diseases – not a role
(b)	1 enzymes are, biological / protein, catalysts / speed up reactions; 2 ref to specificity; 3 active site; 4 substrate / protein, fits into / AW, enzyme / active site; 5 ref to, complementary shape of molecules; 6 enzyme-substrate complex / ESC; 7 enzymes, lower energy needed for reaction; 8 enzymes are, unchanged (at end of reaction) / reused; 9 (enzymes) carry out, chemical digestion / hydrolysis / catabolic reactions; 10 break down, large / insoluble, molecules into, small(er) / soluble, molecules; 11 protein broken down to, polypeptides / peptides / amino acids; 12 pepsin, active in stomach; 13 trypsin, active in, small intestine / duodenum / ileum; *ref. to conditions in alimentary canal* 14 low pH / pH 1–3 / (hydrochloric) acid, in stomach; 15 high pH / alkaline / neutral / non-acidic / pH 7–9, in, small intestine / duodenum / ileum; 16 ref. to denaturation; 17 temperature is 37 °C; 18 ref. to successful collisions;	6	**A** lower activation energy **A** gastric juice **I** rennin **A** ± 1 °C
(c)(i)	no enzyme to, digest / break down, lactose; lactose (molecule) is (too) large / complex; cannot pass through, (cell) membrane(s); no carrier protein for it ;	2	**A** no lactase / not enough enzyme **A** not broken down to small(er) molecules
(c)(ii)	1 dehydration / loss of water; 2 loss of, (named) salt(s) / ions / minerals / vitamins; 3 decrease in, volume of blood / blood pressure; 4 increase in blood concentration / decrease in water potential; 5 any effect on cells ; 6 AVP; e.g. less efficient reactions / slower metabolism / kidney failure / ref to effect on brain cells / coma / death	3	**I** fatigue / weakness / weight loss / headache / deficiency disease / dizziness / AW **A** loss / poor absorption, of nutrients / malnutrition **I** 'food' **A** volume of plasma e.g. cell shrinkage / loss of water from cells by osmosis mp6 **A** *idea that* less water as a solvent **R** no solvent
(d)(i)	control; for comparison (with different treatments) / to see if there is any difference between effects of treated milk and untreated milk;	2	**I** 'fair test'
(d)(ii)	(lactase) digests / breaks down, lactose; molecules, are small enough to be absorbed / do not pass straight through, small intestine / AW; reduces chance of diarrhoea / means lactose intolerant people can consume milk / AW;	2	
(d)(iii)	(concentration / amount of) hydrogen is the lowest / least; **ora** concentration / amount, of hydrogen, shows small, fluctuations / changes / AW; (concentration / amount) not higher than 15 (±1) ppm / between 9 – 15 (±1) ppm; comparative data quote between D and A, B or C;	3	*units – h and ppm must be used at least once* *if no units then don't award MP3 and MP4* mp1 must be comparative
		Total: 21	

AceIGCSE
Pure Perfection, Crafted With Passion

10. 0610_p20_MS_40 Q: 6

(a) **A** epithelium / epithelial lining;

B lacteal;

C capillary / blood vessel; [3]

(b) Any three from:

microvilli

increases / large surface area;

for absorption;

allow: diffusion / active transport (into villus)

mitochondria

(for) respiration;

provide energy / ATP;

for active uptake / transport; [max 3]

AceIGCSE
Paper Perfection,Crafted With Passion

11. 0610_w19_MS_43 Q: 3

	Answer	Mark	Partial Marks
(a)	**1** ingestion / digestion / described, occurs in mouth ; **2** chemical digestion / absorption / described, occurs in small intestine / duodenum / ileum ; *ingestion of large biological molecules* **3** mechanical / physical, digestion / breaking, carbohydrate / food, into small pieces ; **4** *ref to* chew / grind / bite / by teeth / tongue / swallow / moves through oesophagus / churned in stomach ; *chemical digestion* **5** breakdown insoluble molecules into (smaller) soluble molecules ; **6** salivary (glands) / pancreas, secrete amylase ; **7** amylase breaks down, starch, to, maltose / glucose / sugar ; **8** maltase is on epithelium of the, small intestine / duodenum / ileum ; **9** maltase breaks down maltose to glucose ; **10** bile neutralizes (stomach) acid ; **11** *ref to* neutral / 7 / 8 pH for, amylase / maltase ; *absorption into the blood via the alimentary canal* **12** by diffusion / active transport, into villi / microvilli / capillaries ; **13** microvilli / villi / folds, increase the surface area (for absorption) ; *increased blood glucose concentration* **14** insulin, secreted / produced / AW, from pancreas ; **15** insulin reduces blood glucose concentration ; **16** *ref to* negative feedback / homeostasis / described ;	**8**	
(a)	*assimilation in the liver* **17** glucose, stored as / converted to, glycogen (in liver) ; **18** (assimilated) into, cell / tissues to become part of cell / *ref. to* respiration / for release of energy ;		

(b)	*calcium ion:*
	for (the formation / maintenance, of healthy / strong) bones ;
	for (the formation / maintenance, of healthy / strong) teeth ;
	AVP ;;
	
	iron ions:
	found in / AW, haemoglobin (molecule) / red blood cell ;
	transport oxygen ;
	prevent anaemia ;
		4	

(c)(i)	stress ; smoking ; genetic predisposition / family history ; age ; sex ; activity level / AW ; any pre-existing medical conditions / AW ; alcohol / drug / medication ; obesity / weight / mass / BMI / AW ;	**2**	
(c)(ii)	(excess) salt is, excreted / removed from body (in urine) ; some salt is (re)absorbed in the, kidney / tubules / into the blood ; people are not reliable in recording / remembering / measuring how much salt they eat ;	**2**	
(d)(i)	(reduce) fat / cholesterol ; (increase) fibre / roughage ; (increase) water ;	**1**	
(d)(ii)	low = 16.8 (kPa) **and** high = 17.7 (kPa) ; 5(%) ;;	**3**	
(d)(iii)	low salt diets reduce (systolic) blood pressure / risk of CHD ; **ora** modified diets / group 2, reduce (systolic) blood pressure / risk of CHD ; **ora** any description of an interaction between the salt diet and modified diets together affecting the, blood pressure / risk of CHD ; comparative data quote with units ;	**3**	

AceIGCSE
Paper Perfection,Crafted With Passion

12. 0610_m17_MS_42 Q: 6

	Answer	Mark	Partial Marks
(a)	<table><tr><td>enzyme</td><td>substrate</td><td>product/s</td><td>location of enzyme production</td><td></td></tr><tr><td>(salivary) amylase</td><td>starch</td><td>maltose</td><td>salivary glands</td><td>;</td></tr><tr><td>maltase</td><td>maltose</td><td>glucose</td><td>small intestinal wall</td><td>;</td></tr><tr><td>pepsin</td><td>protein</td><td>amino acids</td><td>stomach (wall)</td><td>;</td></tr><tr><td>trypsin</td><td>protein</td><td>amino acids</td><td>small intestinal (wall)</td><td>;</td></tr><tr><td>lipase</td><td>fats</td><td>fatty acids and glycerol</td><td>pancreas/small intestinal wall</td><td>;</td></tr></table>	5	**A** polypeptides for protein **A** peptides for protein
(b)	emulsification ; increased surface area of fat globules ; faster, digestion/break down of fat by enzymes ; by lipase/to fatty acids and glycerol ; neutralises (stomach) acid ;	3	
(c)	the movement of small food molecules and ions ; through the wall of the intestine ; into the blood ;	3	
(d)	marasmus/kwashiorkor ;	1	
(e)	reduces, calorie/energy intake ; reduces obesity ; reduces chances of CHD ; AVP ;;	3	

AceIGCSE
Paper Perfection,Crafted With Passion

13. 0610_w17_MS_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	absorption (of digested food / water) / movement of (small) molecules (from small intestine) into blood ;	1	
(b)	1 goblet cells labelled **P** ; 2 shaped described / produces mucus ; 3 lacteal / lymph vessel / lymphatic vessel, labelled **Q** ; 4 description / transports fatty acids / fats; 5 capillaries / blood vessel, labelled **R** ; 6 thin / one cell thick, walls / carries products of digestion ; 7 microvilli / epithelia labelled **S** ; 8 *for microvilli accept* – large surface area / thin, for diffusion / absorption ;	4	
(c)(i)	watery faeces / AW ; dehydration / described ; loss of, salts / ions / electrolytes ; cramps / stomach pain ; death ;	2	**A** water not absorbed from faeces **I** nutrients
(c)(ii)	oral rehydration therapy ;	1	**A** antibiotics
(d)(i)	(blood) plasma ;	1	
(d)(ii)	assimilation ;	1	
(d)(iii)	protein ; named proteins ;;	2	**A** (poly)peptides e.g. (named) enzymes, antibodies, insulin, fibrinogen, haemoglobin, glucagon **I** hormones

AceIGCSE
Paper Perfection,Crafted With Passion

14. 0610_m16_MS_42 Q: 5

	Answer	Mark	Partial Marks
(a)	*canine* piercing / tearing the food ; *molar* chewing / grinding the food ;	[2]	**A** ripping / pulling **I** cutting / biting
(b) (i)	1 tiger has more pointed incisors / rabbit has less pointed incisors ; 2 tiger has canines / rabbit has no canines ; 3 tiger has jagged, premolars / molars ; 4 tiger has fewer molars / rabbits have more molars ; 5 rabbit has a diastema / (larger) gap between incisors and pre molars ;	[max 2]	**mpt 1 I** flat **mpt 1 A** chisel / wedge- shaped **mpt 2 I** tiger has more canines **mpt 3 A** rabbits have flat, premolar / molars **A** tigers have no, diastema / smaller gap between incisors and pre molars **I** ref to size (photo are not to scale)
(ii)	canines ; jagged, premolars / molars ; eyes positioned at the front of the skull ; pointed ridge / crest, on skull ;	[1]	**I** ref to incisors **A** carnassial / sharp for jagged **I** ref to absence of diastema
(c) (i)	12 / 44 × 100 27 ;;	[2]	
(ii)	*arguments for carnivore:* **1** has same number of incisors as, other carnivores / 5 / 6 ; **2** has same number of canines as, other carnivores 5 / 6 ; **3** has same number of molars as, 6 / a carnivore ; *arguments against carnivore:* **4** same number of premolars as, herbivores / 3 / 4; **5** 1 / 2 / 3 / some herbivores / omnivores, also have 12 incisors ; **6** 1 / 2 / 3 / some herbivores / omnivores, also have 4 canines ;	[max 4]	
(d)	**1** denatures enzymes in microorganisms ; **2** kills, microorganisms / (named) pathogens ; **3** optimum pH for pepsin activity ; **4** proteins are digested / broken down, to (poly)peptides / amino acids ;	[max 3]	**R** kills enzymes **R** denatures
(e)	**1** villi lining / epithelium, only one cell thick / thin ; **2** good blood supply / many capillaries ; **3** microvilli ; **4** large surface area ; **5** lacteal for fats / fatty acid, absorption ; **6** protein channels ; **7** mitochondria for active transport ;	[max 3]	**I** villi is 1 cell thick
(f)	1 weight loss / poor growth / lack of energy / stomach pain / abdominal pain / cramps / diarrhoea / weaker immune system ; 2 malnutrition / deficiency disease ; 3,4 named, nutrient deficiency / effect, with deficient nutrient ;;; &5 e.g. anaemia → iron / vitamin B12 kwashiorkor → protein ; marasmus → all nutrients scurvy → vitamin C night blindness →vitamin A / retinol	[max 3]	**I** weak / sluggish
		[Total: 20]	

AceIGCSE
Paper Perfection, Crafted With Passion

15. 0610_p16_MS_40 Q: 6

(a) **A** epithelium / epithelial lining;

B lacteal;

C capillary / blood vessel; [3]

(b) Any three from:

microvilli

increases / large surface area;

for absorption;

allow: diffusion / active transport (into villus)

mitochondria

(for) respiration;

provide energy / ATP;

for active uptake / transport; [max 3]

---

16. 0610_w16_MS_43 Q: 3

	Answer	Mark	Partial Marks
(a)	human / largest mammal, has the longest / bat has the shortest (small intestine); (small intestine of) rat and cat are very similar in length; comparative data, quote / calculation with units at least once; negative correlation between length and length relative to body mass;	3	**A** relative to body mass bat much larger than other three animals / smallest length relative to body mass is in humans
(b)	movement into / out of / through, (epithelial) cells / villi; into, capillaries; across cell membranes; by active transport; through protein carriers; against a concentration gradient; using energy;	3	**I** walls **I** into blood
(c)(i)	(insect-eating) bat;	1	
(c)(ii)	ratios are higher in the duodenum; higher (inner) surface area (than ileum); data comparison (for any one animal); more villi; more microvilli;	3	
(d)	emulsification; increased surface area of fat (globules); faster, digestion / break down (of fat by enzymes); by lipase / to fatty acids and glycerol; neutralises (stomach) acid / chyme; provides alkaline medium for, pancreatic enzymes / lipase; denatures, pepsin / stomach, enzymes; AVP;	4	**I** faster break down of fats unqualified
		Total: 14	

AceIGCSE
Paper Perfection, Crafted With Passion