Mark Scheme

Question 1:

Question Number	Answer	Mark
(a)	A oesophagus / gullet (1) B stomach (1) C small intestine / ileum / duodenum / jejunum (1) D large intestine / colon / eq (1)	**4**

Question Number	Answer	additional guidance	Mark
(b)	An explanation that makes reference to three of the following: • (plants contain) cellulose (1) • digested by cellulase / enzyme (1) • into <u>glucose</u> (1) • energy released / respiration / eq (1)	 allow broken down by cellulase converse for no cellulase energy not released / energy lost in feaces / eq	**3**

Question Number	Answer	Mark
(c)(i)	• humans do not digest cellulose / do not eat only plant material / omnivores / eat fewer / less plants / vegetables / eq (1)	**1**

Question Number	Answer	additional guidance	Mark
(c)(ii)	An answer that makes reference to two the following: • removes <u>useful</u> bacteria / fewer / no useful bacteria / eq (1) • reduces competition / eq (1) • pathogenic bacteria increase / survive / multiply / grow / more harmful bacteria / eq (1)	not just appendix contains useful bacteria as this is in stem allow toxic / bad / eq to harmful bacteria	**2**

Question 2:

Question Number	Answer	Mark
(a)(i)	The only correct answer is B (carbon, hydrogen, and oxygen only) A is incorrect because carbohydrates also contain oxygen C is incorrect because carbohydrates do not contain nitrogen D is incorrect because carbohydrates do not contain nitrogen	**1**

Question Number	Answer	Additional guidance	Mark
(a)(ii)	A description that makes reference to two of: • add biuret solution (1) • lilac / purple / pink colour (1)	**Allow** potassium / sodium hydroxide and copper sulfate other tests for protein **Allow** correct use of clinistix /uristix xanthoproteic test / ninhydrin with correct answer for two marks	**2**

Question Number	Answer	Additional guidance	Mark
(b)(i)	• 1254(.4) / 1250 / 1300 (g) (2)	One mark for 5.6 **or** × 224 **or** 1400 ÷ 250 Correct answer with no working gains full marks	**2**

Question Number	Answer	Additional guidance	Mark
(b)(ii)	An answer that makes reference to five of the following points: • rice has less **protein** (than cow's milk) (1) • lack of protein / rice, could lead to less growth / repair / eq (1) • soy / rice has **less fat** than cow's milk / soy has more fat than rice / eq (1) • soy / rice has **less energy** (than cow's milk) / rice has more energy than soy / soy has less energy than rice / eq (1)	**Allow** soy has more protein / same protein (as cow's milk) / eq **Allow** converse for soy **Allow** rice could cause kwashiorkor / marasmus **Allow** soy / rice does not have enough fat **Allow** soy / rice do not have enough energy	**5**

	• soy has **less carbohydrate** (than cow's milk) / rice has more carbohydrate than soy / rice has more carbohydrate (than cow's milk) / eq (1) • (less energy means) children may be less active / respire less / get tired easily / eq (1)	**Allow** rice has too much carbohydrate	
	• rice has very little / less / not enough calcium (1)	**Allow** converse for soy	
	• lack of calcium / rice, could lead to rickets / weak bones teeth / eq (1)	**Allow** converse for soy	
	• (overall) soy is closer to cow's milk compared with rice / soy is a better substitute than rice / eq (1)	**Allow** soy is a suitable replacement	
			(Total for Question = 10 marks)

Question 3:

Question Number	Answer	Additional guidance	Mark
(a)(i)	C (X and Z) is the only correct answer A is incorrect because the pancreas also produces amylase B is incorrect because the stomach does not produce amylase D is incorrect because the stomach does not produce amylase		**1**

Question Number	Answer	Additional guidance	Mark
(a)(ii)	<table><tr><th>Enzyme</th><th>Molecule</th><th>Product</th></tr><tr><td>amylase</td><td>starch</td><td>maltose</td></tr><tr><td>lipase</td><td>lipid</td><td>fatty acids / glycerol</td></tr><tr><td>protease</td><td>protein</td><td>amino acids / (poly)peptide</td></tr></table> one mark for each correct row (3)		**3**

Question Number	Answer	Additional guidance	Mark
(b)(i)	• calculate mass of lentils that has 1 g of protein 100 ÷ 25 = 4 g of lentils has 1 g of protein • scale up to 46 g of protein 46 x 4 **184 (2)**	184 = **two marks** **one mark** for ÷ 25 or ×4	**2**

Question Number	Answer	Additional guidance	Mark
(b)(ii)	An answer that makes reference to five of the following: • excess energy may lead to obesity / eq (1) • (excess energy / obesity) increases risk of diabetes / joint damage / heart disease / eq (1) • enough protein / protein is same as RDA, so growth should be normal (rate) / eq (1) • enough vitamin A / vitamin A is same as RDA so no risk of night blindness / eye problems / vision is normal / eq (1) • vitamin C is low so may be at risk of scurvy / eq (1) • calcium is too low so may be at risk of rickets / osteoporosis / eq (1) • enough iron / iron is same as RDA so no risk of anaemia / can make red blood cells / haemoglobin / no problems carrying oxygen (1) • fibre is low so risk of constipation / can't egest / release faeces / eq (1) • data does not list other named dietary components / eq (1)	**max three** for effects with no link to RDA e.g. they will become obese **Allow** puts weight on / get fat **Allow** can build muscle / can grow **Allow** more risk of gums bleeding / connective tissue problems / collagen /have healthy skin **Ignore** waste unqualified	**5**

	• no mention of activity levels / sex / age / pregnancy / eq of person (1)	**max three** for descriptions of functions of dietary components with no ref to deficiency e.g. vitamin C is for healthy skin	

Question Number	Answer	Additional guidance	Mark
(b)(iii)	An answer that makes reference to two of the following: • activity / exercise / active lifestyle / sport / job (may affect energy need) / eq (1) • pregnancy (may affect energy need) (1) • different metabolic rate (1) • age (may affect energy need) (1) • sex (may affect energy need) (1) • body mass / weight / (may affect energy need) (1)	**Ignore** size	**2**

Question 4:

Question Number	Answer	additional guidance	Mark
(a)	A description that makes reference to the following points: • iodine (1) • blue black / blue / black /eq (1)	 allow purple	**2**

Question Number	Answer	Mark
(b)(i)	The only correct answer is B fungus A is not correct because it is not a bacterium C is not correct because it is not a protoctist D is not correct because it is not a virus	**1**

Question Number	Answer	Mark
(b)(ii)	The only correct answer is A amylase B is not correct because it is not digested by ligase C is not correct because it is not digested by lipase D is not correct because it is not digested by protease	**1**
		Total 4 marks

Question 5:

Question Number	Answer	Mark
3(a)(i)	The only correct answer is B A is not correct as it does not produce hydrochloric acid C is not correct as it does not produce hydrochloric acid D is not correct as it does not produce hydrochloric acid	**1**

Question Number	Answer	Mark
3(a)(ii)	The only correct answer is D A is not correct as it does not store faeces B is not correct as it does not store faeces C is not correct as it does not store faeces	**1**

	Answer	Mark
3(b)	An explanation that makes reference to two of the following points: • neutralises acid / eq (1) • optimal pH for enzymes / lipase eq (1) • emulsifies lipid / eq (1) • breaks down (large droplets) into small droplets / eq (1) • increases surface area for enzyme action /eq (1)	**3**

Question Number	Answer	Mark
3(c)(i)	An explanation that makes reference to four of the following points: • large surface area (1) • microvilli (1) • capillaries / blood supply to maintain concentration gradient / diffusion gradient (1) • absorb digested food / molecules / vitamins / minerals / correct named molecule / eq (1) • lacteal to absorb fats / correct vitamin / transport fats / eq (1) • thin wall / one cell thick / capillaries close to surface (1) • so short diffusion path / rapid diffusion / rapid active transport (1)	**4**

Question 6:

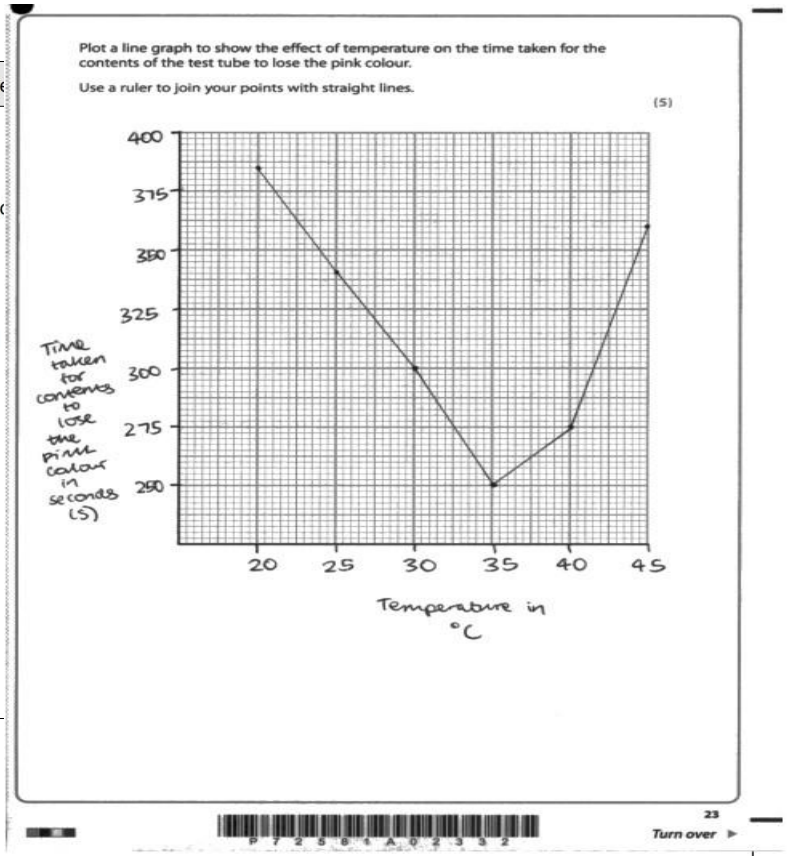
Question Number	Answer	Additional guidance	Mark
7(a)	• so that enzyme / substrate / test tube / beaker / solutions are at / reach correct temperature / same temperature / 20^{O}C / eq (1)	ignore reach optimum temperature / keep temperature constant	**1**

Question Number	Answer	Mark
7(b)(i)	• time taken (to lose pink colour / change colour for milk / lipid to be digested) / rate of reaction / digestion / eq (1)	**1**

Question Number	Answer	Mark
7(b)(ii)	• volume of lipase / volume of milk / volume of sodium carbonate / time left in water bath (in stages 6 and 7) / volume / number of drops of phenolphthalein / eq (1)	**1**

Question Number	Answer	Mark
7(c)	• to show all lipid digested / milk digested/ show fatty acids produced/ to show end (point) of reaction / show (changes in) pH / eq (1)	**1**

Question Number	Answer	Additional guidance
7 (d)	An answer that includes • graph plot covering at least 2.5 large squares for height and scale linear (1) • Lines straight and through all points (1) • Axes correct way round (temp x and time y) (1) • Units labelled with temperature in °C and time in seconds / s (1) • Points correctly plotted within half a small square (1)	allow full or truncated axis No L if extrapolated No L if bar chart even if unlabelled



Question Number	Answer	Additional guidance	Mark
7(e)	An explanation that makes reference to four of the following		**4**
	• increased (kinetic) energy / molecules move faster/ more collisions / more enzyme substrate complexes formed / eq (1)	allow low energy at low temp	
	• so time (to lose pink colour) decreases (1)	allow rate increases / reaction quicker / allow slow rate at lower temp / lipase digests lipid quicker	
	• (up to/ till) <u>optimum temperature</u> / eq (1)		
	• (time increases as) bonds in active site break / enzymes denature / eq (1)		
	• (enzyme) active site changes shape / substrate can no longer fit / bind with enzyme / active site / eq (1)	allow enzyme and substrate no longer complementary	

Total 13 marks