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)	provides, sufficient energy / energy for needs ; provides, molecules / materials, for metabolism / equivalent ; provides, nutrients / named nutrients i.e. CPFVM H_2O fibre ; in correct / right, quantities / proportions / amounts ;	[max 3]	**A** substances fibre – accept roughage and non-starch polysaccharide. **A** minimum of any three named nutrients **A** contains (all the) food, groups / types / classes **R** 'substances' **A** adequate / sufficient **R** 'equal'
(ii)	age ; sex / gender ; activity / exercise; pregnancy / lactation ; growth / body building ; ambient temperature / climate / weather ; disease / medical condition / illness ; allergy / food intolerance ; size / body mass / build ;	[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 *Units essential*	[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)	insulin secreted / produced / released ; by pancreas ; glucose absorbed (by liver / muscles) ; stored as / converted to , glycogen ;	[max 3]	
		[Total:12]	

Question	E Answers	Marks
2 (a)		[5]

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 ;**

Question	E Answers	Marks
(b) (i)		[3]

large molecule	nutrients absorbed
protein	acids ;
glycogen	/ $C_6H_{12}O_6$;
fat	fat acids **and** glycerol ;

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

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