

7. Human nutrition

7.1 Diet

Paper 3 and 4

Marking Scheme

Q1.

(c)	(vitamin) D ;	1	
(d)	<i>calcium</i> : for, bones / teeth ; <i>iron</i> : for, haemoglobin / red blood cells ;	2	
(e)	<i>any two from</i> : (named) carbohydrate ; water ; fibre / roughage ;	2	

Q2.

(a)(i)	cheese ;	1	R each additional circle
(a)(ii)	As age increases the recommended daily intake of calcium increases, then decreases and then increases again. ; The recommended daily intake of calcium doubles from ages 0–3 to ages 19–50. ;	2	3rd box and 4th box from top R each additional tick
(a)(iii)	calcium is needed for (strong) bones / teeth ; (more) calcium is needed, when growing / for development / pregnancy / preventing rickets / prevents osteoporosis / maintaining bone density / AW ;	2	
(b)	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex: 1;"> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 5px;">Rickets</div> <div style="border: 1px solid black; padding: 2px; border-radius: 5px;">Scurvy</div> </div> </div> <div style="flex: 2;"> <div style="display: flex; flex-wrap: wrap; gap: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 5px; width: 150px; height: 40px;">is caused by a lack of carbohydrate.</div> <div style="border: 1px solid black; padding: 2px; border-radius: 5px; width: 150px; height: 40px;">is caused by a lack of iron.</div> <div style="border: 1px solid black; padding: 2px; border-radius: 5px; width: 150px; height: 40px;">is caused by a lack of vitamin C.</div> <div style="border: 1px solid black; padding: 2px; border-radius: 5px; width: 150px; height: 40px;">is caused by a lack of vitamin D.</div> </div> </div> </div>	2	one mark for each correct line R each additional line
(c)(i)	(named) fruit / (named) vegetables / (named) nuts / (named) seeds / (named) wholegrain products ;	1	
(c)(ii)	regular bowel movements / prevents constipation / bulking up, stools or faeces / correct ref. to peristalsis (described) / AVP ;	1	

Q3.

(a)(i)	<i>any two from:</i> all / 6 or 7, nutrients / components ; (nutrients in) correct, proportions / amounts ; idea of, appropriate energy requirements / AW ;	2	
(a)(ii)	cheese ; vegetable oil ;	2	R each additional circle
(a)(iii)	obesity ; coronary heart disease / CHD ; AVP ;	2	

(a)(iv)	carbohydrate ; release energy / respiration ; OR protein ; for, cell division / growth / correct function of a (named) protein / to make more proteins / source of amino acids / antibodies / ref to immune system ; OR (named) vitamin ; to prevent (named) deficiency disease / correct function of a named vitamin ; OR (named) mineral ; to prevent (named) deficiency disease / correct named function of a named mineral ; OR water ; to keep us hydrated / for chemical reactions in cells / solvent ; OR fibre ; keep the digestive system working / speed up egestion / prevents constipation / aids peristalsis / bulking up stools / AW ;	4	each nutrient must be linked to correct function
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(b)(i)	teenage males ;	1	
(b)(ii)	2.6 (MJ) ;	1	
(b)(iii)	males have greater energy requirements (than females) (in all age groups) / AW ;	1	
(b)(iv)	<i>any one from:</i> to grow the fetus / AW ; they have more mass / AW ;	1	

Q4.

(a)	<i>any two from:</i> <i>idea of, variety of / different / all, nutrients ;</i> <i>in the correct proportions / AW ;</i> <i>suitable energy content ;</i>		2											
(b)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">component</th> <th style="text-align: center;">example of principal source</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">calcium</td> <td style="text-align: center;">milk / tuna / grapefruit ;</td> </tr> <tr> <td style="text-align: center;">carbohydrate</td> <td style="text-align: center;">rice / milk / grapefruit ;</td> </tr> <tr> <td style="text-align: center;">protein</td> <td style="text-align: center;">tuna fish / milk ;</td> </tr> <tr> <td style="text-align: center;">vitamin C</td> <td style="text-align: center;">grapefruit ;</td> </tr> </tbody> </table>		component	example of principal source	calcium	milk / tuna / grapefruit ;	carbohydrate	rice / milk / grapefruit ;	protein	tuna fish / milk ;	vitamin C	grapefruit ;	4	words can only be used once
component	example of principal source													
calcium	milk / tuna / grapefruit ;													
carbohydrate	rice / milk / grapefruit ;													
protein	tuna fish / milk ;													
vitamin C	grapefruit ;													
(c)	fibre ;		1	A roughage / water										
(d)	<i>any two from:</i> obesity ; (increased risk of) coronary heart disease ; AVP ;		2											
(e)	<i>any one from:</i> to provide, food / nutrients, for fetus / AW ; for, growth / development, of fetus / AW ;		1											

Q5.

Question	Answer	Marks	Guidance
(a)	<pre> graph LR C[calcium ions] --> B[bone formation] F[fat] --> G[growth of muscles] F --> I[insulation] P[protein] --> G P --> I VD[vitamin D] --> B VD --> I </pre>	4	one mark for each correct line R each additional line
(b)(i)	<u>meat</u> ;	1	
(b)(ii)	meat / (white) fish ;	1	
(c)	prevents constipation / adds volume to material in alimentary canal / promotes movement (along alimentary canal) / AVP ;	1	
(d)(i)	any (named) fruit or vegetable ;	1	
(d)(ii)	scurvy / AVP ;	1	

Q6.

(a)(i)	carbon, hydrogen, oxygen ;	1	
(a)(ii)	fatty acids ; glycerol ;	2	
(b)	any three from: carbohydrates ; proteins ; (named) vitamins ; water ; (named) minerals ; fibre ;	3	

Q7.

(b)(i)	6200 (kJ per day) ;	1	
(b)(ii)	(for male) energy input is, (too) low / below needs ; loss of weight / thin ; normal growth, would cease / be reduced ; fatigue / tired / weak / less active / AW ; <i>idea of</i> more susceptible to infection / disease ;	2	A (8000 kJ) is correct for 11 year-old female I becomes ill unqualified
(c)	1 17 year olds require more energy than inactive adults / inactive adults require less energy than 17 year olds ; 2 17 year olds require less energy than active adults / active adults require more energy than 17 year olds ; 3 comparative data quote with correct units in support of correct statements for mp1 or mp2 ;	3	Comparison must be between 17 year-old and one of the adult groups.

Q8.

(b)(i)	<i>any two from:</i> milk contains, calcium ; calcium / vitamin D, required for, healthy / strong / AW, teeth / bones ; (calcium / vitamin D) prevent, rickets / any symptom of rickets ; AVP ;	2	e.g. vitamin D stimulates absorption of calcium calcium needed for, blood clotting / muscle contraction / nerve function
(b)(ii)	<i>ref. to all nutrients / all food groups / AW ;</i> <i>idea of</i> nutrients in the, correct / appropriate / healthy, proportions / amounts OR to provide suitable amount of energy for, level of activity / (stated) lifestyle(s) ;	2	

Q9.

(c)(i)	6.5 (tablets) ;;;	3	MP1: values 37 and 12 anywhere or 12 and 1.85 MP2: correct calculation = 6.49 / 6.486 MP3: answer correctly rounded to one decimal place
(c)(ii)	<i>any four from:</i> 1 <i>Chlorella</i> contains vitamin C ; 2 vitamin C needed for, wound healing / immune system (function) OR vitamin C prevents, scurvy / bleeding gums ; 3 <i>Chlorella</i> contains, <u>more / AW</u> , calcium ; 4 calcium, prevents rickets / strengthens bones or teeth ; 5 evidence of data manipulation of values for calcium or vitamin C ;	4	
(c)(iii)	citrus fruit / (named) fruit / (named) vegetable ;	1	

Q10.

(d)	<p><i>total of three from:</i></p> <p><i>importance of iron to max 2</i> to make / for, haemoglobin ; to make / for, red blood cells ; for transport of oxygen ; AVP ;</p> <p><i>effects of iron deficiency</i> (iron-deficiency) anaemia ; any symptom of anaemia ;</p>	3	
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Q11.

(a)	(dietary) fibre / carbohydrate / starch / (named) sugar / vitamin C ;	1	
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Q12.

(a)	<p><i>calcium:</i> (formation of) bones ; (formation of) teeth ; prevents rickets ; AVP ;</p> <p><i>protein:</i> repair, cells / tissues ; growth ; used to make, muscle / enzyme / antibodies / protein, channels / carrier ; prevents marasmus ; AVP ;</p>	4	max. three from either section
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Q13.

(a)	poor absorption of calcium / weak bones / weak teeth / depression / fatigue / muscle pain / joint pain / rickets / osteomalacia / AVP ;	1	
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