

Module 2: Food and Health
2.2.1 Diet and Food Production
June 2009-January 2013
Mark schemes

- | |
|---|
| (a) define the term <i>balanced diet</i> ; |
| (b) explain how consumption of an unbalanced diet can lead to malnutrition, with reference to obesity |
| (c) discuss the possible links between diet and coronary heart disease (CHD); |
| (d) discuss the possible effects of a high blood cholesterol level on the heart and circulatory system, with reference to high-density lipoproteins (HDL) and low-density lipoprotein (LDL) |
| (e) explain that humans depend on plants for food as they are the basis of all food chains. (No details of food chains are required); |
| (f) outline how selective breeding is used to produce crop plants with high yields, disease resistance and pest resistance |
| (g) outline how selective breeding is used to produce domestic animals with high productivity |
| (h) describe how the use of fertilisers and pesticides with plants and the use of antibiotics with animals can increase food production |
| (i) describe the advantages and disadvantages of using microorganisms to make food for human consumption |
| (j) outline how salting, adding sugar, pickling, freezing, heat treatment and irradiation can be used to prevent food spoilage by microorganisms. |

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Mark Scheme

January 2013

Question	Answer	Marks	Guidance
7 (a)	<p><i>idea that (dairy) animals use plants for food ;</i></p> <p>plants are the basis of all food chains ;</p> <p>(some) yoghurts contain , (named) fruit / plant (flavouring) ;</p>	1	<p>e.g. cows eat grass / cows are herbivores</p> <p>IGNORE refs to microorganisms</p>

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Mark Scheme

January 2013

Question	Answer	Marks	Guidance
	<p>advantages</p> <p>A1 low in , saturated fat / cholesterol ; ora</p> <p>A2 less likely to cause , heart disease / atherosclerosis / AW ;</p> <p>A3 no / fewer , animal welfare / moral / ethical / religious, issues ;</p> <p>A4 source of <u>essential amino acids</u> ;</p> <p>A5 high rate of (protein) production ;</p> <p>A6 <i>idea of fewer energy losses / more energy efficient ;</i></p> <p>A7 <i>idea that production can be changed more easily (according to demand) ;</i></p> <p>A8 <i>idea that cheaper to produce (once established) ;</i></p> <p>A9 uses less , land area / space ;</p> <p>A10 (might be) <u>grown</u> on (plant) waste ;</p> <p>A11 less risk of transfer of disease from animals ;</p> <p>A12 can be produced in any , climate / season ;</p>		<p>IGNORE refs to obesity / weight loss ACCEPT ref to protein produced by bacteria</p> <p>A1 ACCEPT 'no , cholesterol / saturated fat' A1 ACCEPT implication that fat is saturated , e.g. ,fat that leads to high blood cholesterol A1 IGNORE 'animal fat' unqualified</p> <p>A3 ACCEPT 'suitable for , vegetarians / vegans' A3 ACCEPT refs to fewer animals being slaughtered</p> <p>A5 IGNORE 'high yield' answers must imply rate</p> <p>A6 IGNORE 'efficient' unqualified A6 ACCEPT 'more efficient because lower down food chain'</p> <p>A7 Answers could be in context of rate or content</p> <p>A8 IGNORE 'uses fewer resources'</p> <p>A9 IGNORE 'uses fewer resources'</p> <p>A10 needs to be stated as an advantage</p> <p>A11 e.g. CJD, salmonella from eggs</p>

Question	Answer	Marks	Guidance
7 (b)	<p><i>disadvantages</i></p> <p>D1 different, taste / texture / palatability ;</p> <p>D2 lacks / less, iron ;</p> <p>D3 needs to be processed (to add, taste / texture) ;</p> <p>D4 <i>idea of consumer resistance ;</i></p> <p>D5 growth conditions suit, pathogenic / harmful / spoilage, microorganisms / bacteria / microbes ;</p> <p>D6 need for, isolation / purification (of protein from material on which they grow) ;</p> <p>D7 may require removal of, toxins / (excess) RNA ;</p> <p>D8 loss of farming jobs ;</p> <p>D9 <i>idea of higher set up costs ;</i></p> <p>QWC - balanced account</p>	7	<p>D4 ACCEPT e.g. 'people don't want to eat something made from fungus'</p> <p>D4 'people prefer flavour of meat' = 2 marks (D1 and D4)</p> <p>D5 ACCEPT 'food might be contaminated with bacteria etc'</p> <p>D5 IGNORE mould / bad bacteria</p> <p>D6 ACCEPT 'purification of food from waste'</p> <p>D9 IGNORE 'expensive' unqualified</p> <p>D9 ACCEPT 'equipment costs a lot'</p> <p>Award if 2 A marks and 2 D marks have been awarded</p>

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Mark Scheme

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Question	Answer	Marks	Guidance								
7 (c)	<table border="1"> <thead> <tr> <th>method</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>freezing</td> <td> 1 slows / reduces / AW, enzyme, activity / AW 2 removes available water / AW max 1 </td> </tr> <tr> <td>pickling</td> <td>(low pH) denatures, enzymes / proteins</td> </tr> <tr> <td>irradiation</td> <td>(microbial) DNA / genes / genetic material, destroyed / damaged / changed / mutated / disrupted</td> </tr> </tbody> </table>	method	description	freezing	1 slows / reduces / AW, enzyme, activity / AW 2 removes available water / AW max 1	pickling	(low pH) denatures, enzymes / proteins	irradiation	(microbial) DNA / genes / genetic material, destroyed / damaged / changed / mutated / disrupted	3	<p>Award one mark per box</p> <p>1 ACCEPT 'too cold for enzymes to work effectively'</p> <p>1 DO NOT CREDIT refs to enzymes becoming denatured</p> <p>1 IGNORE 'stops / disrupts (enzyme activity)'</p> <p>2 ACCEPT 'ice crystals puncture cell membrane'</p> <p>DO NOT CREDIT high pH</p> <p>ACCEPT correct description of denaturation, e.g. 'shape of active site changed'</p> <p>IGNORE refs to osmosis</p> <p>IGNORE 'mutation' without ref to genetic material</p>
method	description										
freezing	1 slows / reduces / AW, enzyme, activity / AW 2 removes available water / AW max 1										
pickling	(low pH) denatures, enzymes / proteins										
irradiation	(microbial) DNA / genes / genetic material, destroyed / damaged / changed / mutated / disrupted										
Total		12									

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Mark Scheme

January 2012

Question	Answer	Marks	Guidance
3 (a)	regulates fluidity of / stabilises / AW, membranes / phospholipid bilayer ; (converted to) steroid / named steroid, hormone(s) ; waterproofing the skin ; making Vitamin D ; making bile (salts) ;	2 max	Mark the first answer on each prompt line. ACCEPT decreases / maintains, fluidity ACCEPT supports structure of membranes DO NOT CREDIT makes membrane rigid DO NOT CREDIT allows / increases fluidity
3 (b) (i)	contains C and H and O ; has, OH / hydroxyl, groups ; hex / 6-membered, ring ;	1 max	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks DO NOT CREDIT C, H and O molecules DO NOT CREDIT hexose ACCEPT pent ring IGNORE 6C ring IGNORE branched
3 (b) (ii)	(saturated) lipids / fats / triglycerides ; protein / polypeptide ;	2	Mark the first two suggestions DO NOT CREDIT unsaturated (fats) IGNORE fatty acids / glycerol IGNORE amino acids / peptides

Question	Answer	Marks	Guidance
(iii)	<p>LDL</p> <p>L1 (carry cholesterol) from liver to, tissues / cells ;</p> <p>L2 receptors on (tissue) <u>cells</u> ;</p> <p>L3 raise / AW, <u>blood</u> cholesterol ;</p> <p>L4 increase / cause, deposition of, fats / lipids / triglycerides / cholesterol, <u>in</u> artery wall / under endothelium ;</p> <p>L5 form, plaques / atheromas ;</p> <p>HDL</p> <p>H1 (carry cholesterol) from, tissues / body / blood, to liver ;</p> <p>H2 receptors on, hepatocytes / liver <u>cells</u> ;</p> <p>H3 lower / reduce / decrease, (blood) cholesterol ;</p> <p>H4 reduce deposition, of fats / lipids / triglycerides / cholesterol ;</p> <p>H5 decrease, formation / risk, of, plaques / atheromas ;</p>	6 max	<p>If it is clear that candidates get LDL and HDL the wrong way round do not award L1 or H1 or QWC and then apply ECF</p> <p>L3 IGNORE deposits cholesterol</p> <p>L4 IGNORE LDL / fatty acids</p> <p>L4 ACCEPT under epithelium</p> <p>H1 ACCEPT back to liver</p> <p>H3 ACCEPT remove from blood</p> <p>H4 IGNORE LDL / fatty acids</p> <p>H5 IGNORE removing atheromas</p>
	<p>QWC – Award if you award an L mark and an H mark with the same number twice</p>	1	<p>e.g. L1 and H1, and L3 and H3</p>

Question		Answer	Marks	Guidance
(c)	(i)	(red) meat contains (large amounts of) <u>saturated</u> , fat / fatty acids ; (meat / saturated fat) associated with / leads to, increased / large amounts of, LDLs ;	2	ACCEPT ora throughout for consequences of non-red meat diet No ECF from 3 (b) (iii) ACCEPT animal fat is saturated fat CREDIT high LDL/HDL ratio IGNORE makes LDLs unqualified answer must imply increased amount
	(ii)	(type 2) diabetes ; angina / coronary heart disease / CHD / stroke / hypertension / high blood pressure / obesity ;	1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks DO NOT CREDIT type 1 diabetes IGNORE conary DO NOT CREDIT chronic
Total			15	

Question	Expected Answers	Mark	Additional Guidance
1 (a)	<p>photosynthesis ; starch ; nucleic acids ; monomers ; cellulose ;</p>	5	<p>Mark the first answer in each space. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks ACCEPT minor mis-spellings</p>
1 (b)	<p>1 without fertiliser <u>yield</u> falls (over time) / fertiliser maintains <u>yield</u> / AW ;</p> <p>2 application of fertiliser replaces lost , nitrogen / nitrates ;</p> <p>3 nitrogen / N, required for , amino acids / (named) protein / growth / (named) nucleic acids / (named) nitrogenous base ;</p> <p>4 <i>idea that</i> nitrogen / N / nitrate / NO₃⁽⁻⁾, removed (from soil / system) by , plant / harvesting ;</p> <p>5 <i>idea of</i> denitrification ;</p> <p>6 nitrates / NO₃⁽⁻⁾ are soluble ;</p> <p>7 nitrates / NO₃⁽⁻⁾ are , leached / washed from soil ;</p>	3 max	<p>IGNORE 'nutrients/ minerals' throughout</p> <p>1 ACCEPT it / nitrate / nitrogen as AW for fertiliser ACCEPT fertiliser increases yield</p> <p>2 ACCEPT it / nitrate / nitrogen as AW for fertiliser</p> <p>3 IGNORE 'development' IGNORE fertiliser / nitrate / N₂</p> <p>4 Answers must refer to depletion (from soil) 'used' alone does not imply depletion</p>

Question	Expected Answers	Mark	Additional Guidance
1 (c)	<p>1 natural selection ; insecticide is the , selective agent / selection pressure ;</p> <p>2 idea of mutation / (genetic) variation ;</p> <p>3 random / naturally occurring ;</p> <p>4 resistant survive / non-resistant die ;</p> <p>5 (resistants will) pass on , allele / mutation , for resistance (to offspring) ;</p> <p>6 higher proportion of / more , resistant individuals in population ;</p> <p>7 idea that resistance allele confers resistance only to a small dose of insecticide ;</p>	<p>3</p> <p>5</p> <p>6</p> <p>7</p> <p>4 max</p>	<p>ACCEPT 'tolerance' as AW for resistance If candidates write 'immunity' penalise once and then ecf</p> <p>DO NOT CREDIT idea of insecticide or natural selection <i>causing</i> mutation DO NOT CREDIT variation that could be environmental</p> <p>ACCEPT AW for resistant, e.g. 'the ones with the mutation'</p> <p>ACCEPT gene for resistance IGNORE 'pass on resistance / trait'</p> <p>CREDIT refs to increased allele / gene frequency ACCEPT 'the whole population becomes resistant'</p>
Total		[12]	

Question	Expected Answer	Mark	Additional Guidance
6 (a) (i)	genes / genetic / mutation ; environment(al) ;	2	Mark the first answer on each line IGNORE inherited / DNA
6 (a) (ii)	1 no defined categories ; 2 range of values / intermediate values ; 3 influenced by, environment / many genes / genes and environment ; 4 quantitative / has to be measured / cannot be counted ;	3 max	2 ACCEPT ref to bell-shaped curve / binomial distribution 3 ACCEPT any ref to 3 or more genes 4 ACCEPT metric
6 (a) (iii)	B ;	1	DO NOT CREDIT if more than one letter is given
6 (a) (iv)	1 growth too rapid ; 2 increased susceptibility to, disease / named abnormality ; 3 <u>inbreeding</u> ; 4 reduces <u>gene pool</u> / <u>genetic variation</u> / <u>genetic diversity</u> ;	2 max	2 e.g. bone / skeletal abnormalities or low immunity 3 DO NOT CREDIT if implies inbreeding causes mutations 4 IGNORE refs to biodiversity

Question	Expected Answer	Mark	Additional Guidance
6 (a) (v)	<ol style="list-style-type: none"> 1 maintain biodiversity ; 2 aesthetic (reasons) / tourism ; 3 ethical (reasons) ; 4 part of a food chain / web ; 5 maintain / increase <u>gene pool</u> ; 6 genetic resource / availability to breed with domestic chickens ; 	2 max	<p>3 ACCEPT religious</p> <p>4 ACCEPT food source for local population</p> <p>6 CREDIT description, e.g. 'source of desirable genes' or 'source of genetic variation'</p> <p>6 ACCEPT specific example of genetic resource e.g. disease resistance / strong bones / longevity / heat tolerance / idea of domesticating wild population</p>

Question	Expected Answer	Mark	Additional Guidance
6 (b) (i)	<ol style="list-style-type: none"> 1 reduces / prevents (infectious) disease ; 2 prevent, problems / named problem, with gut ; 3 digest food more, efficiently / easily / quickly ; 4 greater proportion of, food / energy, can contribute to growth ; 5 reduce risk of transmitting, pathogens / named pathogen, to humans ; 	2 max	<p>Mark the first two answers only</p> <p>1 IGNORE illness</p> <p>2 e.g. diarrhoea</p> <p>4 ACCEPT faster growth as AW for contribute to growth</p> <p>4 IGNORE larger chickens</p> <p>5 ACCEPT 'meat less likely to be infected with bacteria'</p>
6 (b) (ii)	<ol style="list-style-type: none"> 1 (antibiotic) resistant, pathogens / bacteria ; 2 antibiotics kill useful, <u>bacteria</u> ; 3 <i>idea of:</i> antibiotic passing into <u>human</u> food ; 	1 max	<p>1 ACCEPT microorganisms / microbes</p> <p>1 IGNORE germs</p> <p>1 DO NOT CREDIT immune</p> <p>2 DO NOT CREDIT if any ref to viruses</p>
Total		13	

Question	Expected Answer	Mark	Additional Guidance
1 (c) (ii)	(death rate for) men greater (at any concentration) / AW ; (death rates) rise with increasing cholesterol / AW ; death rate for men, initially / AW, falls ; steep(er) / AW, rise (in, males / both) at higher cholesterol levels ;		
1			1 ACCEPT ora
2			2 ACCEPT 'positive correlation' (between death and cholesterol)
3			3 ACCEPT 4.8 or below as 'initially'.
4			4 Answers must refer to latter part of graph only (5.7 or above). ACCEPT difference (between sexes) greater at high concentration
5	comparative figures with unit for (blood) cholesterol to support any of the above points ;	3 max	5 There are 3 ways of getting this mark: <ul style="list-style-type: none"> • values for both sexes at single concentration • two values for single sex at two concentrations • subtraction / calculation, that shows comparison IGNORE terms like 'about' See table for acceptable examples of x and y values – if intermediate cholesterol values are used, refer to the graph for the data

blood cholesterol (mmol dm ⁻³)	deaths per 10 000	
	women	men
3.6	13.2 - 14.1	31.2 - 32.1
4.3	15.0 - 15.9	26.0 - 26.9
4.8	14.0 - 14.9	24.0 - 24.9
5.2	15.1 - 16.0	24.6 - 25.5
5.7	17.4 - 18.3	25.8 - 26.7
6.2	17.8 - 18.7	33.2 - 34.1
6.7	23.5 - 24.3	31.3 - 32.2
7.3	22.0 - 22.9	44.1 - 45.0
8.2	31.7 - 32.6	59.5 - 60.4

Must include (blood) cholesterol units Any figure within a particular range is acceptable

Mark Scheme

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Question	Expected Answer	Mark	Additional Guidance
1 (c)	(iii)		
1	coronary heart disease / CHD / cardio-vascular diseases / heart attack / cardiac arrest / myocardial infarction / MI / angina ;		Mark first two in list
2	atherosclerosis / atheroma ;		1 DO NOT CREDIT heart disease alone or 'conary'
3	stroke ;		ACCEPT hypertension / high blood pressure
4	Type 2 diabetes ;	2	2 DO NOT CREDIT arteriosclerosis
Total		16	

Question	Expected Answer	Mark	Additional Guidance
3 (a)	<p>young / elderly / HIV infected / malnourished / post-operative / on immunosuppressants / leukaemia / undergoing cancer treatment / anorexics ;</p> <p>immature / compromised / weak / AW, immune system ;</p>	2	<p>IGNORE prompt lines and mark the answer as a whole</p> <p>ACCEPT AW for young / elderly etc</p> <p>IGNORE 'ill' or 'unfit'</p> <p>IGNORE any reference to populations e.g. those living in vicinity of outbreak</p> <p>ACCEPT description</p> <p>ACCEPT no immunity</p>
3 (b) (i)	<p>1 bacteria / (bacterial) cells, divide / increase in number / multiply / reproduce / proliferate / replicate ;</p> <p>2 (secrete) enzymes / named enzyme ;</p> <p>3 food, digested / broken down ;</p> <p>4a protein / named protein / polypeptides → peptides / amino acids</p> <p>4b OR fat / triglycerides → fatty acids</p> <p>4c OR starch / amylose / glycogen → glucose / sugar ;</p> <p>5 production / release / excretion / secretion, of, toxins / named toxin / waste products ;</p> <p>6 (causes) change in, appearance / smell / texture / taste ;</p>		<p>DO NOT CREDIT 'mould' – penalise once only</p> <p>1 IGNORE 'growth'</p> <p>DO NOT CREDIT 'mitosis'</p> <p>2 DO NOT CREDIT excrete</p> <p>Answer should not imply intracellular enzymes</p> <p>4b IGNORE cholesterol</p> <p>4c ACCEPT other correct carbohydrate breakdown</p> <p>6 CREDIT suitable example e.g. 'goes mushy'</p>
		3 max	

Question	Expected Answer	Mark	Additional Guidance
3 (b) (ii)	<p>1 bacteria, reproduce / AW, more rapidly / faster ;</p> <p>2 (so) more bacteria present ;</p> <p>3 more, toxins / waste, produced / released / AW ;</p> <p>4 more enzymes, secreted / AW ;</p> <p>5 enzyme, action faster / works better / more effective, at higher temperatures ;</p> <p>6 (substrate and enzymes have) more <u>kinetic</u> energy ;</p> <p>7 more, enzyme-substrate complexes / ESC / (successful) collisions <u>between substrate and active site</u> ;</p>	3 max	<p>Idea of 'more' is needed for all marking points but it can be stated once and linked to more than one point.</p> <ul style="list-style-type: none"> e.g. 'more bacteria secreting enzymes' = mp 2 and 4 <p>ACCEPT converse argument throughout</p> <p>ACCEPT 'fungi' / 'mould' in place of bacteria as question stem does not specify</p> <p>1 IGNORE 'grow' IGNORE 'more easily' or 'effectively' DO NOT CREDIT if the candidate thinks there is no reproduction at 5°C</p> <p>4 DO NOT CREDIT excreted</p> <p>5 IGNORE optimum</p>

Question	Expected Answer	Mark	Additional Guidance
3 (b)	<p>max 2 for 2 distinct methods max 2 for 2 correctly linked explanations Only credit the explanation mark if the method mark has been awarded.</p> <p>M1 E1 salting ; lack of <u>water</u> due to, osmosis / low water potential (outside cell) ;</p> <p>M2 E2 sugar ; lack of <u>water</u> due to, osmosis / low water potential (outside cell) ;</p> <p>M3 E3 (air / freeze) drying ; <i>idea that enzymes cannot mobilise / intracellular transport impaired / reactions have no medium in which to occur / (microbes) cannot move ;</i></p> <p>M4 E4 pickling / (use of) vinegar ; (low pH) denatures / changes tertiary structure of / changes 3D shape of, enzymes / proteins OR substrate no longer fits active site / active site shape changes / prevents ESC ;</p> <p>M5 E5 heat treatment / cooking ; denatures / changes tertiary structure of / changes 3D shape of, enzymes / proteins OR substrate no longer fits active site / active site shape changes / prevents ESC ;</p> <p>M6 E6 irradiation / UV / gamma rays / X-rays / ionising radiation ; destroys / damages / changes / mutates, DNA / genes / genetic material ;</p> <p>M7 E7 smoking ; (so exposed to) antibacterial / named antibacterial, chemical(s) ;</p> <p>M8 E8 vacuum packing / canning / bottling ; microorganisms cannot respire <u>aerobically</u> ;</p>	4	<p>Where more than one method is given, mark first on line and assume explanation linked with that DO NOT CREDIT chilling or freezing (as in question)</p> <p>M1 IGNORE drying E1 ALLOW low Ψ / high solute potential</p> <p>M2 IGNORE drying E2 ALLOW low Ψ / high solute potential</p> <p>E4 DO NOT CREDIT high pH</p> <p>M5 ACCEPT pasteurising IGNORE canning for this mp</p> <p>E5, E 6 & E7 ACCEPT 'kills bacteria' or 'kills microbes' as a reason supporting heat treatment, irradiation or smoking only once</p> <p>M6 CREDIT radiation if correctly qualified in explanation</p> <p>M7 CREDIT addition of, sulphites / sodium benzoate / alcohol</p> <p>E8 IGNORE 'denaturing' as a consequence of canning / bottling</p>

Question	Expected Answer	Mark	Additional Guidance
3 (c)	<p>This is a QWC question</p> <p>Ignore sections and mark as continuous prose</p> <p>1 low(er) / less, <u>energy</u> (than beef) ; useful for, slimming / weight control / AW ;</p> <p>2</p> <p>3 low(er) / less, (total) fat ;</p> <p>4 (very) low / (much) less, saturated fat ;</p> <p>5 lower, cholesterol</p> <p>OR</p> <p>lower risk of, (coronary) heart disease / CHD / cardio-vascular diseases / heart attack / cardiac arrest / myocardial infarction / MI / angina / atherosclerosis / atheroma / stroke / hypertension ;</p> <p>6 contains carbohydrate / AW ;</p> <p>7 low(er) / less, iron content ;</p> <p>8 (increased risk of) anaemia / fewer RBCs / less haemoglobin / reduced oxygen carrying capacity of blood ;</p> <p>9 low(er) / less, protein ;</p> <p>10 (mycoprotein provides) more <u>balanced</u> diet ;</p> <p>11 need larger intake to meet requirements / AW ;</p> <p>QWC – award for 2 clear references to the table ;</p>	7 max	<p>Assume candidate is talking about mycoprotein unless otherwise stated.</p> <p>CREDIT ora for beef throughout.</p> <p>IGNORE use of figures alone when awarding mps 1, 3, 6, 7, 9 – look for <u>descriptive statement</u>, e.g.</p> <ul style="list-style-type: none"> • '12 g of protein' = no mark • 'only 12 g protein' = 1 mark (mp 9) <p>2 ACCEPT preventing obesity</p> <p>ACCEPT 'less energy to burn off <i>during exercise</i>'</p> <p>DO NOT CREDIT 'burn off' unqualified</p> <p>6 ACCEPT 'more carbohydrate than beef'</p> <p>IGNORE 'carbs'</p> <p>8 IGNORE answers phrased in terms of role of iron alone e.g. 'haemoglobin contains iron' = 0 Answers must show consequence of deficiency e.g. 'less haemoglobin' = 1</p>
	Total	20	<p>Award for 2 sets of comparative figures (stated or calculated) with units – 'content per 100g' not needed</p> <p>IGNORE vague terms like 'about' as long as figs are correct</p>

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Question	Expected Answers	Marks	Additional Guidance
1 (a)	obese ; iron ; haemoglobin ;	3	
1 (b)	24.7 ; ;		If answer incorrect or to the wrong number of dp, then ALLOW one mark for working: $69 \div 1.67^2$ 24.74 = one mark IGNORE 25 and look for working mark If units are given, they must be kg m^{-2} (or kg/m^2) Max 1 for incorrect units
1 (c) (i)	<u>overweight</u> / borderline <u>overweight</u> ;	1	DO NOT CREDIT if more than one answer given
1 (c) (ii)	1 very close to border / AW ; 2 graph does not distinguish between male and female ; 3 does not measure actual fat / AW ; 4 has, more / less, muscle / bone (than normal) OR (does not take into account) muscle / bone, mass / density / weight ; 5 muscle / bone, heavier / denser, than fat / AW ; 6 pregnant ;	2 max	1 DO NOT CREDIT mistake reading graph 4 Must refer to idea of amount of muscle / bone being different from normal. DO NOT CREDIT muscle / bone unqualified CREDIT has osteoporosis as ref. to different bone density

Question	Expected Answers	Marks	Additional Guidance
1 (d)	1 coronary heart disease / CHD / atherosclerosis / angina / coronary thrombosis / myocardial infarction / heart attack / cardiac arrest / cardiovascular disease / stroke ; 2 (osteo)arthritis ; 3 (Type 2) diabetes ; 4 high blood pressure / <u>hypertension</u> ; 5 gallstones ; 6 cancer ;	2 max	1 DO NOT CREDIT heart disease alone / arteriosclerosis 2 DO NOT CREDIT rheumatoid arthritis 3 DO NOT CREDIT Type 1 diabetes 6 ACCEPT any type of cancer
Total		10	