

Cambridge International A Level

FOOD STUDIES

9336/01

Paper 1 Theory

October/November 2025

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **18** printed pages.

PUBLISHED**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1 Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.

2 The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.

3 Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).

4 The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.

5 'List rule' guidance

For questions that require *n* responses (e.g. State **two** reasons ...):

- The response should be read as continuous prose, even when numbered answer spaces are provided.
- Any response marked *ignore* in the mark scheme should not count towards *n*.
- Incorrect responses should not be awarded credit but will still count towards *n*.
- Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response.
- Non-contradictory responses after the first *n* responses may be ignored even if they include incorrect science.

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

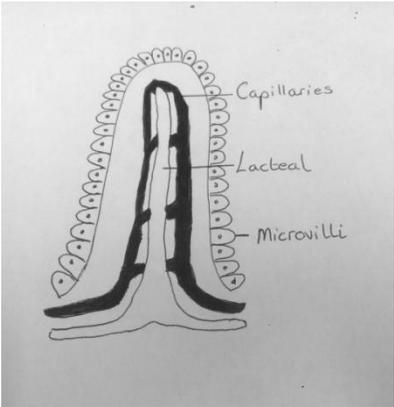
The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	incorrect point or mark not awarded
	information missing or insufficient for credit
	allow or accept
	insufficient point ignored while marking the rest of the response
	contradiction in response, mark not awarded
	benefit of the doubt given
	error carried forward applied
	point has been noted but no credit has been given or blank page seen

Annotation	Meaning
	correct idea but not specific enough
	key point attempted / working towards marking point
	correct, awarding one mark from marking point 1.
	correct, awarding one mark from marking point 2, similar numbered ticks are used for marking point 3, 4, 5 etc.

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Question	Answer	Marks
1(a)	Particles of <i>calcium</i> enter the heart muscle cells and aid in the electrical signal needed for each heartbeat; as calcium ions have a positive electrical charge; <i>Calcium</i> helps the heart muscle to contract and pump blood around the body;	2
1(b)(i)	It has mostly unsaturated fat – energy, etc; HBV protein – growth and repair; Selenium – metabolism and thyroid function; Phosphorous – bones and teeth formation; Vit B3 – conversion of food into energy; Calcium – bones and teeth formation, heart function; Iron – red blood cells; Zinc – healing damaged tissue, metabolism function, enzyme activity; B12 – erythrocytes/red blood cells Chloride – regulate blood pressure, maintain pH in stomach acid AVP;	6
1(b)(ii)	Supermarket chicken is often injected with brine; to plump up the meat;	1
1(c)	A <i>prosthetic group</i> is a non-protein group; that is permanently bound to an enzyme; to form a conjugated protein;	3
1(d)(i)		4
1(d)(ii)	to increase their surface area; to increase their absorption efficiency;	2

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Question	Answer	Marks
1(e)	When gliadin / wheat is eaten; a severe autoimmune response is triggered. Irritation in the small intestine follows; leading to the destruction of the villi in the small intestine; resulting in poor absorption of nutrients / protein; needed for children's growth; Instead these nutrients are released from the body as diarrhoea;	4
1(f)(i)	The acid content of the fruits; has denatured/coagulated/set the protein in the cream;	2
1(f)(ii)	Serve the cream in a jug separate to the fruit salad;	1

Question	Answer	Marks
2(a)	<i>Methionine</i> is an essential amino acid; and must therefore be eaten in the diet / cannot be made by the body; Cheese is an important protein food for vegetarians and is eaten often by children; who need it for growth; but it must be complemented with a protein that contains methionine; in order to provide all of the EAAs.	4
2(b)	Normal bacteria that are found in the colon; provide the enzymes to metabolise dietary fibre.	2
2(c)(i)	cobalt;	1
2(c)(ii)	Fish; nuts; green; leafy vegetables; cereals;	1
2(d)	<i>Fats and oils decompose</i> when they are broken down into their component parts of free fatty acids and glycerol; occurring when very high temperatures are applied; to beyond the smoke point of the fat; when fats and oils are hydrolysed; in the presence of water; which is catalysed by the presence of enzymes / microorganisms; when they are digested by lipases; and if unsaturated; when they are oxidised; catalysed by light; where a hydrogen atom is removed from an unsaturated triglyceride molecule;	6
2(e)	<i>Deamination</i> occurs when there is excess protein intake; to break down amino acids for energy ; and to prevent toxicity to the kidneys / liver; by removing the amine group to convert it to ammonia.	3
2(f)(i)	Vit K aids in blood clotting; supports bone health / to make osteocalcin; regulates blood calcium levels;	2

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Question	Answer	Marks
2(f)(ii)	prevents oxidation/is an antioxidant of PUFAs / Vit A / Vit C OR destroys free radicals in the bloodstream max 2 from preventing damage to cell membranes; helps protect against cancer / heart disease / arthritis / prevents vascular disease; is essential for good quality skin / hair / nails / eye health;	3
2(f)(iii)	In winter in the Northern hemisphere there are not enough daylight hours; not enough UV light from the sun / in contact with human skin; to stimulate the production of enough Vit D;	3

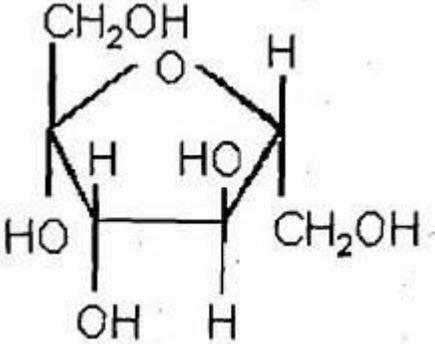
Question	Answer	Marks
3(a)	<i>Refined carbohydrates</i> are starches and sugars that have been altered from the way in which they exist in nature / they are processed; often to remove bran / husk / skin / so that they look white; Examples are granulated sugar; caster sugar; icing sugar; white flour; white rice;	3
3(b)	<i>Milk becomes solid</i> when pepsin; coagulates the <u>casein</u> in the milk;	2
3(c)(i)	Antioxidant; assists in proper thyroid function / metabolism;	1
3(c)(ii)	Oysters; Brazil nuts; halibut; yellowfin tuna; eggs; sardines; sunflower seeds; chicken breast; shitake mushrooms	1
3(d)	Body cells produce <i>metabolic water</i> ; as a by product of oxidative metabolism; of energy giving nutrients /fat / carbohydrate / protein.	3
3(e)	Growth and development rapid; demand for energy and all nutrients is high; in excess of 2000 calories per day between the ages of 11 and 18; demand for iron increases for muscle development; more so in girls because of menstruation; RNI iron for girls is 14.8mg and RNI for boys is 11.3mg; Vit C needed for absorption of iron; more calcium required due to increased bone mass; eat more fruit and veg. to provide vitamins and minerals and keep skin healthy; avoid fatty foods as these aggravate skin conditions; increased protein for rapid growth; avoid excessive junk food as they contain empty calories / increase weight and provide little nutrition; but are filling so proper meal not eaten at mealtimes; peer pressure with an example; AVP	6

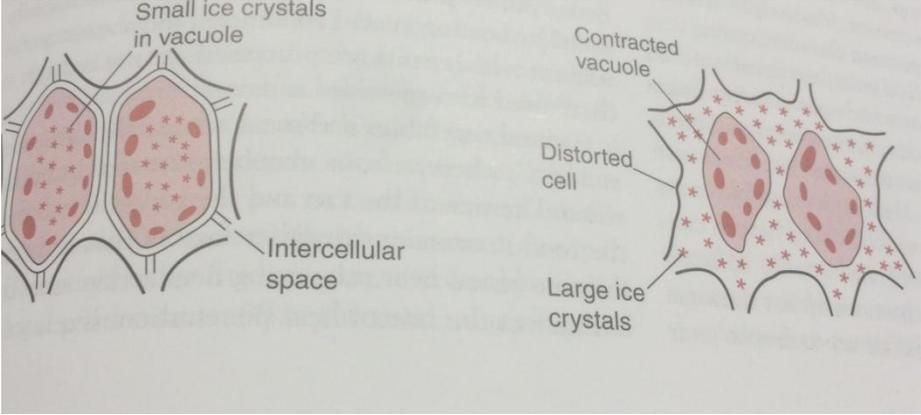
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Question	Answer	Marks
3(f)	<u>Raffinose</u> ; <u>stachyose</u> ; Promote the growth of 'good' / 'friendly' bacteria; in the intestine; Suppress the growth of clostridium perfringens bacteria; Act as dietary fibre; and soften stools;	4
3(g)	<i>Benefits the partially hydrogenated lipid is more plastic / can be used for spreading on bread / creaming with sugar;</i> Complete hydrogenation would result in a fat that was too hard / not plastic; It is cheaper to make products in mass quantities with hydrogenated fats than animal fats; Hydrogenated fats are suitable for vegans to use as spreadable fats if not blended with any animal fat; Hydrogenation improves the colour of the fat through bleaching; Hydrogenation improves the stability of the fat; Hydrogenation improves resistance to oxidative and/or hydrolytic rancidity / rancidity;	5

Question	Answer	Marks
4(a)(i)	<i>Serum cholesterol</i> is a measure of how much cholesterol is in the blood;	1
4(a)(ii)	<i>Cholesterol</i> is a white, fatty substance / white waxy substance / white lipid; It forms the membrane of all cells; it is used to synthesise bile acids; it is used to synthesise sex hormones;	4
4(b)	Fruit in jam contains pectin; when the fruit is heated with sugar; the fruit releases acid and lowers the pH of the mixture; allowing the pectin molecules to form a network; that traps the liquid content of the mixture; forming a gel that is thick;	5
4(c)	<i>DRV</i> : Dietary Reference Values; <i>DRVs</i> provide recommended nutritional intakes for a given population; for the purpose of maintaining good health; avoiding obesity; becoming malnourished / deficient;	3
4(d)(i)	Vitamin C	1
4(d)(ii)	leaking blood vessels/bruising/bleeding gums; anaemia; oedema / fluid build up; gastrointestinal problems; damaged muscle tissue / heart muscle; low blood pressure; teeth fall out; wrinkled skin; brittle nails; thin hair; sore muscles; joint pain; wounds heal slowly;	4

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Question	Answer	Marks
4(e)(i)	A <u>sugar</u> that can be oxidized and lose electrons; due to its free <u>aldehyde</u> or <u>ketone functional groups</u> in its molecular structure	2
4(e)(ii)	Glucose; lactose; maltose	1
4(e)(iii)		2
4(f)	<p><i>The BMR of the twins may differ</i> because one of the twins may be more active than the other twin; and the increased activity will demand a higher intake of calories that increases that twin's BMR;</p> <p>One of the twins may have an illness; resulting in demand for more calories to repair tissues/fight infection, thus increasing BMR;</p>	2

Question	Answer	Marks
5(a)	<p>Plant cells contain a high amount of water; particularly in their vacuoles; if freezing takes places slowly; i.e. slower than down to 0–4 °C in 30 minutes; then the ice crystals that form will be large; form in the intercellular spaces; and in the vacuoles; causing cellular distortion; by drawing out water from within the cells;</p> <p>Small ice crystals form if freezing is fast and cellular distortion is avoided; allowing the vegetable to maintain its shape and crisp texture on thawing;</p> 	8
5(b)	Vinegar / wine / acidic / low pH; that kills bacteria that may be present on the harvested vegetable;	2
5(c)	(i) bacteria (ii) mould (iii) bacteria	3
5(d)(i)	<p>Maillard browning; where amino groups of a protein react with the carbonyl group of a carbohydrate / reducing sugar; to form a new substance; called a melanoidin;</p> <p>Dextrinisation; where pyrodextrins are formed; through incomplete hydrolysis of starch; when dry heat is applied;</p> <p>Caramelisation; the oxidation of sugars; where water is removed as steam; causing a new brown substance to be formed;</p>	6
5(d)(ii)	<p><i>Maillard browning</i> pleasant aroma; crispy surface; attractive 'cooked' colour; enticing to consumer;</p> <p><i>Dextrinisation</i> pleasant aroma; crispy surface; attractive 'cooked' colour; enticing to consumer;</p> <p><i>Caramelisation</i> sweet flavour; attractive 'cooked' colour; enticing to consumer;</p>	2

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Question	Answer	Marks
5(e)	Read the instruction manual; Receive training in the use of the food processor; Plug in the machine with dry hands; Check that the flex is not worn / frayed / exposed / stretched; Ensure the unit is tested annually; Ensure that the unit is clean before use; Do not overfill the bowl; Ensure that the lid is fitted into position correctly; Do not insert anything other than food into the tube opening when in operation; Handle the blade carefully when fitting / washing / removing; Do not wash the electrical unit;	4

Question	Answer	Marks
6(a)(i)	Clostridium perfringens; clostridium botulinum; bacillus cereus;	2
6(a)(ii)	Anaerobic bacteria do not live or grow when oxygen is present; <i>Spore forming bacteria</i> produce spores that are dormant bodies that carry all the genetic material required to produce new bacteria;	2
6(a)(iii)	This type of food poisoning occurs when the bacteria produce poisonous chemicals/exotoxins; whilst they are living/reproducing; causing irritation to the stomach;	3
6(b)	<i>Hot holding</i> is a method of controlling microbial action by temperature; keeping food at a temperature of ≥ 63 °C; keeping the food safe for consumption; by keeping the food's temperature out of the danger zone;	4
6(c)(i)	As a preservative / to extend shelf life / to prevent oxidation	1

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Question	Answer	Marks
6(c)(ii)	<p>Advantages (max 5)</p> <p>Extend shelf life / preservation – means that less food is wasted / gluts of food can be saved / food can be available outside of the home / camping / travelling / shopping not necessary on a daily basis;</p> <p>Improve sensory quality – texture / flavour / appearance / ability to pour / ability to set;</p> <p>Improve manufacturing ease – sequestrants / humectants / flour improvers, etc.;</p> <p>Improve nutrition – added iron / folic acid / Vit D / Vit C / Vit B1 / Vit B2 / Vit B3 / Vit B12;</p> <p>Lower costs of food – flavouring with artificial flavourings is cheaper than flavouring with large quantities of for example strawberries / saving passed on to the consumer;</p> <p>Disadvantages (max 5)</p> <p>Allergies / hyperactivity – can be dangerous for some consumers</p> <p>Not natural – some are but many are synthetic / artificial – consumer may not understand the difference / may not want to purchase foods containing artificial additives;</p> <p>Disguise quality – cheap ingredients can be hidden by flavouring / colouring with additives;</p> <p>Not always regulated / safe – depending on where in the world / regulations and guidelines better in some countries than others / may not be safe for human consumption if not regulated properly;</p> <p>Labelling can be misleading / difficult to understand – may lead to safety concerns for those with allergies;</p> <p>Even if regulated and safe the combination of eating many different additives is unknown / untested – may cause ill health in some people;</p>	8
6(d)	<p>Cheddar; Double Gloucester; Leicester; AVP</p> <p>Milk is pasteurised and pumped into vats; starter culture added and lactose is converted to lactic acid ; milk is heated to 30 °C; rennet is added to clot the milk; caseinogens coagulate; left for 1 hour and curd and whey forms; whey is drained off; curd is heated to 40 °C for 45 minutes to remove further whey; whey is drained off; curd is cut into blocks and blocks are stacked on top of each other; known as cheddaring; salt is added; curd is packed into metal moulds and pressed; sprayed with hot water to form a rind; removed from the mould and left to ripen; at 10 °C for 4 months;</p>	5

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Question	Answer	Marks
7(a)(i)	180 °C	2
7(a)(ii)	120 – 140 °C	
7(a)(iii)	180 – 200 °C	
7(a)(iv)	200 °C	
7(b)(i)	<p>The milk from which the cream was churned could have been contaminated with faeces from the farm; as salmonella is found in the faeces of animals and can get onto animals' skin / udders, etc.;</p> <p>The cream may have been made from unpasteurised milk that contained salmonella bacteria;</p> <p>The cream may have become contaminated with human faeces after a worker had been to the toilet;</p> <p>The cream could have been cross contaminated during delivery / storage / preparation; for example, by poor personal hand hygiene / dripping fluid from chicken stored above the cream / contaminated equipment;</p>	3
7(b)(ii)	<p>The person who became ill may have been immunosuppressed / ill / pregnant / lactating / very young / very old; and, therefore, not have the defences to combat the poisoning quickly;</p> <p>The person who became ill may have ingested the area of the dessert that contained the colony of salmonella bacteria; whilst the other family members portion did not contain the bacteria;</p> <p>AVP;</p>	4
7(c)	<p><i>A blended sauce</i> uses cornflour / arrowroot starch suspension; a hot base liquid is then added / boiling water added / boiling milk added; and stirred / further heated until gelatinisation takes place;</p>	3
7(d)	<p>Crops with improved resistance against disease;</p> <p>Crops with increased resistance to pests;</p> <p>Crops with increased nutrient levels;</p> <p>Crops with increased resistance to drought;</p> <p>Crops with higher yield;</p> <p>Crops with increased shelf-life;</p> <p>Crops with altered sensory properties;</p> <p>Crops with increased tolerance to herbicides;</p> <p>Crops that grow faster</p> <p>Crops with larger fruit / produce</p>	4

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Question	Answer	Marks
7(e)	<p>To avoid deterioration during transport (max 5) Eggs should not be above 20 °C; Perishable foods / meat / dairy should travel in refrigerated lorries at $\leq 1 - 5$ °C; Frozen products should travel in freezer compartments of lorries at ≤ -18 °C; Hot meals / school meals / meals on wheels should travel in a vehicle containing a hot holding unit at a temperature of ≥ 63 °C; Fruits should be in cool but not cold conditions; to avoid ripening / yeast growth / fermentation; wooden crates allow air to fruits and vegetables; Milk / other chilled liquids should travel in refrigerated tankers at $\leq 1-5$ °C;</p> <p>Avoiding damage during transport (max 5) Bubble wrap / foam / polystyrene / wrapping – will absorb impact if items are dropped / squashed; Wooden crates / tertiary packaging – are stackable / build secure stacks in lorries; Eggs in soft, cup shaped cartons – to avoid cracking the shell; Crushable products / biscuits should be closely packed to avoid movement; and be placed in secondary packaging boxes; Lorries should be inaccessible / deny access to animals that may nibble the foods / humans who may tamper;</p>	9

Question	Answer	Marks
8(a)	<p>The timings provided on packaging / in books / on the internet are for thawed birds and will be inaccurate if the bird is not at room temperature; If the bird is not thoroughly defrosted there may be ice crystals in the bird's cavities / thick parts of meat; that will lengthen the cooking time of the bird; The bird may appear cooked on the outside and meat nearer to the surface may be cooked; but meat near the cavity and the bones may not have reached ≥ 75 °C for an extended period of time; Chicken is a high risk food and is likely to contain salmonella food poisoning bacteria that will not be killed if the bird remains below 75 °C in the centre;</p>	3
8(b)(i)	Flaky and choux	1
8(b)(ii)	Yorkshire pudding; souffle;	1

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Question	Answer	Marks
8(c)	<p><i>Low income affects meal planning</i> as the person planning the meals will have a budget to stick to; Meals should be planned to feed the correct number of people the correct portion size so that there is no extra spending necessary; In order to get HBV protein meals will need to include cheaper meats like minced beef rather than beef steak; HBV protein can be obtained from eggs and as eggs are cheap many meals may be based on eggs; Fresh fruit and vegetables are expensive so it will be cheaper to use tinned fruits and vegetables in meals; Meals will need to be made from scratch and take away meals avoided as these are expensive; Meals should be based on foods that are in season as these ingredients will be cheaper; Meals will be based on cheap starchy carbohydrates / rice / pasta / beans so as to be filling;</p>	6
8(d)	<p>Kitchen should be arranged in a logical order to form a continuous working area for meal prep; this will save time and avoid wasting energy; user should be able to move easily from food storage, to preparation area, to cooking area, to serving area, to cleaning area; the L shaped kitchen, U shaped kitchen or kitchen planned in parallel lines achieves this efficiency; the work triangle is an imaginary triangle that exists between the refrigerator / food storage area, cooker and sink and should form a localised and easy transition space; It is important to maximise use of corner space with corner units and wall units for storage; fitted at a suitable height for the person who uses the kitchen most often so that the person can reach the back of the cupboards with ease; The worktops should be positioned at the correct height for the person who uses the kitchen most often so as to ease jobs like rolling out pastry or washing up at the sink; The waste bin can be stored under the sink to use less floor space;</p>	5

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Question	Answer	Marks
8(e)	<p>Advantages of importing foods: Gives choice / variety / range of foods that makes meals more interesting and diverse; Means that a glut of food in one country can be shared worldwide so that the food is not wasted; Brings money into the country that is exporting the food; Improves relationships between countries / is politically beneficial; Improves tolerance/acceptance of other cultures / knowledge of other cultures; Allows immigrants to a country to eat what they would normally eat when in their own country; May be essential to feed the population;</p> <p>Disadvantages of importing foods: Traceability is less easy and therefore consumers might not be able to find out what they want to know about the food; Standards of animal husbandry may not be to a high standard in the country where the meat has been imported from; It can be expensive to import food from very far away and the cost is passed on to the consumer; It is bad for the environment for food to travel / food miles – causes pollution from fuels; It can be unethical to export food from a country where its own population is starving; A country can become reliant on a certain country for an imported foodstuff and if the countries fall out; imports will cease meaning that food becomes unavailable; It is possible to import new diseases or new organisms to a country that has previously not had the problem of those disease / organisms; Use of chemicals / pesticides may not be regulated; Money is spent on imported foods rather than locally produced foods, denying income to local farmers / producers;</p>	9