CAMBRIDGE
International Education

Cambridge IGCSE™

FOOD AND NUTRITION **0648/13**

Paper 1 Theory **May/June 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 May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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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.

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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	<u>'List rule' guidance</u> 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.

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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.

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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
BOD	Benefit of the doubt given
Highlighted text	Highlighting areas of text
On-page comment box	Allows comments to be entered on the page
Off-page comment box	Allows comments to be entered at the bottom of the marking window and then displayed when the associated question item is navigated to
NBOD	Benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied
^	Information missing or insufficient for credit
REP	Repetition in response

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Annotation	Meaning
I	Incorrect or insufficient point ignored while marking the rest of the response
R	Incorrect point or mark not awarded
CON	Contradiction in response, mark not awarded
SEEN	Point has been noted, but no credit has been given or blank page seen
	Key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen

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Question	Answer	Marks
1	*cause of a deficiency disease* lack of a/one/specific nutrient;	**1**

Question	Answer	Marks
2(a)	*elements found in proteins* carbon; oxygen; sulfur; phosphorus;	**3**
2(b)	*dishes where coagulation occurs* any dish that uses a coating e.g. fish cakes, Scotch eggs; any dish that uses egg for binding e.g. fish cakes, meatballs, beefburger; cake e.g. Victoria sandwich, cupcake, muffins, sponge cake; cooked egg e.g. boiled, fried, omelette, poached, scrambled, Benedict; cooking method used for fish e.g. grilled salmon, fried cod, steamed plaice; cooking method used for meat/poultry e.g. grilled chop, fried steak, steamed chicken, roast beef; crème brulee; egg custard / tart; meringue; quiche / named savoury flan;	**3**
2(c)	*reasons why athletes require a good supply of protein in their diet* body building / muscle building/growth; repair of damaged cell tissue; bone development; provide energy;	**2**
2(d)	*enzyme found in the ileum that converts peptones to amino acids* erepsin;	**1**

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Question	Answer	Marks
3(a)	*define the term monosaccharide* simple sugar / single-unit / molecule (carbohydrate) / base unit for other carbohydrates / sugar that cannot be hydrolysed (broken down by addition of water);	**1**
3(b)	*examples of monosaccharides* glucose; fructose; galactose;	**2**
3(c)(i)	*health issue that may result from eating too much sugar* obesity / type 2 diabetes;	**1**
3(c)(ii)	*effects on the body of the named health problem* *obesity* increases risk of complications during surgery / pregnancy / childbirth; problems with the knees / hips / spine / arthritis; breathing / respiratory problems; high/increased blood pressure / stroke; CHD / heart disease; psychological problems / low self-esteem; *type 2 diabetes* insufficient insulin made in pancreas; glucose remains in blood / too much sugar in the blood; circulation problems; eye problems; foot / leg amputation; damage to kidneys; CHD / heart disease; high/increased blood pressure / stroke;	**3**

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Question	Answer	Marks
4	*functions of fats in the body* formation of cell membranes; high satiety value / gives a feeling of fullness after a meal; protein sparing; provides energy store; provides energy; provides essential fatty acids e.g. Omega 3, Omega 6; provides vitamin A / D / E / K (as they are fat-soluble); provides warmth / heat / insulation;	**4**

Question	Answer	Marks
5(a)(i)	*where in the body the majority of calcium is stored* bones / skeleton;	**1**
5(a)(ii)	*why someone who is lactose intolerant may have an inadequate calcium intake* number of lactose-free, calcium-rich food sources are limited; they have insufficient amounts of the enzyme lactase; lactase is needed to digest / break down lactose; lactose is found in milk and dairy products; person who is lactose intolerant would be unable to digest / breakdown lactose; milk and dairy products contain a good supply of calcium;	**3**
5(b)	*reasons why someone may become anaemic* lack of foods providing iron; lack of vitamin C; blood loss e.g. surgery, childbirth. menstruation;	**2**

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Question	Answer	Marks
5(c)	*functions of phosphorus* constituent of bones and teeth / structure and maintenance of bones and teeth / skeletal system structure; forms an essential part of all body cells including hair and nails; growth, maintenance and repair of all tissues and cells / cell membrane; helps filter out waste in the kidneys; helps in energy storage and release of energy / contributes to energy metabolism (from fats, carbohydrates and proteins); helps to keep blood pH neutral; maintains fluid balance in the body; muscle contractions; nerve functioning; normal heartbeat; production of the genetic building blocks / DNA / RNA;	**4**

Question	Answer	Marks
6(a)	*types of processed foods that could be high in salt* bread; breakfast cereals; canned food e.g. vegetables, soup, fish, meat; cheese / cheese products; dressings / sauces e.g. soy sauce, brown sauce, mayonnaise, ketchup; cured meats e.g. bacon, ham, salami, luncheon meat, sausages, Spam, corned beef; (named) convenience foods / fast foods / ready-made meals e.g. instant noodles; peanut butter; preserved food e.g. dried / salted / smoked food e.g. fish, egg, meat, pickles; snack foods e.g. crisps / chips, crackers, salted peanuts; stock cubes;	**3**
6(b)	*reasons why salt is added to processed foods* preservative / extend shelf life / prevent from spoiling; flavouring / flavour enhancer / make food taste better;	**2**

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Question	Answer	Marks
7	*occasions when extra hydration may be needed* during high temperatures / humidity; after exercise / any specific sport or activity causing sweating / manual labour; if suffering from constipation; during pregnancy / lactation; when ill / have a raised temperature / fever / convalescing; after vomiting / being sick; after diarrhoea;	**4**

Question	Answer	Marks
8(a)	*functions of eggs and caster sugar* ingredient: functions eggs: add colour (from the yolk); adds moisture; aerates / traps air when whisked with sugar / increases volume; coagulate / set when heated to provide structure/shape / binds ingredients together; provides a light/airy/fluffy/spongy texture; caster sugar: adds flavour / sweetens; caramelises during baking; Maillard browning occurs during baking; adds moisture as sugar liquefies on heating; preserves / helps to retain moisture / improves the keeping qualities / increases shelf life / reduces staling; aerates / traps air when whisked with egg / increases volume; softens crumb or gluten in flour / provides a tender/light/airy/fluffy/spongy texture;	**4**
8(b)(i)	*reason for sieving flour* to refine flour / make flour finer / to incorporate more air / to remove contaminants;	**1**
8(b)(ii)	*reason for folding in flour carefully* beating / over-mixing will destroy air pockets in egg and sugar;	**1**

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Question	Answer	Marks
8(b)(iii)	*reason for using a metal spoon to fold in the flour* has a cutting edge that will cut through the mixture without destroying the air pockets;	**1**
8(b)(iv)	*reason for using a figure of eight to fold in the flour* this avoids over-mixing and retains as much air as possible;	**1**
8(b)(v)	*reason for continuing to fold until no dry flour is visible* ensure all flour incorporated / avoid lumps / pockets of flour in the baked sponge / result in smooth mixture;	**1**
8(c)	*types of icing that could be used to decorate the finished sponge cake* buttercream / frosting / Swiss meringue buttercream / lemon meringue buttercream / Italian meringue buttercream; cream cheese frosting; fondant / sugar paste; ganache / chocolate icing / melted chocolate; glacé; meringue; royal;	**3**
8(d)(i)	*holding handle* good grip / suits size of person's hand / good position / comfortable shape to hold / non-slip / durability / stable / sturdy / rubber / silicone / moulded handle / gap is comfortable;	**1**
8(d)(ii)	*beaters* the bigger they are the quicker it is to whip a lot of air into mixture / smooth turning action / if beaters click together then it will soon be inoperable**;**	**1**
8(d)(iii)	*weight* whisking can take time so if the whisk is too heavy your arm will tire and you'll need to take breaks, so something lightweight is a must;	**1**
8(d)(iv)	*turning handle* ergonomic (designed for efficiency and comfort) so minimises physical effort and discomfort / turns easily/smoothly / comfortable to hold / can be operated without fingers catching with gears or beaters;	**1**

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Question	Answer	Marks
8(e)	*other points to consider when buying a new rotary whisk* colour to fit in with kitchen décor; consider the dimensions/size of the whisk so it will fit neatly into a cupboard or drawer; choose a whisk which is affordable / suits budget; choose whisk that has a good brand / reputation / ask family or friends for advice to ensure value for money; durability of material; warranty / guarantee; is it easy to clean / is it dishwasher safe;	**2**

Question	Answer	Marks
9(a)	*functions of dietary fibre* absorbs water in colon which softens faeces making it bulky and easy to excrete; aids egestion / stimulates peristalsis making it easier to expel waste regularly / aids normal bowel movement; reduces / lowers cholesterol so reducing the risk of CHD; helps prevent hernia; helps prevent varicose veins; helps to remove/absorb toxins; gives feeling of fullness / high satiety which reduces risk of snacking so contributing to a reduced risk of obesity; helps reduce the risk of developing bowel-related diseases e.g. constipation, cancer of colon, diverticular disease, haemorrhoids; controls blood sugar levels which will help to prevent type 2 diabetes;	**6**
9(b)	*points to consider when buying fresh fruit* no obvious signs of damage / bruising / enzymic browning; check for mould/decay/signs of rotting; no unpleasant smell; (good) colour for type of fruit; even shape and size; firm not soft/spongy; buy in season as often cheaper; slightly under ripe to last longer; select organic; check country of origin / food miles / Fairtrade;	**4**

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Question	Answer	Marks
9(c)(i)	*type of browning* enzymic / enzymatic browning;	**1**
9(c)(ii)	*ways to prevent this type of browning occurring when preparing fresh fruit* immerse in water after preparation; keep in airtight container / sealed bag / cling film in fridge / cool place after preparation; prepare and cover with acidic / citrus juice e.g. lemon, orange; prepare just before needed / prepare and use immediately;	**2**
9(d)	*basic first aid treatment for cut finger* wash/clean the cut under cold water; clean/sterilise with antiseptic wipe / alcohol / rubbing alcohol; dry area with clean (lint free) cloth; apply pressure to stem / stop the bleeding; put antibiotic cream on the cut; cover with a (blue waterproof) plaster / bandage / finger tape;	**4**
10	*guidelines for storing fresh food in a refrigerator* install a thermometer to ensure fridge is operating at 0°C – 8°C; to slow rate of multiplication of microorganisms / enzymes; cover food / store in clean container; prevents drying / prevents absorption of smells / avoid bacteria / pests reaching food / avoid cross-contamination / avoid discolouration / browning of food; do not over-pack / stock fridge with produce; to allow cold air to circulate so fridge remains at optimum temperature; store raw meat at bottom of fridge / below cooked foods; to avoid dripping onto other food so causing cross-contamination; never place warm / hot foods directly into the fridge; it raises temperature which causes microorganisms to multiply rapidly; clean fridge regularly / clean any spills immediately; to prevent attracting pests leading to contamination / remove and slow down growth of microorganisms; do not open door more than necessary / avoid leaving door open; as temperature will not be maintained and conditions become suitable for microorganisms to multiply rapidly; ensure food is clean / pest free when storing e.g. vegetables; to avoid contamination of other foods; separate / cover strong smelling foods; to maintain quality / taste of other food; store food in appropriate place e.g. fruit and vegetables in crisper / salad drawer, dairy closer to top shelf; this will ensure food will maintain its quality / does not deteriorate too rapidly; use food in rotation / check expiry dates / remove foods that have gone beyond their use-by date; food should be used when in best condition / it may be unsafe if eaten after use-by date / may cause cross-contamination if infected;	**10**

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Question	Answer	Marks
11	*Cereals form the main part of the diet for many people of the world. Discuss the nutritional and health benefits of cereals. With examples, demonstrate the varied uses of wheat, maize and rice in family meals.* *nutritional and health benefits of cereals [max 8 marks]* source of (LBV) protein – growth / repair / maintenance / enzymes / hormones / antibodies; provides good source of LBV protein for vegetarians, with complementation can be used to obtain essential amino acids; refined cereals are low in fat / low in saturated fat / low in cholesterol so can help prevent health issues linked to high fat such as obesity, CHD, HBP, stroke; wholegrain cereals (wholegrain wheat, brown rice, unrefined maize, oats) are a source of fat – energy / provides a reserve of energy / provides insulation / protects vital organs / forms structure of cell membranes; source of starch / carbohydrate which provides the body with energy; energy from cereals is released slowly so helps provide energy throughout the day preventing need to overeat; wholegrain cereals (wholegrain wheat, brown rice, unrefined maize, oats) are a source of fibre / NSP – may help lower blood cholesterol so can reduce the risk of developing coronary heart disease / controls blood sugar so helping prevent type 2 diabetes / increases stool bulk / may help with weight control providing satiety due to delaying food leaving the stomach / can help to prevent bowel disorders/constipation/bowel cancer/haemorrhoids/diverticular disease/irritable bowel syndrome; source of vitamin B / thiamin / riboflavin / nicotinic acid / folate – release of energy from carbohydrates / healthy nervous system / normal growth; source of vitamin E – antioxidant that can help lower blood cholesterol levels to help protect against heart disease / destroys free radicals / reduces risk of developing certain cancers; source of iron – production of haemoglobin / red pigment in blood which transports oxygen to cells / for cell respiration / production of energy / removes carbon dioxide / prevents anaemia; source of calcium – gives strength to bones and teeth / maintenance of bones and teeth / can help reduce the risk of tooth decay / dental caries / osteoporosis / rickets; source of phosphorous – releases energy from food / helps build strong bones and teeth; source of potassium – normal functioning of muscles and nerves / maintenance of fluid and electrolyte balance / neutralises effects of sodium so helps reduce the risk of hypertension; some breakfast cereals are fortified with vitamin D which can be used to assist in the absorption of calcium, formation / maintenance / strength bones and teeth - required for blood clotting / prevents rickets / osteomalacia / osteoporosis;	**15**

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Question	Answer	Marks
11	*uses of wheat, maize and rice in family meals [max 8 marks]* *wheat* milled into semolina / bulgur / couscous and used as accompaniment to or part of named sweet or savoury dishes; milled into flour and used as an ingredient in bread/pasta/pastry/cakes/biscuits / used for thickening sauces/gravies / coating food before frying; processed into breakfast cereals (with examples); *maize* milled into cornflour and used as thickening agent, eg. corn flour in custard, gravy; milled into cornmeal and used for polenta / biscuits / bread / grits / hominy; processed as oil that can be used in named dishes; made into popcorn that can be eaten as a snack; used as a vegetable accompaniment or part of main dish; processed into corn syrup used as sweetening ingredient in baked goods / frostings / jams / jellies; processed into breakfast cereals (with examples); *rice* milled into rice flour and made into rice cakes / noodles / pancakes / pastries; used as an accompaniment or part of a main dish e.g. boiled rice, paella, stir fried rice; used as part of sweet dish e.g. rice pudding, ground rice pudding; processed as oil that can be used in named dishes; processed into breakfast cereals (with examples);	

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Question	Answer	Marks
12	*Discuss the advantages of preserving food in the home.* *With examples, suggest different methods of preserving apples by the use of temperature. Explain the principles involved in each identified method.* *advantages of preserving food [max 10 marks]* prevents waste / spoilage of food by stopping enzyme action in ripening process when there is a glut; prevents waste / spoilage of food / reduces risk of food poisoning by preventing growth of microorganisms when there is a glut / when batch baking / or when food is left over from a meal; food can be enjoyed when out of season e.g. frozen strawberries in winter; diet can have more variety by introducing different flavours / textures of the same food eg dried, canned or bottled tomatoes allowing flexibility of ingredient choice when meal planning; new products can be created using different ingredients eg apple jam, apple chutney; shelf life of food is extended by preservation methods so food can be kept/stored in peak condition rather than allowed to spoil and be wasted by action of enzymes and microorganisms; by sealing food in packaging such as sterile airtight containers/bottles/freezer bags/cans spoilage and further attack by microorganisms is prevented; when supply of food is limited or scarce such as bad harvest/famine/war/pandemic there are supplies of preserved food available; preserving foods allow retention of the sensory qualities of fresh food eg flavour, colour which contribute to appetising meal outcomes; preserving foods allow retention of the nutritive value of fresh food e.g. water-soluble vitamins B / C; preserving food is a means of saving money as produce / leftovers are not thrown away due to food spoilage; do not have to shop as often as there is a food supply at home which means less time is used in shopping trips / lowers carbon footprint / lowers fuel costs; can be cheaper / more economical to preserve food rather than buy in a shop if fresh produce is home-grown / reduced in a supermarket / market / bought from farm shop or pick your own; preservation is an enjoyable / satisfying process; the taste / flavour of home-made preserves may be preferable to those bought from a shop; preserves can be made to suit own nutritional / sensory requirements, e.g. less sugar, no artificial flavourings / colourings / chemicals, different ingredients can be used from conventional recipes;	**15**

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Question	Answer	Marks
12	*methods and principles involved in the preservation of apples at home [max 6 marks]* jam / jelly / bottling / canning / chutney; added sugar (makes conditions unsuitable for microorganisms to thrive); method uses high temperature; to destroy enzymes; to destroy microorganisms; product sealed in sterilised jars / cans; jars/cans sealed to prevent entry of air and growth of microorganisms; freezing; food blanched to destroy enzymes; food blanched to destroy microorganisms; food put in container / sealed plastic bag and air removed to prevent freezer burn / maintain quality of food; food freezes between –18°C to –21°C; microorganisms are dormant at cold temperatures;	

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