CAMBRIDGE
International Education

Cambridge IGCSE™

FOOD & NUTRITION **0648/12**

Paper 1 Theory **October/November 2024**

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.

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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	‘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.

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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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Question	Answer	Marks
1(a)	*elements that occur in protein molecules* carbon; hydrogen; nitrogen; oxygen; phosphorus; sulfur;	**2**
1(b)(i)	*disease that results from an insufficient amount of protein* marasmus / kwashiorkor;	**1**
1(b)(ii)	*animal foods that help prevent the disease named in* (b)(i) dairy foods or named example e.g. cheese, milk, yoghurt etc.; eggs; fish / seafood or named example; poultry / meat or named example; offal or named example;	**3**
1(c)	*where in the digestive system the absorption of protein takes place* ileum;	**1**
1(d)	*end product of protein digestion* amino acid;	**1**
1(e)	*term that describes the effect of heat on protein* coagulation / denaturation;	**1**

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Question	Answer	Marks
2	*functions of calcium* building / forming / growing bones / teeth / nails; increases bone density which increases bone mass; involved in blood clotting; strengthen / maintain healthy bones / teeth / nails; needed for contraction of the muscles / avoid muscle pain; needed for nerve function; needed for the maintenance of a regular heartbeat;	**4**

Question	Answer	Marks
3(a)	*foods that are a good source of polyunsaturated fats* fish liver oil / any named e.g.; maize oil / wheat germ oil; margarine; nut / nut oil / nut butter any named e.g. peanuts / walnuts / almonds; oily fish / any named e.g.; seeds e.g. sesame / flax / sunflower / safflower / grape / chia / mustard; soya bean / oil;	**3**
3(b)	*substance that emulsifies fat* bile;	**1**

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Question	Answer	Marks
4	*functions of vitamin E* antioxidant / helps resistance to infection / fights infection / maintains healthy immune system; healthy skin; helps functioning of sex organs / reproduction / fertility; helps with health of eyes; may help prevent the formation of blood clots that could cause CHD / heart disease / heart attack / stroke; protects cells / cell membranes from (oxidative) damage by free radicals; reduces risk of developing certain cancers;	**2**

Question	Answer	Marks
5(a)	*reasons for garnishing savoury food* enhances the appearance of food / provides sensory appeal / makes meal more appealing; may improve nutritional content; may provide additional aroma; may provide additional colour; may provide additional flavour / taste; may provide alternative texture; stimulates appetite / makes meal more appetising;	**3**

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Question	Answer	Marks
5(b)	*examples of garnishes* croutons; edible flowers; egg e.g. sliced, chopped white, sieved yolk; olives; one named cheese e.g. Parmesan, red Leicester, sage Derby, Stilton etc.; one named cream e.g. crème fraîche, double cream, sour cream; one named fruit e.g. lemon, orange, lime, berries, pomegranate etc.; one named herb e.g. parsley, chives, coriander, mint, dill etc.; one named nut e.g. almond, pecan, walnut etc.; one named oil e.g. sesame, olive, walnut; one named salad leaf e.g. spinach, rocket, little gem, romaine, iceberg, radicchio, endive, watercress etc.; one named salad vegetable e.g. cucumber, tomato, radish, beetroot, spring onion, pepper, carrot, chilli, onion ring, shallot etc.; one named seed e.g. sesame, poppy, pumpkin, sunflower etc.; one named vinegar e.g. cider, balsamic; paprika; savoury butter e.g. sun-dried tomato, parsley, chive;	**3**

Question	Answer	Marks
6(a)	*monosaccharide example* fructose; galactose; glucose;	**1**
6(b)	*disaccharide example* lactose; maltose; sucrose;	**1**

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Question	Answer	Marks
6(c)	*functions of sugar in food products* adds colour by use of brown sugar / caramelisation / Maillard reaction; aerates e.g. creaming; aids fermentation of yeast; bulking agent / adds volume; flavour / taste enhancer / balances acidic, spicy, sweet flavours; provides soft / tender / spongy / fluffy structure by softening gluten; stabilises mixtures e.g. meringues / whisked mixtures; sweetener / adds sweet taste;	**3**

Question	Answer	Marks
7(a)	*problems associated with a lack of NSP in the diet* build-up of toxins; cancer of colon / bowel cancer; constipation; diverticular disease; haemorrhoids / piles; hernia; higher blood sugar; higher cholesterol; lack of satiety; varicose veins;	**4**

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Question	Answer	Marks
7(b)	*ways to increase the intake of NSP in family meals* add bran to food e.g. dishes using flour, sprinkled over cereal; add nuts to breakfast cereal, yogurt, cakes, salads, etc.; add seeds to breakfast cereals, yoghurt, home-made bread or sprinkle over salads; choose high fibre breakfast cereals; choose wholegrain bread for toast / sandwiches; eat carrots / potatoes / apples etc. with skins on; add beans / pulses / legumes in salads, soups, stews and casseroles; add fresh fruit / dried fruit on cereal or in desserts; add vegetables in soups, meal accompaniments, salads; substitute whole wheat or oat flour for up to half of the flour in flour-based recipes; switch from white pasta to brown / wholemeal / chickpea pasta; switch from white rice to brown rice; use whole grains such as barley in vegetable soup or stews and bulgur wheat in casserole or stir-fries;	**6**

Question	Answer	Marks
8(a)	*chemical raising agent found in self-raising flour* baking powder;	**1**
8(b)	*mechanical methods of raising the cupcake mixture* creaming the sugar and fat together; sieving flour; beating eggs;	**2**
8(c)(i)	*why the flour is 'folded' into the mixture when making the cupcakes* ensures that air is not lost from the mixture / air bubbles are maintained / helps ensure the cake has a light / spongy / fluffy texture when cooked;	**1**
8(c)(ii)	*piece of equipment that is used to fold the flour into the mixture* metal spoon / tablespoon / spatula / palette knife;	**1**

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Question	Answer	Marks
8(d)	*why cupcakes may not be successful when made with a low-fat spread* low-fat spread contains a high proportion of water / creamed mixture cannot hold air as well with low-fat spread / use of low-fat spread does not result in a risen / light / spongy / fluffy textured cake / low-fat spread tends to give a greasy / oily mouthfeel / does not produce a cake with as good a flavour / taste;	**1**
8(e)	*types of sugar that can be used to make successful cupcakes* (soft) dark brown (Muscovado / Barbados) sugar; (golden) caster sugar; (soft) light brown (Muscovado / Barbados) sugar;	**2**
8(f)(i)	*effects on the baked cupcakes if too much sugar added* cake will be brown / darker in colour; cake will be sweeter / too sweet; cake will burn (more easily); rough / coarse / grainy / denser texture; the structure may collapse / sink in the middle;	**3**
8(f)(ii)	*reasons why cupcakes may be too crisp around the edges when baked* cake baked for too long / over-baked; cake too close to heat source; cake too high in oven / not on correct shelf; insufficient flour added; oven temperature too high;	**3**

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Question	Answer	Marks
8(g)	*functions of the egg in the recipe* adds flavour; adds moisture; adds / gives / provides colour, by yolk, by Maillard reaction; aerates / raising agent / provides air / steam (to help cake rise) to provide cake with volume and a have fluffy / spongy / open texture; binds mixture / protein in egg sets / coagulates on heating to form shape / structure of cake; emulsifies / holds fat and water / prevents curdling; enriches / adds nutritional value;	**3**

Question	Answer	Marks
9(a)	*benefits to the consumer of weight or volume on a food label* to calculate unit cost; make comparisons between products to get value for money; buy the amount required; to check how many portions / servings the product will give;	**2**
9(b)	*benefits to the consumer of storage instructions on a food label* decide whether to purchase product if stated storage conditions not available in the home; to know best conditions / how / where to properly / correctly keep / store product (help consumers who have limited knowledge of product); prevent potential growth of microorganisms / mould / bacteria so preventing possible food safety / poisoning issues; prevent wastage of food as if not kept in specified place food may get spoiled / go bad; to maintain quality of product / allows the product to be at its best / in good condition before eating;	**2**

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Question	Answer	Marks
10	*reasons for cooking food* cooking adds variety of foods to diet e.g. eggs can be poached / fried / boiled / scrambled; cooking changes appearance of food e.g. makes it more attractive / appetising / appealing; cooking changes the colour of food e.g. caramelisation / dextrinisation / Maillard browning in pastry / cakes / meat; cooking creates new dishes from ingredients e.g. quiche, chocolate cake; cooking develops / changes texture e.g. egg sets on heating, fried food becomes crisp; cooking extends shelf life / helps preserve food / delays / prevents spoilage e.g. jam / pickles / condensed milk; cooking improves / changes flavour / taste / makes it tastier / more tasty e.g. extractives in meat are developed during cooking / caramelisation / dextrinisation; cooking makes food more digestible e.g. cooked starch, (potato / rice / pasta) is digested more easily than raw; cooking makes food more edible / easier to eat / chew e.g. meat is tenderised / softened / cooked fish easier to chew; cooking provides hot food in cold weather e.g. soup in winter; cooking reduces bulk of food e.g. green vegetables; it is necessary for some cooking processes e.g. thickening sauces / baking / rising; smell of cooked food stimulates flow of digestive juices e.g. curry, fried bacon; to destroy natural toxins in food e.g. red kidney beans / cassava; to make it safe to eat / prevent harm to consumer through food poisoning e.g. bacteria in meat / milk are destroyed by heat;	**6**

Question	Answer	Marks
11(a)	*advantages to the consumer of using antioxidants in convenience foods* extends shelf life of <u>high fat</u> content foods; help improve keeping quality; make foods last longer / preserves food / extends shelf life; prevent fat in foods combining with oxygen (oxidisation) and becoming rancid; prevent staling of food such as cakes and biscuits; prevents enzymic browning; prevents formation of free radicals (by forming stable radicals) / may lower risk of developing cancer;	**2**

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Question	Answer	Marks
11(b)	*types of additives that may be found in convenience foods* anti-caking agents; bulking agents; colourings; emulsifiers / stabilisers / gelling agents / thickeners; flavours / flavour enhancers / sweeteners; humectants; nutrient enrichment / enhancers; preservatives; raising agents;	**2**

Question	Answer	Marks
12(a)	*nutrients found in soya beans* calcium; carbohydrate / starch; fat; iron; NSP / dietary fibre; phosphorus; potassium; vitamin B group / B1 thiamine / B3 nicotinic acid / B9 folate; vitamin K;	**5**

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Question	Answer	Marks
12(b)	*products that can be made from soya beans* soy flour; soy sauce; soya cheese; soya cream; soya milk; soya yogurt; soybean oil / butter; soybean paste / miso; tempeh; tofu / bean curd / teokon;	**4**
12(c)	*benefits of using TVP* adds texture to dishes; adds variety to meals as it can be made into many forms e.g. sausages / mince / chunks / burgers / ready meals; can be mixed with meat to give a cheaper product / meat extender; can be used as a meat replacement; cheap to produce so less expensive than meat; cooks quickly; dehydrated so easy to store; dehydrated so light to transport / carry; easy to cook; ethically / morally acceptable due to no slaughter of animals, less use of land for raising animals / sustainability; filling / provides feeling of satiety; no preparation; no risk of animal diseases e.g. BSE / bird flu etc.; not ‘high risk’ food compared to meat; takes flavours from other food / flavours can be varied; useful for vegans / vegetarians;	**5**

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Question	Answer	Marks
13	*Discuss ways to be economical when shopping for food to prepare balanced meals.* be selective and don't be tempted to buy food just because it is on offer; buy cheaper local produce / avoid buying more expensive imported food; buy foods in season at pick your own, market stall, local farms which may be cheaper and better nutritional quality than supermarket; buy in bulk / larger packages can prove more cost effective; buy in bulk as long as the product does not have a short shelf life or it can be preserved for future use; buy loose / refillable items e.g. fruit / veg / pasta / pulses which may be cheaper as money is not spent on packaging; buy store's own brand as they tend to be cheaper than premium brands; cheaper sources of protein e.g. milk, cheese, eggs, soya products, pulses can be used to extend/substitute meat, mix LBV protein to give HBV so reducing overall cost yet still getting good nutritional value; check best-before date / quality of fresh produce / packaging for rips / dents / bulges so there is a longer time to use / less waste; check the unit price on foods e.g. price per kg so price comparisons can be made; choose easy to prepare meals that don't require expensive, specialist ingredients; compare / research online prices in different shops to decide which is cheapest; do not have fixed meal plans look for bargains / base meals around special deals to avoid overspending; have a fixed budget / use cash instead of credit / use 'scan and go' to avoid overspending; if possible use a cheaper substitute/alternative ingredient e.g. margarine rather than butter, peanuts instead of almonds; look for reduced food bargains which are at / almost at their use-by-date / reduced at the end of the day as long as they can be used or stored; make a shopping list / only buy the quantity / portions needed to reduce impulse buys / avoid waste if food not used; make meals from scratch rather than using convenience / processed/ready-prepared foods / fast food which can be unhealthy and more expensive; make use of special offers / BOGOF offers / look for incentives offered by supermarkets such as loyalty cards and money saving coupons to save money; make use of starchy carbohydrates that are cheap and filling; plan weeks meals before shopping / shop once a week / fortnight / month to lessen transport cost / to avoid temptation / impulse purchases;	**15**

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Question	Answer	Marks
13	rather than buy pre-prepared fruit / veg / salad do this at home; shop after eating to avoid buying food when hungry; shop at different places e.g. discount supermarkets / markets / wholesaler to get value for money; shop locally / shop online to save transport costs; stop or reduce purchasing luxury items, such as steak; take own bags to avoid extra cost paying for supermarket ones; tinned and frozen foods e.g. vegetables can be cheaper than fresh and are easily stored; use a basket / small trolley to avoid overfilling empty space in larger trolley; use cheaper cuts of meat / types of fish; use left-over food and purchase items to add to make another dish / check what is in cupboard / fridge and make use of food already available / don't double buy;	

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Question	Answer	Marks
14	*Discuss factors that may influence a person to follow a vegetarian lifestyle.* *culture / religion/tradition* family tradition that children are brought up as vegetarian may continue to follow when adult; cultural or traditional diet of a particular area or country e.g. Jamaican Ital / Ethiopian diet / Indian culture; religious beliefs e.g. Buddhism, Hinduism, Jainism, Rastafarians, Zoroastrianism all practice some form of vegetarianism; *economical* if income limited a vegetarian diet can be cheaper; meat and animal products are more expensive to buy than plants and plant products; *environmental* huge areas of land are subject to deforestation to graze cattle so not green friendly / wildlife habitats protected**;** arable farming better for the environment as less production of methane compared to pastoral farming so this helps to reduce global warming; less water is used in arable farming than pastoral so being vegetarian helps world water crisis; choosing vegetarian diet may help lessen pollution of waterways / streams / rivers / oceans through animal waste and helps reduce destruction of wildlife habitats and endangered species**;** *health* diet may be higher in NSP so may reduce the risk of constipation / bowel disorders / diverticular disease / bowel cancer / haemorrhoids; diet may contain low amounts of fat / <u>saturated</u> fat which helps reduce the risk of obesity / coronary heart disease / keeps blood cholesterol level low / helps reduce the risk of hypertension / stroke / type 2 diabetes / gallstones / rheumatoid arthritis; diet has lower intake of cholesterol which helps reduce the risk of coronary heart disease / keeps blood cholesterol level low / helps reduce the risk of hypertension / stroke / gallstones; diet may contain high amounts of fruit / leafy green vegetables that are a good source of antioxidants / A / C / E vitamins so may help to ward off free radicals in the body / reduce the risk of certain cancers; diet may protect against certain food-borne illnesses / avian flu / BSE / presence of E-coli and salmonella; less risk of ingesting hormones used in animal rearing may result in prevention of certain cancers;	**15**

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Question	Answer	Marks
14	*Influencers* influence from others such as family / celebrities / peers / media trends to follow vegetarian diet; *moral/ethical* some people are influenced from a humanitarian perspective as they consider it cruel to kill animals for consumption or use animal products for food; people are concerned for animal welfare and object to factory / intensive animal farming / rearing conditions; animals waste resources as crops that could be used to feed humans are used to feed animals; more crops can be produced from the same area of land used for animal rearing so more people could be fed; *other* personal preference such as dislike appearance, texture, taste, smell of animal flesh and products; some people have space to grow their own crops but may not be able to rear animals so plant foods easier to obtain and store; evolving technology methods have allowed wider variety and availability of vegetarian products so vegetarian lifestyle easier and more tempting with all choice available;	

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