Cambridge Assessment International Education

Cambridge IGCSE™

FOOD AND NUTRITION **0648/12**

Paper 1 Theory **May/June 2022**

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 descriptors 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	***term used to describe chemical processes that take place in the body*** metabolism;	**1**

Question	Answer	Marks
2(a)(i)	***chemical name for simple sugar*** monosaccharide;	**1**
2(a)(ii)	***examples of simple sugars*** glucose; fructose; galactose;	**2**
2(b)	***ways the body uses carbohydrate foods*** energy; provide dietary fibre / aids digestion / satiety/fullness / lowers cholesterol / lowers blood sugar or any function of NSP; stored as glycogen (as reserve energy source); protein sparer so protein can be utilised for growth etc.;	**2**

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Question	Answer	Marks
3(a)	*oily fish* anchovies; eel; herring/kipper; mackerel/kingfish; pilchards; salmon; sardines; sprats; swordfish; trout; tuna; whitebait;	**4**
3(b)	***good sources of HBV for a lacto-vegetarian*** chia; dairy foods or named example e.g. cheese, milk, yoghurt etc.; eggs; quinoa; Quorn; soya / products or named example e.g. tofu;	**3**

Question	Answer	Marks
3(c)(i)	***enzymes that break down proteins during digestion*** pepsin / peptidase / protease; trypsin; erepsin;	**2**
3(c)(ii)	***end-product of protein digestion*** amino acid;	**1**
3(d)	***deficiency disease caused by a lack of protein*** kwashiorkor / marasmus;	**1**

Question	Answer	Marks
4(a)	***functions of vitamin E in the body*** antioxidant / destroys free radicals; formation of new blood vessels around damaged areas / helps wounds heal; forms / makes new red blood cells; functioning of sex organs / reproduction/fertility; healthy skin; helps resistance to infection / maintains healthy immune system / supports production of antibodies; maintenance of cell membranes / cellular respiration; prevents blood from clotting / works with vitamin K; reduces risk of developing certai n cancers;	**3**

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Question	Answer	Marks
4(b)	***sources of vitamin E*** asparagus; avocado; beans; dairy foods or named example e.g. cheese, milk, yoghurt etc.; egg yolk / egg; green leafy vegetables / broccoli; kiwi; liver; mango; margarine; nuts; oily fish; olives; peanuts / peanut oil / butter; peppers, any colour; quinoa; seeds; tofu; tomato; vegetable / soya bean oils; wheatgerm / whole-grains / grasses e.g. oats, corn, rice; yam;	**3**

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Question	Answer	Marks
5	***functions of vitamin C*** absorption of iron / prevention of anaemia; antioxidant / destroys free radicals; build / maintain healthy skin; build / maintain linings of digestive system; heals cells / wounds / fractures; healthy gums; helps form/build strong bones and teeth; helps resistance to infection / maintains healthy immune system / supports production of antibodies; prevent scurvy; production of blood / walls of blood vessels; reduces risk of certain cancers; to make connective tissue / formation of collagen;	**4**

Question	Answer	Marks
6(a)	***group of people who are most likely to suffer from rickets*** children;	**1**
6(b)(i)	***mineral that helps to prevent rickets*** calcium / phosphorus;	**1**
6(b)(ii)	***vitamin that helps to prevent rickets*** vitamin D;	**1**

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Question	Answer	Marks
6(c)	***foods that are a good source of vitamin D*** milk / butter / cheese / cream / yoghurt; eggs; fish liver oils (or named example cod / halibut); fortified fat spreads / margarine; fortified (breakfast) cereals; liver; oily fish (or named example salmon, sardines, herring, mackerel and fresh tuna); red meat;	**2**

Question	Answer	Marks
7(a)	***factors that may increase the risk of developing type 2 diabetes*** age; being overweight / obese; leading an inactive / sedentary lifestyle; genetics / family history / certain ethnicities / hereditary; high blood pressure; pregnancy;	**4**
7(b)	***nutritional guidelines to help manage type 2 diabetes*** eat a well-balanced diet / follow nutritional tools; eat foods low in sugar / reduce sugar intake / use artificial sweetener; eat complex / starchy carbohydrates e.g. wholegrain / wholemeal; reduce intake of refined carbohydrates e.g. white rice, pasta, bread; reduce saturated fat intake (as diabetics are more susceptible to CHD); limit salt added to foods / naturally salty foods (due to increased risk of HBP); increase intake of vegetables and fruits (as they contain ACE vitamins that help prevent heart disease / provide satiety / are less energy dense);	**4**

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Question	Answer	Marks
8(a)	***explain why cream from supermarket B should not be purchased*** temp 0°C – 8°C is correct for chilled foods / 12°C temp is too high; cream is in danger zone; bacteria will multiply as cream is a high risk food; consumer will be at risk of food poisoning; cream is highly perishable / it would spoil / go off / go rancid / expire more quickly;	**2**
8(b)	***process of manufacturing condensed milk*** milk is homogenised; heated to 80°C / 176°F; heated for 15 minutes; sugar added; some water removed / evaporated; cooled; sealed in cans / canned / pouches / cartons;	**4**
8(c)(i)	***different animal foods that are good sources of iron*** eggs; oily fish or shellfish e.g. prawns / tuna / mackerel / pilchards / salmon / sardines; offal e.g. liver / kidney / pate; poultry; red meats e.g. beef / lamb / veal / pork;	**3**
8(c)(ii)	***function of iron in the body*** formation of the (protein) haemoglobin / red pigment in blood; prevents anaemia; oxidises / converts glucose to produce energy;	**1**

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Question	Answer	Marks
8(d)	***best-before date on a food label*** best before dates are an indication of quality rather than safety; best before means that the product will not go bad but after that date the quality may have deteriorated; best before used for foods with a long shelf life;	**2**

Question	Answer	Marks
9(a)	***causes of food spoilage*** chemical contamination; damaged in transit / by handler e.g. bruised foods / broken packaging; enzymes; incorrect storage conditions / temperature; moisture gain; moisture loss; moulds / fungi; oxidation / enzymic browning; pests / flies / rats / vermin; physical contamination e.g. hair; yeasts;	**2**

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Question	Answer	Marks
9(b)	***reasons why a person would make their own jam*** grow their own fruit; glut of fruit in season so preventing waste; enjoy jam-making / pass on skills; fruit reduced for quick sale in a supermarket / farm shop / pick your own; provide food by using when fruits plentiful and cheaper to store when more costly; they like the taste of home-made jam / better flavour / make it to own taste / different varieties of fruit can be used;; want to know what ingredients are in their jam / can reduce quantity of sugar; cheaper than buying jam; free from artificial flavourings / colourings / chemicals; lower carbon footprint / food miles through transportation methods; to enjoy fruit when out of season / to extend shelf life of fruit; to provide food when supply is limited or scarce / to use in emergencies / famine / war; to retain as many of the qualities of fresh food as possible / flavour / colour / appearance / texture / nutritive value; to prevent loss of water / dehydration of fresh fruit; to prevent food spoilage by destroying microorganisms / to prevent the growth of microorganisms;	**5**
9(c)(i)	***how salt prevents food spoilage*** reduces water content (by osmosis); microorganisms cannot survive in conditions with a high concentration of salt; microorganisms need water to grow;	**2**
9(c)(ii)	***how vinegar prevents food spoilage*** increases acidity of food; bacteria cannot reproduce as they need a slightly alkaline or neutral pH in order to grow; bacteria cannot thrive in highly acidic conditions;	**2**

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Question	Answer	Marks
10(a)(i)	***why fresh fish should be used within 24 hours of purchase*** fish is a high risk food; fish has a high moisture content that bacteria need to thrive; fish has a high protein content that bacteria need to thrive; to keep it safe to eat / to reduce risk of food poisoning; to prevent bad smell / odour developing; to maintain quality of fish / tastes better / doesn't get spoilt / prevent fish going off;	**3**
10(a)(ii)	***reasons to wrap fish before storing*** to prevent flesh drying; to prevent fish contaminating other food e.g. by leaking; to prevent vermin contaminating fish; to prevent absorption of smells (from other food / to other food); to prevent microorganisms from other food contaminating fish;	**3**
10(b)	***suitable moist-heat methods of cooking fish*** poach; steam; stew / casserole; slow cook;	**2**
10(c)	***effects of cooking on fish*** collagen converted to gelatine / fish tenderises / flesh becomes softer / fish becomes more digestible; protein coagulates / denatures; flesh colour changes / becomes opaque; loss of vitamin B; microorganisms are destroyed; connective tissue dissolves and fish shrinks; flesh breaks apart easily / flakes; flesh becomes firm;	**4**

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Question	Answer	Marks
10(d)	***different sources of vitamin C that could be included as part of a fish dish*** citrus fruit / named example; mango; peppers; (new) potatoes; tomatoes; green vegetables / named example; parsley;	**2**

Question	Answer	Marks
11(a)	***mechanical methods of introducing air into a mixture*** beating; creaming; rolling and folding; rubbing in; whisking;	**3**
11(b)	***ingredient that is used as a raising agent*** self-raising flour / baking powder / bicarbonate of soda / yeast;	**1**

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Question	Answer	Marks
12	***personal safety precautions that should be followed before cooking*** roll up long sleeves; don't wear loose clothing / wear close-fit clothing; don't wear clothing with long, loose sleeves; remove any other loose articles of clothing like scarves or ties; wear suitable footwear OR avoid wearing high heels / open sandals / slippers; keep hair tied back / covered; avoid wearing jewellery such as rings / bracelets / long necklaces; wear an apron; ensure hands are dry before handling electrical equipment / using oven gloves / knives;	**4**

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Question	Answer	Marks
13	***Eggs are used in a wide variety of dishes. Explain, with examples, the following functions of eggs in the preparation and cooking of dishes:*** *aeration* *coagulation* *aeration [max. 8 marks]* egg acts as a raising agent when used in some dishes / helps dishes rise; aeration can be achieved by using the whole egg or just egg white; dishes that include whisked egg are lighter in texture; egg is mechanically whisked or beaten; whisking egg introduces bubbles of air into mixture; by whisking egg it increases the volume / air rises in heat of oven causing expansion of dish; protein in the egg forms a foam / framework / mesh / grid / matrix that traps and holds bubbles of air; whisking also produces heat to partially coagulate / denature protein; partial denaturation causes the egg white protein chains / molecules to stiffen, unravel then straighten and form a thin layer around the air bubbles, holding them in place; when cooked the foam coagulates and this makes the spongy appearance created by the foam permanent; Examples include: meringue / fool / mousse / Genoese sponge / soufflés / omelette / cheesecake / sponge cakes / sponge drops / Swiss rolls / creamed cake mixtures; *coagulation [max. 8 marks]* coagulation happens when a raw egg changes texture from a liquid to a solid or semi-solid, the protein molecules join together / set / denature; coagulation is irreversible;	**15**

Question	Answer	Marks
13	coagulation happens when the protein in the egg is heated; different parts of an egg coagulate at different temperatures / egg white coagulates at 60˚C / egg yolk coagulates at 70˚C; when using whole eggs they should be well beaten to combine white and yolk so one does not set quicker than the other; egg changes colour when cooked, the egg white becomes opaque, the yolk becomes slightly paler; egg can be incorporated with other ingredients and the process of coagulation helps form the structure of the product (e.g. Swiss roll, quiche, choux pastry dishes); egg can been used to bind ingredients, the coagulation of the egg holds the ingredients together (e.g. burger, cutlets, meatballs, biscuits); egg can been used to coat a product where the egg coagulates on heating holding the coating ingredients onto the product (e.g. scotch eggs, fish fingers); coagulation causes the protein chain to unravel, straighten and bond together around small pockets of water in the egg / water becomes trapped; if eggs are overcooked, the coagulated proteins molecules tighten up and squeeze out the water (syneresis); overcooked egg would be rubbery and watery; Examples include any form of cooked egg: boiled, poached, scrambled, fried, omelettes, meringue, egg custard, quiche, bread and butter pudding, batter mixtures, lemon curd	

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Question	Answer	Marks
14	***Discuss reasons for the increasing popularity of vegetarian diets.*** ***Explain what is meant by a vegan diet.*** ***Explain why protein complementation is important to a vegan. Include examples.*** *reasons for popularity of vegetarian diets [max 8 marks]* economy e.g., vegetarian diet can be cheaper / more economical as meat is more expensive to buy than plant products / cereals / pulses; ethical reasons e.g., animal welfare / rights / cruelty some people disagree with the way animals are reared / intensive animal farming (e.g., battery hens, factory farming); food safety e.g. less risk of health issues caused by the use of hormones used in animal rearing; green / environmental issues e.g., better for the environment as less production of methane from cows / e.g. may feel large scale animal farming isn't sustainable / uneconomical use of land / wasteful of resources / deforestation to graze cattle; health / cholesterol e.g., may contain low amounts of saturated fat so reduces the risk of obesity / high blood cholesterol / hypertension / stroke / heart disease / type 2 diabetes; health / NSP e.g., vegetarian diet may be higher in fibre so helps prevent the risk of constipation / diverticulitis / bowel cancer / haemorrhoids / piles; health / vitamins e.g., diet may contain high amounts of fruit / leafy green vegetables that are a good source of ACE / antioxidant vitamins that help ward off free radicals in the body / reduce the risk of certain cancers; influence from others e.g., from family / culture / celebrities / peers / media trends to follow vegetarian diet; land wastage more crops could be grown if land was used for cereals so more people could be fed from same area of land; likes/dislikes e.g., people may not like the taste / smell / texture / appearance of animal flesh; moral beliefs e.g. may object / believe it is wrong / cruel to kill / slaughter animals for consumption; protection from disease e.g. vegetarian diet may protect against certain food-borne illnesses bird 'flu / BSE / salmonella from eggs / chickens; religious beliefs e.g. Hinduism, Jainism, Rastafarians, Zoroastrianism; availability e.g. wider variety / availability of vegetarian products / options in shops / restaurants nowadays makes it easier to follow vegetarian diet;	**15**

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Question	Answer	Marks
14	*vegan diet [2 marks max]* vegan diet excludes all flesh such as meat, meat products, poultry, fish; vegan diet excludes all animal products including eggs, dairy, honey, rennet, gelatine; vegan diet includes plant and cereal foods; *protein complementation [4 marks max]* HBV protein are mainly from animal foods and contain all essential amino acids; LBV protein mainly from plants and lacks at least one essential amino acid; in a vegan diet very few plant proteins (may give e.g. soya, quinoa, Quorn and chia etc.) contain all the essential amino acids required for a balanced diet; complementation is eating / combining two LBV proteins together in the same meal; complementation means that EAA lacking in one plant food can be compensated by the other to form HBV protein; *examples of protein complementation [3 marks max]* rice pudding using a vegan type milk (do not accept soya milk); beans on toast; lentil soup and bread roll; bread and vegan type cheese; cereal and vegan type milk (do not accept soya milk); vegetable curry with rice; akara and pap; any combination of legumes, pulses with cereals or nuts or seeds;	

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