CAMBRIDGE
International Education

Cambridge IGCSE™

FOOD & NUTRITION **0648/13**

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.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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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.

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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	*define the term balanced diet* contains <u>all nutrients</u> in <u>correct proportion</u>; ;	**2**

Question	Answer	Marks
2(a)	*disease that results from an insufficient amount of vitamin B_{12}* <u>pernicious</u> anaemia / <u>megaloblastic</u> anaemia;	**1**
2(b)	*sources of vitamin B_{12} suitable for vegetarians* dairy products / one named example e.g. milk, cheese; eggs; <u>fortified</u> **breakfast** cereals; <u>fortified</u> soya / plant milk; <u>fortified</u> tofu; (nori) seaweed; nutritional yeast; Quorn; shiitake mushrooms; tempeh / fermented soy bean; yeast extract / Marmite;	**4**

Question	Answer	Marks
3(a)	*food that contains fructose* any <u>named</u> fruit or vegetable / honey;	**1**
3(b)	*food that contains lactose* milk or any food produced from milk e.g. cheese, yogurt, ice-cream, cream etc.;	**1**

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Question	Answer	Marks
3(c)	*effects of dry heat on sugar* colour change / non-enzymic browning reaction occurs / gives a brown / golden / golden brown / yellow colour; <u>continued / prolonged</u> heating causes burning / charring / blackening; smells of caramel; sugar caramelises; texture change / sugar melts / becomes sticky / becomes liquid; when cooled sugar has (golden brown) crisp / hard / crunchy crust / texture;	**4**

Question	Answer	Marks
4	*sources of beta-carotene* apricots; (cantaloupe) melon; carrot; green leafy vegetables (or one named e.g. lettuce, broccoli, cabbage, spinach, sprouts, kale, watercress); green peas; mango; margarine; orange; papaya; passion fruit; persimmon / kaki / Sharon fruit; pumpkin / squash; red / orange / yellow pepper; sour cherries; sweet potato; tomato;	**4**

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Question	Answer	Marks
5(a)	*function of maltase in the digestive system* converts maltose; to glucose;	**2**
5(b)	*where in the digestive system maltase is found* small intestine;	**1**

Question	Answer	Marks
6(a)	*nutrients that provide energy* protein; fat;	**2**
6(b)(i)	*what is meant by energy balance* energy intake equals energy output;	**1**
6(b)(ii)	*how to achieve energy balance* amount of energy from food eaten is equal to the amount of activity / energy used;	**1**
6(c)	*unit used to measure energy in food* kilocalorie / calorie / kilojoule / kJ / joule;	**1**

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Question	Answer	Marks
6(d)	*factors that affect a person's energy requirements* age; climate; gender / sex; occupation / job; physical activity; body size / height / weight; state of health; state of the body e.g. pregnant / lactating;	**4**

Question	Answer	Marks
7	*importance of iodide in a balanced diet* makes (hormone) thyroxine; thyroxine controls rate at which energy is used / controls rate of metabolism; thyroxine is important in pregnancy and for babies and young children as it helps development of brain and nervous system; prevents the disease goitre;	**3**

Question	Answer	Marks
8(a)	*water-soluble vitamins* thiamin / vitamin B1; riboflavin / vitamin B2; niacin / vitamin B3; (cyano)cobalamin / vitamin B12; vitamin C / ascorbic acid;	**3**

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Question	Answer	Marks
8(b)	*reasons for drinking at least two litres of water a day* (combines with NSP) to soften faeces / to reduce risk of bowel disorders / constipation / diverticular disease / help with bowel movement; constituent / required for all body fluids (mucous, saliva, blood, digestive juices, sweat, urine); decreases risk of kidney problems; helps with removal of waste products / toxins; improves alertness / concentration / brain function / decreases risk of migraines / headaches; keeps mucous membranes moist which protects body from infection; keeps skin hydrated / healthy / clear; less risk of high blood pressure; lubricates muscles and joints / prevents ends of bones damaging each other; maintains water balance / hydrates body / prevents thirst, dehydration; needed during lactation for milk production; regulates body temperature (through perspiration); required in chemical reactions as processes take place in solution e.g. absorption, digestion, respiration, metabolism; transports nutrients around the body;	**5**

Question	Answer	Marks
9(a)	*functions of the plain flour when making shortcrust pastry* flour gives pastry colour when baked – due to dextrinisation of starch; flour is the main / bulk ingredient – helps form the structure of the pastry; gluten / protein in plain flour coagulates when baked – to form the structure of the product; plain flour has a low gluten / protein content – gives a soft / tender / short-crumb texture as pastry is less elastic / stretchy; plain flour has no added raising agent – prevents pastry rising / gives pastry traditional flat appearance;	**4**
9(b)	*functions of the fat when making shortcrust pastry* fat coats the flour particles and prevents gluten formation / breaks down gluten into shorter strands – results in a crumbly 'short' texture; fat coats the flour particles and prevents it from absorbing water – this gives a crumbly 'short' texture; yellow fat e.g. butter / margarine improves sensory attributes of pastry – gives colour and flavour; white fat shortens pastry and gives 'short' crumbly result – stops pastry being too tough or hard;	**4**

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Question	Answer	Marks
9(c)(i)	*reasons why the pastry may be soft and crumbly* hands / fingertips too warm / not using fingertips so fat melted during rubbing in; incorrect proportion / ratio fat to flour / more than half fat to flour / insufficient flour to fat / too much fat; insufficient water; left in cool place / fridge too long and not brought back to room temperature before rolling out; left uncovered whilst relaxing; not left to relax in cool place / fridge before rolling out; over rubbing the fat into the flour; used self-raising flour instead of plain flour;	**4**
9(c)(ii)	*reasons why the pastry may be hard and tough* environment / kitchen conditions not cool enough for pastry making; fat not cold / hard enough; hands / fingertips too warm / not using fingertips so fat melted during rubbing in; incorrect oven temperature / too low an oven temperature during baking; incorrect proportion / ratio fat to flour / less than half fat to flour / too much flour; insufficient rubbing in / fat not mixed in correctly; not enough air incorporated during preparation; not relaxing the dough sufficiently before using it; pastry not covered when left to relax; pastry re-rolled too many times; pastry turned over during rolling; too much flour for rolling out; too much kneading / heavy / over handling (when rolling out) developed gluten / pressed out air; too much water added to rubbed in mixture;	**4**

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Question	Answer	Marks
9(d)	*seeds that could be used to flavour shortcrust pastry* caraway; celery; chia; coriander; cumin; fennel; fenugreek; flax; linseed; mustard; nigella; onion; papaya / paupau; pomegranate; poppy; pumpkin; rape seed; quinoa; sesame; sunflower;	**3**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>10(a)</td><td>
<table>
<tr><th>function of eggs</th><th>name of dish</th></tr>
<tr><td>coating</td><td>cutlets e.g. meat, vegetable;
fish cakes;
fish fingers;
fried chicken e.g. drumstick, nuggets, goujons;
fried fish e.g. fillet, scampi;
fritters e.g. apple, banana;
onion rings;
croquettes e.g. chilladas, potato, bitterballen;
Scotch eggs / Yorkshire egg roll;
escalope / Schnitzel e.g. veal, turkey;</td></tr>
<tr><td>aeration</td><td>angel food cake;
chiffon cake;
chocolate éclairs;
cupcake;
meringue /lemon meringue pie / pavlova / baked Alaska;
mousse;
muffin;
named cake or gateau;
profiteroles;
soufflé / soufflé pancake;
sponge cake;
sponge drops;
Swiss roll;
Victoria sponge;
whisked flan;</td></tr>
</table>
</td><td>4</td></tr>
</table>

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Question	Answer	Marks
10(b)	*functional uses of eggs in food preparation* binding; decoration; emulsification; enriching / add nutritional value; garnishing; glazing; main dish / breakfast / snack; setting / coagulation / thicken;	**2**

Question	Answer	Marks
11(a)	*how freezing preserves food* freezer works at – 18 °C or below; microorganisms need warmth to multiply; at – 18 °C or below microorganisms are dormant / inactive / cannot multiply; at – 18 °C or below water is frozen; bacteria need water / moisture to survive / reproduce; at – 18 °C or below enzyme activity is slowed down;	**4**
11(b)	*why freezing would not be a suitable preservation method for a whole tomato* tomatoes have a high-water content which forms ice crystals when frozen; ice crystals formed when the tomatoes are frozen burst; burst ice crystals rupture / damage the cells of the tomatoes; when defrosted the tomato loses its firm texture and becomes soft and squashy;	**2**

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Question	Answer	Marks
11(c)	*alternative methods for preserving tomatoes* bottling; canning; drying; irradiation;	**2**

Question	Answer	Marks
12	*benefits of using emulsifiers in convenience foods* help mix / hold ingredients together which would not normally mix together / prevents separation of ingredients; mix oil and water to maintain an emulsion; fats and oils can be mixed with water to make low-fat spreads / salad dressings / mayonnaise which is good for people on a weight reducing diet as it gives increased choice; help to improve the consistency of products / give food a smooth and creamy texture / mouth feel; improves the appearance (of low-fat spreads / salad dressings / mayonnaise) makes products more attractive for consumers; help to improve the shelf-life of baked products so there will be less wastage / products can be stored for a longer period of time; form an emulsion when fat and sugar are mixed together; added to bread dough to enhance volume / reduce staling / extend shelf life; added to chocolate to stop fats separating forming fat crystals called blooming; added to frozen dessert products ice cream / mousse / sorbet for a smooth texture and ensure the product does not melt rapidly after serving;	**5**

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Question	Answer	Marks
13(a)	*benefits to the consumer of the manufacturer's contact details on a food label* can see where product was manufactured in case of moral / ethical reasons; in case of complaint; in case of query; in case they want to compliment / make a suggestion / provide feedback to the manufacturer;	**2**
13(b)	*safety details that may be found on a food package label* allergy information; cooking instructions; date mark / use by date; ingredients list; storage information;	**3**
13(c)	*methods that may be used to make a food product tamper proof* additional pull-away ring top underneath lid; jam jar lids with press-to-check feature / button tops; plastic collars on bottles; plastic film on ready-meal trays; plastic film wraps on cardboard boxes; plastic tab to remove in order to open lid e.g. on ice cream tub; tear-away strips around the top of bottles / plastic ring joined to lid by perforated connection; tin foil seals in pourable boxes;	**2**

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Question	Answer	Marks
14	*Some countries recommend eating at least five portions of fruit and vegetables a day. Discuss nutritional reasons for including fruit and vegetables in the diet. Discuss other reasons for including fruit and vegetables in the diet.* *nutritional reasons [max 10]* contribute to a balanced diet / follow nutritional tools; high water content quenches thirst / refreshing / prevents dehydration / keeps body cool / helps eliminates waste / maintain water balance; contain antioxidants (vitamins A / C / E) which prevent free radical damage and help reduce risk of CHD / cancers; contain beta-carotene / vitamin A for growth / mucous membranes / visual purple / prevents night blindness / skin health / is an antioxidant to boost immune system; contain calcium for formation and maintenance bones and teeth / bone density / clotting blood / function of nerves and muscles / prevent rickets, osteoporosis / regularise heartbeat; contain folate to reduce risk of neural tube defects; contain iron for formation of haemoglobin / prevent anaemia; contain (LBV / HBV) protein for growth / repair / energy; contain potassium which helps to lower blood pressure; contain carbohydrate / starch / sugar for energy; contain vitamin B group / named B vitamin for energy release; contain vitamin C for absorption of iron / prevent scurvy / make connective tissue / help wounds heal quicker / keep skin healthy / is an antioxidant to boost immune system; contain vitamin E an antioxidant to boost immune system / destroys free radicals / helps fertility / healthy skin; contains vitamin K for blood clotting; good source fibre / NSP which provides satiety helping reduce risk of obesity / reduces risk of bowel related diseases / controls blood sugar levels helping to prevent type 2 diabetes; low in energy reducing risk of obesity / CHD; low in saturated / fat reducing risk of high cholesterol / CHD / obesity; low in sodium / salt reducing risk of hypertension; contains natural sugar / fructose / is low in sugar so less damaging to teeth / helps prevents dental caries / obesity / type 2 diabetes;	**15**

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Question	Answer	Marks
14	*other reasons [max 7]* can be cooked in a variety of ways stewed / steamed / fried / baked / roast etc. e.g. potatoes, beans, apples etc.; can be eaten raw to add variety of texture / interest to meals / reduce loss of vitamin C e.g. apple, carrot, radish etc.; can be served in a variety of ways in dishes e.g. drink / snack / accompaniment / main meal / starter / cake / desserts e.g. berry smoothie, stir fry, cauliflower cheese, parsnip soup, peach cobbler; fruit or vegetables used as decoration or garnish e.g. cherries on cake for decoration, watercress as a garnish to add interest and appeal; fruits / vegetables generally cheap / economical to purchase and can be used to extend / replace meat which is also useful for vegetarians; variety of colour useful to make meals look appetising / stimulates the flow of digestive juices, e.g. vegetables used as an accompaniment to main meal e.g. broccoli, carrots, green salad, / fruit used as dessert e.g. fruit salads; variety of flavour sweet / sharp / acidic / tart e.g. sweet and sour, chutney, lemon curd; variety of shape to add to sensory appeal / encourage appetite e.g. round tomato / apple wedge; variety of texture soft / crunchy / juicy e.g. plums, bananas, apples, celery, peaches, blackberries;	

Question	Answer	Marks
15	*Chicken is a popular commodity to include in family meals.* *Discuss guidelines to follow when buying and storing fresh chicken to use the next day.* *Discuss methods of tenderising chicken before it is cooked and describe the changes that occur during cooking.* *buying and storing fresh chicken [max 8 marks]* buy from a reliable clean source / premises should be free from vermin / flies to ensure no potential for food poisoning; check date mark on packaged chicken to ensure it will remain in good condition till the next day / has not already passed the use by date; check packaging of chicken to make sure no damage to bag / wrap so no risk of contamination; assistants handle chicken hygienically / should have good personal hygiene / hair tied back from face / covered / clean short fingernails / no nail varnish / clean overalls / aprons / wear gloves / don't handle money to prevent contamination;	**15**

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Question	Answer	Marks
15	look for chicken that is organic / has been vegetable fed / raised without feed including animal by-products to ensure it is as pesticide / chemical free as possible; check for a pleasant, neutral smell / no foul odour to ensure it is as fresh as possible; firm / plump flesh / flesh springs back into shape when pressed to ensure it is as fresh as possible, not old, not been previously frozen; check skin is undamaged / free from bruising / discolouration to ensure an unspoiled bird; check for moist / soft texture if it is dry then it is not fresh; buy skinless if possible to avoid any saturated fats / paying for unnecessary weight; fresh chicken should have a light pinkish / white colour if it is dark (unless corn fed) then it may be contaminated / old; storage area should be clean to prevent cross-contamination; store in a fridge / cold area to delay microbial growth; temp 0 ºC – 5 ºC out of the danger zone; store away from cooked products to prevent cross-contamination; store raw chicken on bottom shelf of fridge to prevent blood / liquid spilling onto other food; keep it in its original container or alternatively place in a shallow container <u>loosely</u> but completely covered to prevent drying out / unwanted contamination;	

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Question	Answer	Marks
15	*tenderising and cooking [max 8 marks]* beat or pound with mallet / rolling pin to break down protein (elastin / collagen) connective tissue; mincing or cutting into small / thin pieces to / shorten muscle fibres; score to allow heat to penetrate more rapidly as quicker cooking makes for more tender meat; soak / marinade in acid (brine / wine / vinegar / lemon juice / yogurt) to break down protein (elastin / collagen) connective tissue; use of enzymes / papain from papaya / bromalin from pineapple / ficin from figs to break down protein (elastin / collagen) connective tissue; protein (collagen) coagulates / sets / becomes firm; chicken muscle shrinks; moisture is lost; meat texture changes due to connective tissue softens / chicken is made more tender; fat melts; colour changes from red / pink to brown / white; vitamin B lost due to heat; flavour is developed; microorganisms are destroyed; good aroma is released; crispy skin forms on outside of chicken; the protein collagen that holds muscle fibres together is converted to gelatine;	

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