CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0648 FOOD AND NUTRITION

0648/11 Paper 1 (Theory), maximum raw mark 100

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.

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1 (a) Functions of protein
growth
maintenance/repair
energy
hormones/antibodies/enzymes

3 x 1 mark [3]

(b) Elements in protein
carbon – hydrogen – oxygen – nitrogen

4 points: 2 points = 1 mark [2]

(c) HBV protein
contains **all** indispensable amino-acids
in adequate amounts/in correct proportion

2 points: 2 points = 1 mark [1]

(d) Sources of HBV protein
meat – fish – milk – cheese – eggs – soya

4 points: 2 points = 1 mark [2]

(e) LBV protein
lacks at least one indispensable amino-acid [1]

(f) Sources of LBV protein
cereals (or max. 2 named e.g.)/bread – pulses (or max. 2 named e.g.) – nuts (or max. 2 named e.g.) – gelatine

4 points: 2 points = 1 mark [2]

(g) Complementary proteins
2 protein foods – eaten together – LBV + LBV – LBV + HBV
Deficiency of IAA in one food – is made up by the other

4 points: 2 points = 1 mark [2]

(h) Examples of complementary proteins
beans on toast – lentil soup and bread – dhall and rice – eggs on toast – cheese sandwich etc.

2 points: 2 points = 1 mark [1]

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2 (a) Digestion and absorption of protein

in the stomach – rennin – clots milk – in small children – pepsin – in presence of acid/HC*l* – converts protein to peptones/peptides/polypeptides – in the duodenum – enterokinase – in pancreatic juice – converts trypsinogen to trypsin – converts protein to peptones/peptides/polypeptides – in the ileum – erepsin – from intestinal juice – converts proteins to amino-acids – absorbed in villi – into blood capillaries – then into circulatory system – to liver

(must be at least 2 points on absorption)
12 points: 2 points = 1 mark [6]

(b) Deamination

nitrogen removed – in liver – produces ammonia – toxic – excreted as urea –in urine– via kidneys – remainder is oxidised for energy – or converted to fat

4 points: 2 points = 1 mark [2]

3 (a) Importance of calcium

building bones/teeth
maintaining bones/teeth
clotting blood
muscle function
nerve function

4 points: 2 points = 1 mark [2]

(b) Sources of calcium

milk – cheese – yoghurt
bones of canned (or 1 named e.g.) sardines, pilchards, salmon etc.
green vegetables (or 1 named e.g.) spinach, cabbage, Brussels sprouts, lettuce etc.
bread – white flour (by law) – soya etc.

4 points: 2 points = 1 mark [2]

(c) Deficiency disease

Rickets/osteomalacia/osteoporosis [1]

(d) Symptoms

Rickets	leg bones deformed – bow legs – knock knees – pigeon chest
Osteomalacia	soft bones – break easily
Osteoporosis	porous bones – break easily

2 points: 2 points = 1 mark [1]

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(e) Importance of vitamin D
absorption of calcium – and phosphorus
formation of bones/teeth
maintenance of bones/teeth

4 points: 2 points = 1 mark [2]

(f) Sources of vitamin D
milk – cheese – eggs – red meat (or named e.g.) – liver
oily fish (or named e.g.) – butter – margarine – cod liver oil
UV rays from the sun/sunlight

4 points: 2 points = 1 mark [2]

(g) Importance of iodine
makes hormone – thyroxine – in thyroid gland – controls rate at which energy is used/controls rate of metabolism

4 points: 2 points = 1 mark [2]

(h) Deficiency of iodine
goitre
swelling of thyroid gland/base of the neck

2 points = 1 mark [1]

4 Ways of encouraging good eating habits in children
eat meals with rest of the family – do not allow to leave the table
cut food if necessary to encourage independence
small portions – to encourage to eat everything – regular mealtimes – importance of breakfast – no snacking between meals
do not use sweets as a reward
serve food attractively – easy to eat – no strong flavours – variety of foods – introduce new foods – variety of colours – variety of flavours – variety of textures
avoid sweet drinks before meals – water to drink with meals
include fresh fruit and vegetables

10 points: 2 points = 1 mark [5]

[Section A Total: 40]

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5 **(a)** Coagulation
heat on protein – begins at 60 °C – cannot be reversed
hardens/sets – chemical structure changes
overheating causes protein to shrink – e.g. syneresis when scrambled egg is overcooked or baked egg custard in overcooked
e.g. boiled egg, baked egg custard, quiche, baked bread, skin on boiled milk, coating on fried fish

6 points (must include **one** example): 2 points = 1 mark [3]

(b) Fermentation
Yeast – produces carbon dioxide – and alcohol – with food/sugar – and moisture / warmth / time
enzymes bring about fermentation process
amylase – changes starch to maltose
maltase – changes maltose to glucose
zymase – changes glucose to carbon dioxide and alcohol
e.g. bread making

6 points (must include **one** example): 2 points = 1 mark [3]

(c) Gelatinisation
moist – heat – on starch – grains soften – swell / absorb water
Some rupture – releasing starch granules – liquid thickens – irreversible
e.g. roux sauce, custard, boiled rice

6 points (must include **one** example): 2 points = 1 mark [3]

(d) Hydrogenation
makes fat solid – from liquid oil – unsaturated fats – become saturated
fats – can take up hydrogen – breaks double bond – using a nickel catalyst – can stop at any time to achieve degree of hardness required – hard margarine more saturated – soft/spreading margarine less saturated
e.g. margarine, cooking fats

6 points (must include **one** example): 2 points = 1 mark [3]

(e) Pasteurisation
heat – destroys harmful bacteria / souring bacteria – lasts longer but does not prevent decay
72 °C/162 °F – for 15 seconds **or**
62 °C – 65 °C/145 °F for 30 minutes
rapid cooling – to prevent bacterial growth – little change to nutritive value – e.g. milk

6 points (must include **one** example): 2 points = 1 mark [3]

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6 (a) Nutrients in fruit

carbohydrate/sugar	bananas, grapes, mango, pears dried figs, dates, sultanas
fat	avocado pear
vitamin A/carotene	apricots, mango, melon, peaches
vitamin C/Ascorbic acid	oranges, lemons, blackcurrants, grapes, strawberries
vitamin B/nicotinic acid	avocado pear, dried apricots, dates, figs
calcium	blackcurrants, oranges, dried apricots, figs
iron	avocado pear, dried apricots, dried fogs

5 nutrients + 5 suitable named examples
10 points: 2 points = 1 mark [5]

(b) Ways of using fruit in family meals

as a drink	orange juice, banana smoothie
in ice cream	lemon sorbet, strawberry
hot dessert	apple pie, rhubarb crumble
cold dessert	lemon meringue pie, fruit salad, fruit fool
scones	apple, sultanas, cherries
cakes	cherry, pineapple upside down, sultanas
accompaniment	apple sauce with pork, pineapple with ham
snack	apple, banana, grapes
preserves	raspberry jam, marmalade, lemon curd
main dish	curry, sweet and sour chicken
decoration/garnish	lemon wedges, glace cherries

5 uses + 5 suitable named examples (without repetition)
10 points: 2 points = 1 mark [5]

(c) Other reasons for including fruit in the diet

high water content – refreshing
quick snack / easy to carry / little or no preparation required
can eat raw or cooked – good source of NSP
filling if on weight-reducing diet
for efficient working of the digestive tract
variety of colour / variety of flavour / variety of texture
many ways of serving – can be preserved at home
can be grown at home – cheap when in season
easily available
attractive shapes and appearance – make meals attractive
canned fruit often cheaper than fresh – e.g. peaches, pineapples
can be stored at home – used in emergencies
can prevent deficiency diseases (named e.g.) – antioxidants
reduce cholesterol

10 points: 2 points = 1 mark [5]

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7 (a) Preparing, cooking and serving green vegetables to conserve vitamin C
tear rather than cut – follows cell wall – contents of cell do not leach out
large pieces – less damage to cells
sharp knife – less damage to cell walls – less mixing of ascorbase and ascorbic acid
prepare just before cooking – prevent oxidation of vitamin C
do not soak – vitamin C is water soluble
boil water first
add small amounts of vegetable at a time – to keep water close to boiling point
bring back to boil before adding more vegetable – destroy ascorbase
lid on pan – prevent loss of steam – cooks quicker – vitamin C destroyed by heat
no bicarbonate of soda – alkali, and vit. C is acidic – will neutralise
serve immediately
do not keep hot
use cooking water for sauce or gravy – to gain vitamin C dissolved in water

10 points: 2 points = 1 mark [5]

(b) Advantages and disadvantages of frying
Advantages
quick method of cooking – crisp surface
deep frying gives even colour to foods – food browns
flavour developed – appetising smell
different types of frying

Disadvantages
adds fat to product / increases calorific value of food
need constant attention during cooking / can be a dangerous process
can be expensive to buy enough fat/oil to fill pan
cannot cook large amounts at once
unhealthy method of cooking – fried food can be difficult to digest – linked to CHD/obesity
can be difficult to judge temperature of fat/oil
needs skill for successful results

(At least 2 points from each area)
10 points: 2 points = 1 mark [5]

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(c) Saving time when preparing and cooking family meals
collect equipment and ingredients required before starting to cook
read recipe carefully / wastes time constantly referring to books
use some raw dishes/courses
make use of electrical equipment
save cooking time – example of equipment
frying and grilling are quick methods of cooking
make use of convenience foods – e.g. frozen puff pastry
prepare and cook food in bulk – freeze some
make stew and casseroles – require little attention – fewer pans to wash
do not peel vegetables – scrub to remove soil
cook and serve in same dish
cook when required – no time spent on re-heating
one stage method of making rich cakes
cut potatoes etc. into small pieces to cook quicker
lids on pans to cook quicker

10 points: 2 points = 1 mark [5]

[Section B Total: 45]

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8 (a) Discuss ways of preventing food spoilage when preparing, cooking and storing food. [15]

The answer may include the following knowledge and understanding:

Conditions for growth of bacteria (also consider yeast / moulds)
warmth – moisture – food – time – suitable pH – some require oxygen

Symptoms of food poisoning – (Can be caused by food spoilage)
vomiting – diarrhoea – headache – tiredness/exhaustion – abdominal pain – fever– double vision – can be fatal

Preparing food
wash hands – after toilet/raw meat/vegetables with soil – avoid cross-contamination – no coughing/sneezing over food – do not cook if ill – so bacteria are not passed to others – tie back/cover long hair – bacteria from hair could get into food – no long fingernails – dirt and bacteria collect underneath
clean apron – no outdoor clothes – avoid transfer of bacteria from outside
do not touch face during food preparation – handle food as little as possible – cover cuts with waterproof dressings – bacteria will be on skin – no licking spoons/fingers – bacteria from mouth transferred to food
separate chopping board/knife for raw and cooked food
equipment clean – work surfaces clean – wash up in hot soapy water – clean tea towel/allow to dry in air
no animals in kitchen

Cooking food
thoroughly cook foods – especially meat/eggs – should reach 72 °C in centre – maintain for 2 minutes – to kill bacteria – e.g. Salmonella – do not keep warm – re-infected with bacteria from air
know source of food – danger of BSE etc. – clean water supply
should reheat until piping hot – use food probe
do not reheat after 24 hours – only reheat once cook just before eating if possible – serve immediately
do not use raw eggs if possible – in mayonnaise/marzipan – danger of Salmonella – do not use cracked eggs – etc.

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Storing food
clean containers – cool place/refrigerator – covered
especially high risk foods – e.g. meat/fish/milk/eggs
to prevent cross contamination – use in rotation / check 'use by' dates
cool leftover food rapidly – use within 24 hours
keep raw and cooked food separate – raw meat at bottom of refrigerator
weevils/rats/mice etc. – grain off floor – dry place
prevent multiplication of bacteria – check cans for bulges – indicates seal has been damaged and bacteria entered – food still spoils in refrigerator
do not thaw then refreeze food – bacteria will have multiplied in warmth – bacteria dormant in freezer

8 (a)	Band	Descriptor	Part mark	Total
	High	Can identify conditions for bacterial/yeast/mould growth Some symptoms of food poisoning may be identified Is able to identify and discuss several points on preventing spread of bacteria during preparing, cooking and storing food Gives examples to illustrate points made Understanding of the topic is apparent Information is specific and generally accurate All areas of question addressed Answers are detailed where appropriate Some scientific facts included	11–15	15
	Middle	Some conditions for bacterial/yeast/mould growth given May give some symptoms of food poisoning Is able to identify several points on preventing the spread of bacteria during preparing, cooking and storing food Some discussion or explanations given Gives a few examples to illustrate points made Shows a basic understanding of the topic Information is basic but generally accurate Some areas of question addressed more fully Gaps in knowledge will be apparent May be a few scientific facts Answer will be detailed in parts and superficial in others Overall lack of detail	6–10	
	Low	May give conditions for bacterial/yeast/mould growth Little information on food poisoning Mentions some points on preventing spread of bacteria during preparing, cooking and storing May give examples to illustrate Answer tends to be a list of statements Not always accurate Information is brief Answers not specific Little or no scientific information Emphasis on one part of the question Lack of knowledge will be apparent	0–5	

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8 (b) Identify and give examples of different raising agents. Discuss their use in the preparation of meals. [15]

The answer may include the following knowledge and understanding:

Principles of raising agents
gases expand when heated – mixture enlarges – steam has a larger volume than water
hot gases rise
heat sets risen shape – protein in ingredients coagulates – e.g. egg, gluten in flour

Air
gives a light texture – no change in colour – or flavour
must be introduced before cooking – expands on heating
sieving flour – air trapped between grains of flour
creaming fat and sugar – traps air as tiny bubbles
rubbing-in fat and flour – air trapped as mixture falls
whisking egg white – ovalbumin stretches – entangles 7 x own volume of air
whisking whole egg and sugar – traps less air – due to fat in egg yolk
used in cakes e.g. Swiss roll
folding and rolling – flaky pastry/puff pastry – air trapped between layers – sealed to prevent air loss – expands on heating – pushes layers apart

Carbon dioxide

bicarbonate of soda – with moist heat gives off carbon dioxide – residue of sodium carbonate – yellow colour – bitter flavour – used in dishes where this would be hidden – e.g. gingerbread etc.

bicarbonate of soda and cream of tartar – with moist heat gives off carbon dioxide – colourless and tasteless residue – Rochelle salt – e.g. scones etc.

bicarbonate of soda and sour milk – as above – acid + alkali

baking powder – contains correct proportion of bicarbonate of soda and cream of tartar – e.g. suet pastry, scones, cakes

self-raising flour – plain flour + baking powder

yeast – feeds on sugar – moisture – warmth – ferments sugar – produces alcohol – and carbon dioxide – continues to produce under favourable conditions – heat of oven kills yeast – fermentation stops – e.g. bread etc.

Steam/Water vapour
used in mixtures with a high proportion of liquid e.g. choux pastry, Yorkshire puddings etc.
hot oven – water changes to steam

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8 (b)	Band	Descriptor	Part marks	Total
	High	Able to name all gases Demonstrates a clear understanding of how gases are introduced Candidate can state clearly how raising occurs and how shape is set Gives example to illustrate points made Understanding of the topic is apparent Information is specific and generally accurate All areas of question addressed Answers are detailed where appropriate Some scientific facts included	11–15	15
	Middle	Can name at least 2 gases. Can give a few examples of how gases are introduced Factual information is sound but not always linked to specific examples to illustrate Gives a few examples to illustrate points made Shows a basic understanding of the topic Information is basic but generally accurate Some areas of question addressed more fully Gaps in knowledge will be apparent May be a few scientific facts Answer will be detailed in parts and superficial in others Overall lack of detail	6–10	
	Low	Can give 1 or 2 examples of gases Action of gases may be considered in simple terms. May give examples to illustrate Answer tends to be a list of statements Not always accurate Information is brief Answers not specific Little or no scientific information Emphasis on one part of the question Lack of knowledge will be apparent	0–5	

[Section C Total: 15]

[Total for Paper: 100]

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