

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers

0648 FOOD AND NUTRITION

0648/01

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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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Section A

- 1 (a) Elements in fats and oils**
carbon – hydrogen – oxygen
3 × 1 mark [3]
- (b) Functions of fat**
energy
stores energy for later use
warmth
insulation
protects internal organs
formation of cell membrane
stores fat-soluble vitamins (or named Vitamins A and D)
provides essential fatty acids
makes food more palatable
increases energy value of food without adding bulk
gives a feeling of fullness after a meal
adds flavour
provides texture
5 × 1 mark [5]
- (c) Saturated fats**
contain all the hydrogen they can hold
molecule composed of single bonds/no double bonds (can show on a diagram)
solid
3 × 1 mark [3]
- e.g. butter, lard, dripping, suet, dairy cream, coconut oil etc.
2 points 2 points = 1 mark [1]
- (d) Polyunsaturated fats**
can accept more hydrogen/do not contain maximum number of hydrogen atoms
more than one double bond in the molecule (can show on diagram)
liquid/found as oils
3 × 1 mark [3]
- e.g. corn oil, soya oil, sunflower oil, groundnut oil, sesame oil, olive oil
some fish oils e.g. mackerel
2 points 2 points = 1 mark [1]
- (e) Problems associated with a diet high in saturated fats**
contains cholesterol
sticks to artery walls/arterial plaque
narrows them
blocks arteries
restricts blood flow
can lead to CHD
high blood pressure, varicose veins, haemorrhoids, angina, strokes (max. 2)
- Cholesterol 1 mark
6 other facts = 6 points 2 points = 1 mark [4]

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(f) Digestion and absorption of fat in small intestine
 in duodenum – fats are emulsified – by bile – from the liver – stored in gall bladder – breaks fats into small droplets – to give a greater surface area – lipase – from pancreatic juice – converts fats to glycerol – and fatty acids – lipase – intestinal juice – fatty acid – glycerol
 in ileum – fats are absorbed into lacteal – in villi – recombine to form fats – mix with lymphatic fluid – then join blood circulatory system – as insoluble fats
 10 points (at least 2 on absorption)
 2 points = 1 mark [5]

2 (a) Functions of calcium
 building of bones and/or teeth
 maintenance of bones/teeth
 clotting of blood
 functioning of muscles
 functioning of nerves
 3 × 1 mark [3]

(b) Sources of calcium
 milk – cheese – bread (fortified) – bones of canned fish – hard water – green vegetables
 2 points 2 points = 1 mark [1]

(c) Vitamin D
 1 mark [1]

(d) rickets – osteomalacia – osteoporosis
 1 mark [1]

3 Importance of iron
 forms haemoglobin – red pigment in blood – picks up oxygen – forms oxyhaemoglobin – transports oxygen around the body/to cells – oxidises glucose – to produce energy
 deficiency causes anaemia – gives a pale colour – causes tiredness/lethargy – headaches – dizziness
 8 points 2 points = 1 mark [4]

4 Meals for convalescents and those recovering from surgery

follow doctor's advice	may need to avoid certain foods etc
protein	repairing/body-building
low-fat diet	difficult to digest fat
low energy	not as active
iron	to replace blood lost
vitamin C	to absorb iron
calcium after fractures	repair damaged bone
vitamin D	to absorb calcium
small, frequent meals	easier to digest/breaks monotony
10 points	2 points = 1 mark

 [5]

[Section A Total: 40]

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Section B

5 (a) Shortcrust pastry method with reasons

sift flour	to aerate – to remove lumps	
rub in fat	fingertips – coolest part of hand – hands raised to trap air	
should look like breadcrumbs		
add cold water	avoid melting fat	
mix with a round-bladed knife	keeps everything cool – stiff dough	
knead lightly	firm dough – to avoid pressing out air	
chill	allow fat to harden – cool trapped air	
	allows gluten to relax – easier to roll	
12 points	2 points = 1 mark	[6]

(b) Rules for rolling pastry

Do not turn pastry over.
Roll in one direction.
Do not use too much flour for dredging.
Use short, forward strokes.
Avoid pressing down on the pastry.
Do not stretch the pastry.
Lift pastry on rolling pin to turn.

4 points	2 points = 1 mark	[2]
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(c) Dishes using shortcrust pastry

fruit pies, meat pies, Cornish pasties, quiches, jam tarts, curry puffs etc
4 points (without repetition e.g. only 1 fruit pie)
2 points = 1 mark

[2]

(d) Choice of flour and fat

plain flour	air is raising agent	
not self-raising flour	contains baking powder	
	air is raising agent in shortcrust pastry	
wholemeal/brown flour	adds fibre – fat – colour – flavour	
	vitamin B – calcium	
margarine	for colour – flavour	
butter	for colour – flavour	
lard	good shortness – lacks flavour – and colour	
mixture of lard and margarine	combines shortening power with colour and flavour	
10 points (names of ingredients or qualities)	2 points = 1 mark	[5]

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- 6 (a) (i) Saving money
- | | | |
|--|--|-----|
| buy foods in season | cheaper – better quality – good quality food – to last until needed – prevents waste | |
| buy in bulk | economies of scale | |
| do not buy too much at once | may be wasted – may not have suitable storage | |
| grow own fruit and vegetables | cost of seeds only | |
| reduce use of ready-prepared food/ convenience foods | no added labour costs | |
| use cheaper protein food | cheap cuts of meat – use eggs, milk and cheese | |
| use pulses | mix with other LBV protein to give HBV | |
| only cook the amount required | saves waste | |
| have a shopping list | reduces impulse buys | |
| use left-overs | to prevent waste | |
| look for special offers | check 'sell by' dates etc | |
| do not have fixed meal plans | look for bargains | |
| supermarket's own brands are cheaper | can bulk buy and pass savings to customer | |
| use 'money off' coupons | | |
| compare prices between shops for 'best buy' | | |
| compare prices per 100g/unit | to get best value | |
| shop locally | save transport costs etc | |
| 10 points | 2 points = 1 mark | [5] |
- (ii) Saving fuel
- | | | |
|--|---|-----|
| use microwave | less time (less fuel) | |
| use quick methods | e.g. frying/grilling | |
| steam foods | low heat – several dishes at once | |
| use only the oven for meal | several dishes at once | |
| batch bake | can use some and freeze some | |
| use only the hob for meal | no need to heat oven | |
| reduce size of flame | wastes fuel if flames reach up sides of pans | |
| use pressure cooker | quicker – several items at once | |
| use convenience foods | | |
| keep lid on pan | prevents loss of heat | |
| do not overcook food | | |
| cut potatoes into smaller pieces | less cooking time (less fuel) | |
| do not preheat oven too long | switch off burners when not using | |
| cook only the amount of food required | to avoid reheating | |
| turn off electric cookers before end of cooking time | use residual heat | |
| have flat-based pans | to have good contact between hotplate and pan | |
| boil only the amount of water required for tea etc | | |
| choose materials which are good conductors of heat for pans e.g. cast iron, copper etc | | |
| match size of pan base to hotplate size etc | | |
| 10 points | 2 points = 1 mark | [5] |

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(d) TVP

Textured Vegetable Protein

made from soya beans – HBV protein

(must give these 2 points – asked in question)

textured and flavoured to resemble meat

shaped into cubes or granules

cheaper alternative to meat

used as a meat substitute – in sausages, pies, curries etc

can be used as an extender by mixing with meat

no waste

low in fat

conforms with dietary guidelines – reduction in saturated fat

useful for vegetarians

iron, thiamine and riboflavin can be added

can be used in canteen meals

used in convenience foods e.g. Pot Noodles

needs little cooking etc

8 points

2 points = 1 mark

[5]

(e) Preparing and cooking dried red kidney beans

soak – to take up water lost during drying – to allow them to soften – swell – cook more quickly

boil – for 15 minutes during cooking time – destroys toxins – which occur naturally in kidney beans – prevents food poisoning

6 points

2 points = 1 mark

[3]

[Section B Total: 60]

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Section C

Answer either 8(a) or 8(b).

8 (a) High levels of bacteria in food can cause food poisoning.

Discuss ways of preventing food poisoning when storing, preparing and cooking food. [15]

The answer may include the following knowledge and understanding.

Conditions for growth of bacteria

warmth – moisture – food – time – suitable pH – some require oxygen

Symptoms of food poisoning

vomiting – diarrhoea – headache – tiredness/exhaustion – abdominal pain – fever – double vision

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 – fresh meat/fish – use on day of purchase – follow storage instructions – cool leftover food rapidly – use within 24 hours – keep raw and cooked food separate – raw meat at bottom of refrigerator – so drips do not fall onto other foods – check containers regularly – weevils/rats/mice etc. – grain off floor – dry place – prevent multiplication of bacteria – check cans for bulges – indicates seal has been damaged – bacteria entered – food still spoils in refrigerator – action of bacteria slower – do not thaw then refreeze food – bacteria will have multiplied in warmth – bacteria dormant in freezer – spoilage halted etc.

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 – no rings – food/bacteria trapped in settings – no nail varnish – flakes off into food – 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 chipped plates used – avoid introducing bacteria from dirty cloths – dish cloth not to be used for cleaning floor etc. – boil/bleach dish cloth regularly – kill bacteria – cover waste bin – clean up spills/pools of water – to avoid attracting mosquitoes – avoid insects/vermin – wrap waste tightly – bin outside kitchen – no animals in kitchen – animals must not use family's meal plates – dispose of rubbish/waste regularly – throw away/wash food dropped on floor – no flies etc. in kitchen – carry bacteria – etc.

Cooking food

thoroughly cook foods – especially meat/eggs – use meat thermometer/food probe – 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 – danger of barbecues, food overcooked on outside but not hot enough in centre – warmth encourages bacterial growth – 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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8 (a) Band	Descriptor	Marks
High	<ul style="list-style-type: none"> - Can identify conditions for bacterial growth. - Some symptoms of food poisoning identified. - Is able to identify and discuss several points on preventing spread of bacteria during storing, preparing and cooking 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
Middle	<ul style="list-style-type: none"> - Some conditions for bacterial growth given. - May give some symptoms of food poisoning. - Is able to identify several points on preventing the spread of bacteria during storing, preparing and cooking food. - Some discussion or explanations given. - Gives a few examples to illustrate points made. - Shows a basic understanding of the topic. - Information is basic and generally accurate. - Some areas of question addressed. - 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	<ul style="list-style-type: none"> - May give conditions for bacterial growth. - Little information on food poisoning. - Mentions some points on preventing spread of bacteria during storing, preparing and cooking. - 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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- (b) Cows' milk is important in the diet but it does not keep long unless it is treated or made into another dairy product.

Discuss this statement under the following headings:

- (i) nutritive value of milk;
- (ii) different methods of treating milk to extend its shelf-life;
- (iii) dairy products. [15]

Answers may include the following knowledge and understanding.

- (i) Nutritive value of milk

HBV – protein – casein – lactalbumin – lactoglobulin – fat – vitamin A – vitamin D – calcium – phosphorus – thiamin – riboflavin – little nicotinic acid – lactose – no NSP – no vitamin C – no iron
 high proportion of water
 functions of named nutrients

- (ii) Methods of treating to prevent souring

Pasteurised

72°C (162°F) – 15 seconds – HTST method
 OR 63°C (145°F) – 30 minutes – Holder method

cooled rapidly – to not more than 10°C
 destroys harmful (pathogenic) bacteria

Sterilised

homogenised – 113°C (230°F) – 15 to 40 minutes

UHT

132°C (270°F) – 1 second – cooled rapidly – sealed in foil-lined containers – store at room temperature if unopened

Dried

homogenised – may be skimmed – water removed – by spray-drying – fine jet into chamber of hot air – water evaporates and powder falls to bottom – or roller-drying – spread onto heated rollers – water evaporates – film of dry milk scraped off

Condensed

homogenised – heated to 80°C (176°F) – 15 minutes – sugar added – heated in vacuum – some water removed – cooled – sealed in cans

Evaporated

as condensed milk – no addition of sugar – sealed cans
 sterilised – 20 minutes – 115.5°C (240°F)

Frozen

pasteurised homogenised milk – in polythene bags – up to 1 year – pasteurised milk not suitable – separates on thawing

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(iii) Dairy products

Butter

cream separated from milk – pasteurised – held at 4°C – to harden fat globules – then at 15–18°C – for 3 or 4 hours – to develop acidity – cooled to 7°C – churned – fat globules stick together – buttermilk drained off – fat chilled – washed – hardened – salt added – for flavour – and to preserve – worked until smooth

Cream

milk left to stand for 24 hours – cream forms a layer on surface – skimmed off – cooled – pasteurised – single/double/whipping – can be acted upon by lactic acid bacteria – soured cream

Cheese

many varieties – pasteurised milk used – bacteria culture added – converts lactose to lactic acid – acid helps to preserve cheese – heated – 30°C – rennet added – milk clots – caseinogen coagulates with acid – left for 45 minutes – curds and whey formed – curd cut – whey drained off – curd scalded to 30°C – 45 minutes – stirred – cut into blocks – piled up – drained – cut into chips – salt added – packed into moulds – pressed for 24 hours – sprayed with hot water – to form rind – ripens – at 110°C – for 4 months – develops flavour – smell – texture – mature cheeses ripened longer – cottage/blue-veined/cream cheese

Yoghurt

made from all types of milk – homogenised – pasteurised – at 85-95°C – cooled – bacteria added – lactobacillus bulgaricus – streptococcus thermophilus – incubated 4-6 hours – becomes acidic – flavours develop – proteins coagulate – cooled – flavours etc. added

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Mark	Bands Descriptors	Marks
High	<ul style="list-style-type: none"> - Candidate can name several nutrients with functions. - Can state at least 3 methods of treating milk and can give details of methods. - Can name at least 3 dairy products. - Gives details on their production. - Comments are precise and related to specific examples. - Information given is accurate. 	11–15
Middle	<ul style="list-style-type: none"> - Can name many of the nutrients in milk and some functions are stated - Can state at least 2 methods of treating milk and can give some details of methods. - Can name at least 2 dairy products and can give some information on production. - Some gaps in knowledge. - Terminology not always accurate. - Information given is not always precise. 	6–10
Low	<ul style="list-style-type: none"> - Can name a few nutrients. - Functions not always known. - 1 or 2 brief notes on methods of treating milk. - 1 or 2 dairy products mentioned. - Information not always accurate. - General information. - Poor knowledge of production. - Limited knowledge of the topic apparent. 	0–5

[Section C Total: 15]