**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.

Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

## 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]

**(f)** Digestion and absorption of fat in small intestine
in duodenum – fats are emulsified – by bile – from the liver – stored in gall bla
breaks fats into small droplets – to give a greater surface area – lipase – from panc
juice – converts fats to glycerol – and fatty acids – lipase – intestinal juice – fatty a
– 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]**

## 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<br>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]

**(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<br>air is raising agent in shortcrust pastry |
| wholemeal/brown flour | adds fibre – fat – colour – flavour<br>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]

**6 (a) (i)** Saving money

| | |
|---|---|
| buy foods in season | cheaper – better quality – good quality<br>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] |

**(b)** Convenience foods

**Advantages:**
saves time (quick to prepare)
saves energy (not tiring)
easy to prepare
easy to store
easy to transport
little waste
can be kept for emergencies
consistent result
wide variety available
may have extra nutrients added e.g. vitamin C to dried potato
cook may not have the ability to prepare the product well e.g. puff pastry
easy to use

**Disadvantages:**
more expensive than fresh
must follow instructions carefully for good results
small servings
nutrients lost during processing not replaced
low in dietary fibre
high in fat
high in sugar
high in salt
artificial colourings and flavourings may be added
use of additives – long-term effects not known etc

10 points covering both areas 2 points = 1 mark [5]

**7 (a)** Nutritional value of pulses

LBV – protein – (soya HBV) – fat – carbohydrate/starch – dietary fibre (NSP) – iron – thiamine – nicotinic acid – calcium

6 points 2 points = 1 mark [3]

**(b)** Examples of pulses

butter beans – haricot beans – mung beans – adzuki beans – borlotti beans – split peas – lentils – soya beans – chick peas – flageolet beans – black-eyed beans – dhal – peanuts/ground nuts

4 points 2 points = 1 mark [2]

**(c)** Importance of pulses

easily produced
dry so easily stored
cheap to produce
can be mixed with another LBV food – to give HBV protein – complementation
filling
give variety to meals
valuable in vegan diet

4 points 2 points = 1 mark [2]

**(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]**

**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.

**8 (a)**

| Band | Descriptor | |
|---|---|---|
| High | - Can identify conditions for bacterial growth.<br>- Some symptoms of food poisoning identified.<br>- Is able to identify and discuss several points on preventing spread of bacteria during storing, preparing and cooking food.<br><br>- Gives examples to illustrate points made.<br>- Understanding of the topic is apparent.<br>- Information is specific and generally accurate.<br>- All areas of question addressed.<br>- Answers are detailed where appropriate.<br>- Some scientific facts included. | 1 |
| Middle | - Some conditions for bacterial growth given.<br>- May give some symptoms of food poisoning.<br>- Is able to identify several points on preventing the spread of bacteria during storing, preparing and cooking food.<br>- Some discussion or explanations given.<br>- Gives a few examples to illustrate points made.<br>- Shows a basic understanding of the topic.<br>- Information is basic and generally accurate.<br>- Some areas of question addressed.<br>- Gaps in knowledge will be apparent.<br>- May be a few scientific facts.<br>- Answer will be detailed in parts and superficial in others.<br>- Overall lack of detail. | 6–10 |
| Low | - May give conditions for bacterial growth.<br>- Little information on food poisoning.<br>- Mentions some points on preventing spread of bacteria during storing, preparing and cooking.<br>- May give examples to illustrate.<br>- Answer tends to be a list of statements.<br>- Not always accurate.<br>- Information is brief.<br>- Answers not specific.<br>- Little or no scientific information.<br>- Emphasis on one part of the question.<br>- Lack of knowledge will be apparent. | 0–5 |

**(b) Cows' milk is important in the diet but it does not keep long unless it is t… 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

**(iii)** Dairy products

**Butter**

cream separated from milk – pasteurised – held at 4°C – to harden fat globul 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 thermophillus – incubated 4-6 hours – becomes acidic – flavours develop – proteins coagulate – cooled – flavours etc. added

| Mark | Bands Descriptors | |
| --- | --- | --- |
| High | - Candidate can name several nutrients with functions.<br>- Can state at least 3 methods of treating milk and can give details of methods.<br>- Can name at least 3 dairy products.<br>- Gives details on their production.<br>- Comments are precise and related to specific examples.<br>- Information given is accurate. | 1 |
| Middle | - Can name many of the nutrients in milk and some functions are stated<br>- Can state at least 2 methods of treating milk and can give some details of methods.<br>- Can name at least 2 dairy products and can give some information on production.<br>- Some gaps in knowledge.<br>- Terminology not always accurate.<br>- Information given is not always precise. | 6–10 |
| Low | - Can name a few nutrients.<br>- Functions not always known.<br>- 1 or 2 brief notes on methods of treating milk.<br>- 1 or 2 dairy products mentioned.<br>- Information not always accurate.<br>- General information.<br>- Poor knowledge of production.<br>- Limited knowledge of the topic apparent. | 0–5 |

**[Section C Total: 15]**