

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

6065 FOOD AND NUTRITION

6065/01

Paper 1 (Written), 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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Section A

- 1 (a) Named fats
 accept suitable named examples × 4 –
 e.g. butter / cream / lard / suet / dripping / ghee / margarine –
- 4 points (2 points = 1 mark) [2]
- Named oils
 accept suitable named examples × 4 –
 e.g. fish liver oil (or a named example) / nut oil (or a named example) / ground nut / coconut / olive / palm / sesame / soya –
- 4 points (2 points = 1 mark) [2]
- (b) Fats as oils
 fats are solid at room temperature and oils are liquid –
- 1 mark [1]
- (c) Functions of fat
 energy –
 warmth –
 insulation –
 protection of internal organs / shock absorber –
 to convey fat soluble vitamin (or named examples e.g. A D E K) / contains vitamins A D E K
 to form a fuel reserve –
 forms part of structure of cell membrane –
 gives feeling of fullness (satiety) after a meal –
- 4 x 1 mark [4]
- (d) (i) Saturated fat
 hard / solid – less reactive fat –
 carbon atoms saturated with hydrogen / the fat molecule contains max. number of hydrogen atoms –
 no double bonds between carbon atoms – only single bonds –
 usually from animals –
 (credit information shown on a diagram)
- 2 x 1 mark [2]
- (ii) Polyunsaturated fat
 softer fats – more reactive fat –
 fat molecule contains more than one double bond in the carbon chain / two or more double bonds in the carbon chain –
 does not contain max. number of hydrogen atoms / can accept more H₂ –
 the more double bonds the softer the fat –
 usually from plants –
 (credit information shown on a diagram)
- 2 x 1 mark [2]

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(iii) Essential fatty acids

must be included in the diet – because cannot be manufactured by the body – deficiency causes dry skin / poor hair / diarrhoea (allow 2 max. effects of deficiency)

2 x 1 mark

[2]

(e) (i) (fats digested in) duodenum –

(ii) bile (emulsifies fats) –

(iii) (emulsification is necessary) to break fat into tiny droplets / to increase the total surface area of the fat –

(iv) (fat is broken down by enzyme) lipase –

(v) (fat is broken into) glycerol and fatty acid –

(vi) (1g of absorbed fat produces) 9 kcal – 9 Calories – 37 kJ –

6 x 1 mark

[6]

(f) Problems associated with high fat intake

excess fat stored in the body causes obesity –

high intake of animal fat means high cholesterol in diet –

fat / cholesterol deposited in arteries –

can cause CHD / heart attack / stroke –

obesity may lead to breathlessness / lethargy / lack of self-esteem –

3 x 1 mark each

[3]

(g) Name, function and source of two fat-soluble vitamins

1. Vitamin A (retinol) 1 point

Functions

makes visual purple – in retina of eye –

to enable the eye to perceive things in dim light / at night –

prevents Night Blindness –

required to keep mucous membranes moist – and free from infection

example of mucous membranes e.g. throat / digestive / bronchial / excretory tracts –

any example – 1 point (1 only)

for healthy skin –

required for growth –

4 points

Animal Sources (as retinol)

milk – cheese – eggs / egg yolk – butter – liver – kidney – oily fish / e.g. fish liver oils –

Plant Sources (as carotene)

carrots – spinach – watercress – apricots – parsley – cabbage – pumpkin tomatoes –

prunes – margarine – orange – papaya –

3 points

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2. Vitamin D (cholecalciferol) 1 point

functions

formation / maintenance of bones / teeth –
 absorption of calcium / phosphorus –
 prevents rickets in children – rickets symptoms –
 prevents osteomalacia in adults – soft bones –
 growth –

4 points

sources

fish liver oils – oily fish – egg – milk – butter – cream – margarine – cheese – dairy products – yoghurt –
 sunlight / ultra violet rays of the sun –

3 points

[4]

3. Vitamin E (tocopherol) 1 point

functions

healthy skin –
 protection against heart disease –
 fertility / reproduction in some animals –
 antioxidant –

4 points

sources

eggs – nuts – seeds – cereal products – vegetable oils –

3 points

[4]

4. Vitamin K 1 point

functions

clotting of blood 1 point

sources

fruit – cereals – meat – liver – (bacteria in large intestine) –

3 points

[4]

For each vitamin, 8 points max. (2 points = 1 mark.)

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(h) (i) Nutritional needs of elderly women

calcium and phosphorus – prevent osteoporosis / for strengthening bones –
 less carbohydrate / reduced energy giving food – less active –
 vitamin C – to resist infections / absorb iron –
 less fat – difficult to digest or increase risk of CHD / obesity (as less active) –
 less salt – hypertension –
 NSP – prevent constipation –
 4 nutrients + 4 reasons

8 points (2 points = 1 mark)

[4]

(ii) Nutritional needs of very active teenagers

more carbohydrate / high energy food – more energy needed –
 at least a third of energy from fat – higher calorific value / less bulky –
 more protein – growth spurt / body building –
 more calcium / phosphorus – bones and teeth –
 more vitamin D – absorption of calcium –
 more water – to replace water lost in perspiration –
 more NaCl / sodium chloride / salt – to replace salt lost in perspiration –
 more vitamin B thiamin – to release energy from carbohydrate –
 more iron – carries oxygen for cell respiration / energy release –
 more vitamin C – absorption of iron –
 4 nutrients + 4 reasons

8 points (2 points = 1 mark)

[4]

[Section A Total: 40]

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Section B

- 2 (a) Gelatinisation**
 moist – heat – on starch – grains soften / swell – absorb water – some rupture – liquid thickens –
 e.g. custard / roux sauce / cooking cakes / rice / macaroni –
- 6 points (must include an example) (2 points = 1 mark) [3]
- (b) Coagulation**
 heat – on protein – denatures – from 40 °C – coagulation begins at 60 °C – cannot be reversed – hardens / sets –
 chemical structure changes
 e.g. boiled egg / egg custard / roast meat / baked bread –
- 6 points (must include an example) (2 points = 1 mark) [3]
- (c) Fermentation**
 yeast – produces carbon dioxide – and alcohol / ethanol – with food / sugar / glucose –
 moisture – warmth –
 enzymes / named (e.g. maltase / invertase / zymase)
 e.g. bread-making –
- 6 points (must include an example) (2 points = 1 mark) [3]
- (d) Pasteurisation**
 heat – destroys harmful bacteria – and souring bacteria –
 does not prevent decay – keeps longer –
 72°C / 162°F – for 15 seconds – HTST or Flash –
 145°C – for 30 minutes – Holder method –
 cool rapidly – to prevent bacterial growth to below 10°C
 e.g. milk –
- 6 points (must include example) (2 points = 1 mark) [3]
- (e) Hydrogenation**
 H₂ added makes fat solid – from liquid oil – e.g. sunflower / soya – unsaturated fats – can take up hydrogen to make oil saturated – uses a nickel catalyst – can be stopped at any time to achieve degree of hardness required
 e.g. margarine –
- 6 points (must include example) (2 points = 1 mark) [3]

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3 (a) Purpose of ingredients in Victoria sandwich cake

(i) Self-raising Flour

- | | | |
|--------------------------|---|-----------------------------------|
| adds bulk | – | main ingredient |
| carbohydrate | – | provides energy |
| gluten | – | forms framework / sets on heating |
| contains baking powder | – | raising agent |
| traps air during sieving | – | raising agent |

6 points (2 points = 1 mark)

[3]

(ii) Sugar

- | | | |
|------------------------|---|---|
| | – | softens crumb / sweetens / adds flavour / taste |
| traps air when creamed | – | raising agent / lightens texture |
| caramelises | – | dry heat during baking / browns / colour |
| preserves | – | high sugar concentration / helps to retain moisture |

6 points (2 points = 1 mark)

[3]

(iii) Margarine

- | | | |
|------------------------|---|---|
| retains moisture | – | keeps cake fresh longer |
| high energy | – | fat concentrated source of energy |
| traps air when creamed | – | raising agent / lightens |
| adds colour | | |
| adds flavour | | |
| adds nutrients | – | vitamins A and D added during manufacture |

6 points (2 points = 1 mark)

[3]

(iv) Eggs

- | | | |
|-----------------------|---|--|
| protein | – | growth / repair |
| iron | – | haemoglobin |
| gives shape | – | protein coagulates on heating |
| colour | – | depends on brightness of yolk |
| emulsifies | – | holds fat and water separate / prevents curdling |
| traps air when beaten | – | raising agent / lightens |
| flavour | | |
| water | – | (steam) raising agent |

6 points (2 points = 1 mark)

[3]

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- (b) (i) The cake has risen to a peak then cracked
oven temperature too high –
too much mixture for the size of tin –
too high oven shelf –
- (ii) Close textured cake
too much liquid in mixture –
too little raising agent used –
not enough creaming –
mixture has curdled –
oven temperature too low –
cake not cooked for long enough –
overbeating when adding flour – causes loss of air –
overbeating after adding liquid –
not sieved –
wrong proportions –
opens oven door too much before cake sets –

6 points (must be at least 1 from each section) (2 points = 1 mark)

[3]

4 (a) Reasons for preserving food

- | | | |
|---|---|--|
| kills bacteria | – | e.g. milk |
| to keep longer / prevents decay | – | e.g. canned meat, dried fruit |
| give variety | – | e.g. jam, pickles |
| reduces transport cost | – | e.g. convenience foods |
| less bulky | – | e.g. dried milk |
| easier to transport | – | e.g. frozen meat from New Zealand, canned corned beef from Argentina, dried fruit from Greece etc. |
| enjoy food from other lands | – | e.g. pineapples from South Africa etc. |
| enjoy foods out of season | – | e.g. frozen strawberries |
| make use of food when cheap and plentiful | – | e.g. seasonal fruit |
| to avoid waste | – | e.g. named seasonal fruit or vegetable |
| cope with a glut | – | e.g. cannot use all produce at once |
| good for emergencies | – | e.g. dried milk, frozen meat |

8 points (2 points = 1 mark) (must include example for each)

[4]

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(b) Preventing decay

(i) Freezing

low temperature prevents growth of micro-organisms, need warmth / 37 °C –
water unavailable / frozen, need moisture to multiply –
1 well-explained point

(ii) Jam-making

high sugar content 60 %, inhibits growth of micro-organisms – or
boil / high temperature during process, destroys micro-organisms – or
jars sealed, to prevent entry of micro-organisms from air –
1 well-explained point

(iii) Drying

water removed, micro-organisms need water to multiply – or
food supply too concentrated, micro-organisms need dilute food supply –
1 well-explained point

[3]

(c) **EITHER JAM-MAKING OR FREEZING**

Jam-making

use ripe or just under-ripe fruit – more pectin
prepare fruit according to type – remove inedible parts, stones, cut up etc.
boil / stew fruit to soften – release pectin / make fruit palatable
test for pectin – fruit rich in pectin / commercial pectin may be needed
only add sugar when skins are soft – will not get softer with sugar / osmotic effect of sugar
hardens skins
stir until sugar is dissolved – to prevent burning on bottom of pan
boil rapidly – to reach setting point
test for setting point – description of wrinkle test / flake test.
temperature or 220 °C
fill jars almost to the top – less room for air / jam shrinks when cooling
label with name and date – must use in rotation / to identify
store in cool, dark place – to maintain colour / prevent growth of mould

10 points (2 points = 1 mark)

[5]

Freezing

choose undamaged fruit – good appearance of finished product
prepare fruit according to kind – remove inedible parts / cut up
spread fruit onto open trays – freeze separately / easier to thaw and use later
cook if necessary – easier to store / less bulky / saves cooking time later
pack into containers according to amount used at one time –
to avoid waste / defrost quicker
pack in airtight containers – to prevent 'freezer burn'
label with name, date, quantity – identify / use when quality still good
freeze quickly – small ice crystals prevent damage to cell

10 points (2 points = 1 mark)

[5]

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(d) Pectin

polysaccharide –
 complex carbohydrate – found in fruit and some root vegetables –
 name one good source (e.g. apples) –
 name one poor source (e.g. strawberries) –
 important as setting agent in jam – sugar needed to give set –
 lower pH will aid setting – lemon juice often used – 65% acid content –
 pectin changes to pectic acid as fruit ripens – under-ripe fruit best for jam –
 test for pectin – description –

6 points (2 points = 1 mark)

[3]

5 (a) Advantages and disadvantages of frying

advantages

quick – food browns / colour – crisp surface – adds nutrients without adding bulk – develops flavour – develops aroma – fat / vitamins A / D added –

disadvantages

uses a lot of fat – expensive outlay – against 'healthy eating' guidelines – fat may be difficult to digest – dangerous method of cooking – if overheated could cause fire – needs constant attention – food could be greasy and unappetising – heat sensitive nutrients lost –

10 points (covering both areas) (2 points = 1 mark)

[5]

(b) Care and choice of saucepans

choice of saucepans

must suit cooking stove – thick base for electric cooker – retain heat –
 well balanced – to prevent tipping over –
 insulated handles and knobs – to prevent burning –
 well-fitting lids – to prevent loss of heat and steam –
 base should cover hotplate – prevents waste of heat – more economical –
 non-stick coating – easier to clean –
 enamel outside – to match kitchen decor –
 buy the best that can afford – less need to replace frequently –
 copper bases – good conductor of heat – more efficient –
 glass – can see what is cooking –
 stainless steel – hard wearing / easier to clean –
 iron – cheaper – stains –
 aluminium – lightweight – dents when dropped – not balanced on stove –
 choose a variety of sizes – to suit uses / size of family –

care of saucepans

soak – to remove burnt on food –
 wash in hot soapy water – removes grease –
 dry thoroughly – prevents rusting – discourages smells and growth of bacteria –
 do not stack – prevents scratching –
 do not use steel wool or metal spoons on non-stick pans – removes coating –
 store in dry place – prevents rusting –

10 points (covering both areas) (2 points = 1 mark)

[5]

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(c) Disposal of kitchen waste

empty bin daily – wash daily – dry thoroughly / in the sun –
do not leave water in bin – attracts mosquitoes – disinfect regularly –
line with plastic bin liner – easier to empty – keeps bin cleaner –
wrap all waste – tie bags – pour away liquid – wrap broken glass –
clear up spills and mess around bin – prevents attraction of flies / insects –
cover bin tightly – prevents flies / insects –
rinse out and flatten tins – removes smell of food – takes up less space –
recycle paper / glass / aluminium cans if possible – peelings for compost –
stand the outside bin on bricks – allows air to circulate underneath –
keep outside bin away from house and away from open windows –
so flies do not get into the house easily –
do not pour fat down drains – blocks drains when it hardens –
make sure U-bend contains clean water – disinfect at night –
leave no scraps lying about on benches or floor – encourages vermin –
do not allow bin to overflow – encourages vermin / insects –

10 points (2 points = 1 mark)

[5]

6 (a) Nutrients in red meat

protein – fat – iron – vitamin A – vitamin D – thiamine – riboflavin – nicotinic acid – cobalamin (B12) –

6 points (2 points = 1 mark)

[3]

(b) Tenderising meat before cooking

hammer / beating – mincing or cutting into small / thin pieces – hanging – score
soak / marinade in acid (wine / vinegar / lemon juice) –
use of enzymes / papain (from papaya) / bromalin (from pineapple) –
(Do not allow 'use of tenderising powders' or 'meat tenderizer'.)

4 points (2 points = 1 mark)

[2]

(c) (i) Moist methods of cooking

braising – boiling – stewing – steaming –

4 points = 1 mark

[1]

(ii) Changes during cooking of tough meat

insoluble – collagen – changes to gelatine – which is soluble –
fibres fall apart – fat melts – colour change from red to brown –
meat shrinks – extractives squeezed out – protein coagulates –

8 points (2 points = 1 mark)

[4]

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(d) Reasons to reduce red meat intake

contains saturated fat – high in cholesterol – blocks arteries –
 can lead to CHD – high blood pressure – strokes –
 fat can cause obesity / weight gain – can result in breathlessness –

6 points (2 points = 1 mark)

Alternatives to red meat

white meat (or named e.g. chicken / turkey) – fish – soya beans – eggs / cheese / milk
 TVP – pulses (or 1 named example) – cereals – nuts – mention of complementation – quorn
 – quinoa – soya products – tofu –

4 points (2 points = 1 mark)

[5]

7 (a) Types of convenience foods (not freezing)

canned	–	pineapples / corned beef / tuna
dried	–	milk / currants / yeast
ready made	–	biscuits / breakfast cereals / yoghurt
ready to cook	–	cook chill

name + example of 3 types

6 points (2 points = 1 mark)

[3]

(b) Advantages of convenience foods

quick to prepare – easy to prepare – save fuel – easy to store – easy to transport – can be
 kept for emergencies – little waste – wide variety available – cook may not have the ability to
 prepare the product well (e.g. puff pastry) – enjoy foods out of season – enjoy foods
 unavailable in country – less washing up – less equipment used –

Disadvantages of convenience foods

more expensive than fresh – small servings – nutrients lost during processing not replaced –
 low in NSP – high in fat – high in sugar – high in salt – long-term effects not known – loss of
 skill –

8 points (covering both parts) (2 points = 1 mark)

[4]

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(c) Additives in Convenience Foods

- used to maintain nutritional quality (e.g. add vit. C to juices) –
- improve keeping quality –
- to make food more attractive / add aroma / colour / flavour –
- can improve texture / consistency –
- emulsify oil and water –
- prevent rancidity in fats (anti-oxidants) –
- can be natural but not found in the particular food to which added –
- may be synthetic (e.g. vitamin C) –
- can be artificial – those with E numbers have been approved by the European Community –
- must be used in the smallest amount possible to produce the desired effect –
- some people are intolerant / are allergic to certain additives –
- long-term effect is not known –
- danger of adding nut extracts for someone allergic to nuts –

8 points (2 points = 1 mark)

[4]

(d) Freezing

- maintain temperature in body of freezer at -18°C –
- to prevent growth of micro-organisms –
- most foods contain large amounts of water – ice crystals form when frozen –
- fruit and vegetables can be damaged by ice crystals if too large –
- cells rupture if ice crystal exceeds size of cell –
- structure collapses when food is thawed –
- liquid released –
- large crystals form when food is frozen too slowly –
- frozen at -24°C – small ice crystals –
- remain inside cells without rupturing –
- to quick freeze, drop temperature from 0°C to -4°C in 30 minutes –

Storing frozen food

- airtight containers – prevent surface from drying – remove air from plastic bags –
- label with name, date, quantity – use in rotation –
- once thawed, do not refreeze – bacterial growth / cell damage –
- packages tightly fitted together – maintain coldness / use space economically –
- open freezer for as little time as possible – risk of thawing food –

8 points (covering both parts) (2 points = 1 mark)

[4]

[Section B Total: 60]

[Paper Total: 100]