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

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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 H_2 –
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 NaC*l* / 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 ºC – coagulation begins at 60 ºC – 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 ºC / 162 ºF – for 15 seconds – HTST **or** Flash –
145 ºC – for 30 minutes – Holder method –
cool rapidly – to prevent bacterial growth to below 10 ºC
e.g. milk –

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

(e) Hydrogenation

H_2 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) <u>The cake has risen to a peak then cracked</u>
oven temperature too high –
too much mixture for the size of tin –
too high oven shelf –

(ii) <u>Close textured cake</u>
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) <u>Reasons for preserving food</u>

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 ºC –
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 ºC
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 ºC –
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 ºC – small ice crystals –
remain inside cells without rupturing –
to quick freeze, drop temperature from 0 ºC to −4 ºC 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]

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