UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

6065 FOOD AND NUTRITION

6065/01 Paper 1 (Written), maximum raw mark 100

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UNIVERSITY of CAMBRIDGE
International Examinations

Section A

1 (a) (i) Monosaccharides

simple sugars – $C_6H_{12}O_6$ – basic unit – end product of digestion –
sweet – soluble in water
(4 points) (2 points = 1 mark) [2]

(ii) Disaccharides

double sugars – $C_{12}H_{22}O_{11}$ – 2 monosaccharides combined –
sweet – soluble in water – glucose + 1 other simple sugar –
broken down to monosaccharides during digestion
(4 points) (2 points = 1 mark) [2]

(iii) Polysaccharides

made up of many monosaccharides – insoluble in water – not sweet –
not all polysaccharides can be digested –
Non Starch Polysaccharide (NSP) – adds bulk to diet –
prevents constipation/diverticulitis/varicose veins etc.–
chain is branched – cannot break –
starch can be digested – because molecules are linked together in a simple chain
(4 points) (2 points = 1 mark) [2]

(iv) Digestion and absorption

in the mouth
amylase/ptyalin – from salivary glands – acts on <u>cooked</u> starch –
converting it into maltose
in the duodenum
amylase – in pancreatic juice – converts starch to maltose
in the ileum
maltase – in intestinal juice – converts maltose to glucose –
villi – finger-like projections – in walls of small intestine –
have walls made of single cells – and a network of blood capillaries –
glucose passes through walls of blood vessels – into bloodstream –
then transported to liver
(12 points) (2 points = 1 mark) [6]

(v) Reasons for reducing sugar intake

tooth decay – bacteria change sugar to acids – dissolve enamel
excess stored as fat – obesity – breathless – low self–esteem –
associated with coronary heart disease (CHD) – varicose veins – hypertension etc.
risk of diabetes – too much glucose in blood for insulin produced
3 reasons + 3 explanations
(6 points) (2 points = 1 mark) [3]

(vi) Ways of reducing sugar

avoid adding sugar to drinks – use artificial sweetener –
fewer sweets/chocolate – biscuits/cakes – reduce sugar in recipes –
use canned fruit in fruit juice instead of syrup –
drink low calorie drinks/Diet Coke – avoid fizzy drinks –
do not buy sugar-coated breakfast cereal – buy 'sugar free' products –
fewer convenience foods – study nutritional information on packaging
(6 points) (2 points = 1 mark) [3]

(b) (i) Importance of iron

formation of haemoglobin – red pigment in blood –
picks up oxygen from lungs – oxyhaemoglobin –
transports oxygen to cells – oxidises glucose – cell respiration –
energy produced – leaving carbon dioxide and water –
CO_2 attaches to haemoglobin – carboxyhaemoglobin –
tranported to lungs – for breathing out/disposal
(4 points) (2 points = 1 mark) [2]

(ii) Sources of iron

liver/kidney – red meat (or one named e.g. corned beef) –
eggs – cocoa/plain chocolate – curry powder – black treacle –
dried fruit (or named e.g.) – pulses (or named e.g.) – soya beans –
green vegetables (or one named e.g.)
(4 points) (2 points = 1 mark) [2]

(iii) Deficiency disease

Anaemia
(1 mark) [1]

(iv) Symptoms

pale – tired/lethargic/fatigued – weak – headaches –
feel dizzy/faint – lacks energy – breathless –
(2 points = 1 mark) [1]

(c) (i) Importance of vitamin C

clear skin – building/maintenance of linings of digestive system –
makes connective tissue – to bind cells together –
for production of blood – and walls of blood vessels – immunity –
growth – helps to heal wounds/fractures –
helps to build strong teeth and gums –
absorption of iron – antioxidant etc.
(4 points) (2 points = 1 mark) [2]

(ii) Sources of vitamin C

citrus fruit (or named e.g.) – blackcurrants – rose hips –
strawberries – melon – tomatoes – mango – green peppers –
green vegetables (or named e.g.) – new potatoes etc.
(4 points) (2 points = 1 mark) [2]

(iii) Deficiency disease

Scurvy
(1 mark) [1]

(iv) Symptoms

walls of blood vessels weaken/break – blood escapes –
bruises appear under the skin – pain in muscles and joints –
gums bleed – teeth loosen – heart failure –
as blood passes through walls of capillaries etc.
(2 points = 1 mark) [1]

(d) Deficiency diseases

Not iron or vitamin C – in previous questions

Vitamin A/Retinol	Night blindness/Xerophthalmia
Vitamin D/Cholecalciferol	Rickets/osteomalacia
Vitamin B1/Thiamine	Beri–beri
Vitamin B2/Riboflavin	Dermatitis/cataracts
Vitamin B3/Nicotinic acid	Pellagra
Vitamin B12/cobalamin	Pernicious anaemia
Folate/folic acid	Anaemia/spina bifida
Calcium	Rickets/osteomalacia/osteoporsis/tetany
Iodine	Goitre
Protein	Kwashiorkor
Carbohyrate/fat/protein	Marasmus (lack of energy foods)

4 deficiency diseases × 1 point
4 associated nutrients × 1 point
(8 points) (2 points = 1 mark) [4]

(e) Planning meals for the elderly

small portions – appetite reduces with age
remove bones/skin etc. – eyesight may be poorer – food needs to be easy to eat/chew – may need to cut into small pieces/mince – elderly may have few teeth
fewer carbohydrate foods – elderly may be less active
need protein foods – to repair worn out cells
iron – to prevent anaemia
vitamin C – to absorb iron – immunity
calcium/phosphorus – to maintain bones and teeth – for blood clotting – muscle function
vitamin D – to absorb calcium
soft foods – easier to eat
low in fat – easier to digest – reduces risk of CHD – obesity
reduce salt – reduces risk of hypertension/high blood pressure
reduce sugar – reduces risk of tooth decay and obesity – high sugar intake is linked to diabetes
fruit and vegetables – NSP – less risk of constipation
variety of colour – flavour – texture – to add interest – make appetising
reduce spices and strong flavours – these are less easily tolerated
snack foods should be nutritious – include milk daily etc.
(12 points) (2 points = 1 mark) [6]

[Section A Total: 40]

Section B

2 (a) Nutrients in eggs

protein (or named e.g. ovalbumin/mucin/vitellin) – fat –
vitamin A/retinol – vitamin D/cholecalciferol –
vitamin B2/riboflavin (or vitamin B) – iron – phosphorus – sulfur
(6 points) (2 points = 1 mark) [3]

(b) Uses of eggs

main dish/breakfast/snack –	omelette, scrambled egg, boiled egg etc.
trapping air/making mixtures rise – lightening	Swiss roll, sponge flan etc. mousse, meringue, soufflé
thickening	custard, sauces, soup etc.
setting	quiche, rich cakes, baked egg custard etc.
emulsifying	mayonnaise, rich cakes etc.
binding	croquettes, fish cakes, stuffing etc.
coating	Scotch eggs, fish fillets etc.
glazing	pastry, bread etc.
enriching	sauces, milk pudding, soup etc.
garnishing	salad, dressed crab, omelette strips etc.
colour	pastry, cake etc.

5 uses + 5 examples
(10 points) (2 points = 1 mark) [5]

(c) Storage of eggs

cool place/refrigerator – keep longer –
not too dry – water evaporates –
in an egg box/special rack in fridge door – safe/less easily broken –
do not store past expiry date – not safe to eat – risk of Salmonella –
do not freeze whole eggs – liquid inside shell expands and cracks shell
freeze only if separated – add sugar or salt to egg whites –
do not wash shells – removes protective cuticle – bacteria enter –
round end upwards – air space at top – holds yolk in place –
check for cracked eggs – bacteria enter – egg contaminated –
use in rotation – prevents waste –
keep away from strong smells/onions/fish – smell absorbed through pores in shell – etc.
(6 points) (2 points = 1 mark) [3]

(d) Changes when egg is boiled

protein coagulates/sets/solidifies/hardens –
egg white at 60°C – egg yolk at 66°C –
egg white thickens – changes from transparent to opaque –
becomes firm – then rubbery if overcooked –
yolk thickens – becomes powdery when overheated –
green ring forms around yolk – ferrous sulfate –
iron in yolk – sulfur in egg white –
indigestible if overcooked
(8 points) (2 points = 1 mark) [4]

3 (a) Food additives

nutritional – vitamin C in fruit juice, calcium in white flour, vitamins A and D in margarine
improve keeping quality/preserve/reduce spoilage – used in processed foods –
make food more attractive/add colour – flavour – smell –
can improve texture/consistency – stabilisers –
emulsify fat and water – prevent separating – ice cream, mayonnaise
anti-oxidant – prevent rancidity in fats
can be natural but not found in particular food added to
or synthetic – e.g. vitamin C can be made synthetically –
can be artificial colours and flavours etc.
E numbers have been approved by the European Community –
must be used in smallest amount possible to produce desired effect –
some people are allergic/intolerant to certain additives
long–term effect is not known – used in processed foods
must be stated, by law, if contained in the product
danger of adding nut extracts for those allergic to nuts etc.
may be used to increase sales – longer shelf-life – reduce waste etc.
(10 points) (2 points = 1 mark) [5]

(b) Uses of fats and oils

spreading on bread – butter, margarine
frying – corn oil, sunflower seed oil, dripping
sauce-making – margarine, butter
aeration – margarine traps air when creamed with sugar in cakes
pastry-making – holds layers apart in flaky pastry – cake-making –
shortening – crumbly texture of shortcrust pastry, rock buns etc.
adding flavour – butter in cake-making
improve keeping quality – butter used in rich cakes etc.
sealing – melted butter/margarine on pate to retain moisture – flavour/colour
adds calories without adding bulk – fried food
dressings – French dressing
form an emulsion – mayonnaise
basting – adds moisture to meat cooked by dry heat/grilled/roasted
decorating – butter icing
make foods easier to eat/lubricates – butter on toast
prevent sticking – oiled baking tins
retains moisture – rich cakes
glazes – melted butter on new potatoes, carrots etc.
(10 points) (2 points = 1 mark) [5]

(c) Reasons for choosing a vegetarian diet

religious beliefs
object to slaughter of animals – think it cruel – family custom
expensive to rear animals – land could be used for crops –
more people could be fed from same area of land
dislike of animal flesh – texture/taste etc.
meat is expensive to buy
belief that vegetarian diet is more healthy –
animal fat has cholesterol – associated with CHD
recent health scares – BSE/bird 'flu etc./salmonella
(10 points) (2 points = 1 mark) [5]

4 (a) Reasons for preserving food

enjoy food out of season
buy food when plentiful to use when scarce
to cope with a glut
to prevent waste
to give variety – food can be frozen, dried
new products made – jam, pickles etc.
to enjoy foods produced in other countries
to have a store of food
useful in emergencies etc.
to prevent the growth of yeast – mould – bacteria
to prevent loss of water/dehydration of fresh foods
(4 points) (2 points = 1 mark) [2]

(b) Methods of preserving

Freezing
water in cells frozen – unavailable for growth of bacteria –
bacteria cannot grow at low temperatures – dormant –
e.g. fish, vegetables , meat etc.

Jam–making
high sugar content/60% added sugar –
water withdrawn from cells – too concentrated for bacteria to thrive
sealed in jars – to prevent entry of micro-organisms
e.g. plums, strawberries, guava etc.

Pickling
salt to cover food – withdraw water from cells (by osmosis)
acid/vinegar to replace water – micro-organisms cannot thrive in high acidic conditions
e.g. onions, gherkins, cabbage etc.

Pasteuristion
heated to 72°C (162ºF) – 15 seconds **or** 63ºC (145ºF) – 30 minutes
cooled rapidly – destroys harmful bacteria
e.g. milk, fruit juice etc.

Ultra Heat Treatment (UHT)
heated to 132°C – for not more than 1 second –
destroys harmful bacteria – prevents souring
e.g. milk, cream etc

Bottling and Canning
heat destroys bacteria – sealed to prevent further entry of bacteria
e.g. fruit, milk, vegetables, fish etc.

Drying
water removed – bacteria cannot multiply without water
e.g. fruit, meat, fish, herbs, spices etc.

Salting
water removed by osmosis – micro–organisms need water to thrive
e.g. fish, beans etc.

Smoking
salt removes water – phenols from smoke deposited on food surface
inhibits growth of micro–organisms
e.g. fish, meat

Accelerated Freeze Drying (AFD)
water sublimes in vacuum – structure remains same –
micro–organisms need water to thrive e.g. coffee, vegetables, strawberries

Vacuum packing
air removed – entry of micro-organisms prevented –
no oxygen for bacterial growth
e.g. meat, fish, coffee etc.

Irradiation
packages irradiated – no change to appearance of food –
cannot detect that process has taken place –
micro-organisms destroyed by gamma rays –
e.g. spices, strawberries etc.

Artificial additives
sulfur dioxide – nitrates – inhibit growth of micro-organisms
e.g. sausages, bacon etc.

Name of method	1 point
Principles of method	2 points
Named example	1 point
4 points for each method	
3 methods of preserving	3 × 4 points = 12 points

2 points = 1 mark [6]

(c) (i) Advantages and disadvantages of convenience foods

Advantages
save time
little or no preparation
little or no cooking
useful in emergencies
less washing up
no waste
large variety available
readily available
easy to carry
portion control
cook may not have ability to make product – e.g. puff pastry
less equipment required
may cook and serve in same container
consistent product
easy to store
longer shelf life than fresh
may be fortified/have added nutrients

Disadvantages
expensive
packaging may cause pollution
can be high in fat
can be high in sugar
can be high in salt
can be low in NSP
contain additives
small portions
loss of vitamins B and C during processing
loss of skills
6 points – at least 2 points from each area
2 points = 1 mark [3]

(ii) Labelling convenience foods

give information to consumer – some information is a legal requirement
name of product – so consumer knows what is being bought
description – further details e.g. tuna in brine/identify
brand – reliability, consumer knows what to expect etc.
name of manufacturer – recognised as something seen before
address of manufacturer – in case of need to contact
ingredients – descending order – by weight – consumer may have allergies etc.
cooking instructions – for best result/new product/inexperienced
storage instruction – to maintain best condition
serving suggestion – to give ideas to consumer
picture of product – to give information on new products
weight – consumer can calculate unit cost/make comparisons
special claims – reduced fat/no added sugar/added vitamin C etc.
vegetarian society symbol – so vegetarians know food is suitable
wheat ear symbol – gluten free/coeliacs can consume
recycle symbol – consumer knows how to dispose
nutritional information – consumer knows nutritional value per 100g
kilocalorie content – consumer may be calorie counting, trying to lose weight
sugar – useful for diabetics
fat – states amount of saturated fat –
– consumer may have CHD – or wish to follow healthier diet
salt – consumer can control salt intake if suffering from hypertension
additives identified – consumer may wish to avoid/allergies etc.
may include nuts – important information for people with allergies etc.
price – if on special offer/can compare with other products etc.
(8 points) (2 points = 1 mark) [4]

5 (a) Reasons for the importance of cereals

readily available – easy to transport – easy to grow – cheap –
carbohydrate/starch – source of energy – staple food – filling – easy to store – source of (LBV) protein – NSP in wholegrains –
versatile – can be used for sweet and savoury dishes –
easy to prepare – easy to eat etc.
(6 points) (2 points = 1 mark) [3]

(b) Named cereals

wheat – oats – barley – rye – corn/maize/mealie meal –
millet – rice – sorghum
(4 points) (2 points = 1 mark) [2]

(c) Storage of cereals

cool – dry – to prevent germination/growth – away from smells –
to prevent mould – and formation of lumps –
check regularly – can be attacked by weevils –
covered containers – to prevent entry of dust etc. –
sealed – to keep out moisture etc. –
keep bins off the ground – prevent attack by rats etc. –
use in rotation – do not mix old and new supplies –
decay could spread from old to new – wasteful –
wholegrain cereals do not keep as long – fat becomes rancid etc.
(6 points) (2 points = 1 mark) [3]

(d) Choice of flour for making bread

strong/hard flour – high gluten content – becomes stretchy/elastic with moisture – and kneading – stretches to hold gases –
gives firm structure –
white flour – lighter – so rises better –
plain flour – no chemical raising agent required –
wholemeal flour – contains NSP – follows dietary guidelines –
not SR flour – contains baking powder – yeast is raising agent
(6 points) (2 points = 1 mark) [3]

(e) Changes taking place when a loaf of bread is baked

rises/increases in size –
warmth of oven encourages fermentation of yeast –
carbon dioxide produced – gives open texture –
alcohol evaporates – water evaporates – pushes up dough –
yeast is killed by heat – no more carbon dioxide produced –
gas in dough expands when heated – protein/gluten coagulates –
shape sets – starch dextrinises – forms crust – browns –
crust lifts off/'oven spring' – light texture – fat melts
as carbon dioxide continues to expand after shape has set –
air replaces escaped gas – flour gelatinises –
Maillard browning – action of protein and sugar – etc.
(8 points) (2 points = 1 mark) [4]

6 (a) Creaming

e.g. Victoria sandwich cake, queen cakes, Eve's pudding etc.
equal quantities – fat and sugar – with wooden spoon/electric mixer –
until light and fluffy – traps air – to help raise the mixture –
butter or soft margarine – good colour – and flavour –
caster sugar – finer grains – easier to cream
(6 points to include 1 example) (2 points = 1 mark) [3]

(b) Basting

e.g. roast beef, grilled steak etc.
pour – or spoon – hot fat – over surface of food – from time to time
to prevent drying – or burning – adds flavour of fat –
and extractives
(6 points to include 1 example) (2 points = 1 mark) [3]

(c) Making a roux

e.g. base for sauce, soup or named e.g. – cheese sauce
equal quantities – fat and flour – usually margarine/butter/dripping
for colour – and flavour – melt fat – do not brown – stir in flour – wooden spoon
resembles a paste – cook over gentle heat – for 1 minute –
stir constantly – to prevent sticking/burning – starch absorbs fat –
looks 'sandy'/like marzipan (or other description)
(6 points to include 1 example) (2 points = 1 mark) [3]

(d) Sautéing

e.g. mushrooms, potatoes, onions
toss – small/thin pieces of food – or cooked food –
in small amount – of hot fat – over low heat – type of frying – lid on pan – until fat absorbed –
quick method – browns food
(6 points to include 1 example) (2 points = 1 mark) [3]

(e) Making a stock

e.g. vegetable, chicken, beef, fish
boil – bones/small pieces of food – for a long time – strain
to gain flavour/extractives – to add to soup/sauces/casseroles –
instead of water – can use commercial stock cube
(6 points to include 1 example) (2 points = 1 mark) [3]

7 (a) Choice and care of kitchen knives

Choice

reliable brand – may have a guarantee –
variety of sizes for different purposes – peeling, chopping etc. –
serrated edge useful for slicing fruit and vegetables finely –
strong handle – comfortable to hold – handle firmly fixed –
wood, plastic etc. – easy to grip – no cracks/joins for dirt to collect
some have blade and handle as one piece of metal – easy to clean –
sharp – blunt knives slip – rigid blade – does not bend when cutting, except palette knives – need to be flexible –
stainless steel – hard wearing –
large knives not usually stainless unless permanently sharp –
blade able to be sharpened – for efficient cutting etc.

Care

store with blades pointing downwards – in a knife block –
or with sheath over blade – or point protected by cork –
use on a chopping board –
wash in hot soapy water – dry thoroughly – to prevent rusting –
do not use to cut frozen meat etc. unless specially for purpose –
wash immediately after cutting lemon – to prevent staining metal –
(10 points to cover choice and care) (2 points = 1 mark) [5]

(b) The disposal of kitchen waste

empty bin daily – wash daily – dry thoroughly – dry in sun –
do not leave water in bin – attracts mosquitoes –
line with plastic bin liner – easier to empty – keeps bin cleaner –
disinfect regularly –
wrap all waste – tie bags – pour away liquid – wrap broken glass –
clear up spills and mess around bin – prevent flies/insects –
cover bin tightly – prevent flies etc. – rinse and flatten cans –
removes smell of food – takes up less space –
recycle paper, glass, aluminium cans etc. if possible –
stand bin outside on bricks – allows air to circulate underneath –
keep outside bin away from house – and from open windows –
so flies do not get into house easily –
do not pour fat down drains – blocks drains when fat hardens –
make sure U-bend contains clean water – disinfect at night –
leave no scraps lying about on work surfaces or floor –
encourages vermin –
do not allow bin to overflow – encourages animals/vermin/insects – etc.
(10 points to cover choice and care) (2 points = 1 mark) [5]

(c) Hygiene in shops and markets

shop assistants should have clean overalls/aprons –
bacteria from clothing can be transferred to food –
hair tied back from face/covered – prevent hair in food –
clean short fingernails – bacteria thrive in dirt under nails –
no nail varnish – chips and contaminates food –
do not lick fingers when picking up wrapping paper –
bacteria in mouth passes to paper then food –
do not blow into paper bags to open them –
different knives and chopping boards for raw and cooked food –
to prevent cross–contamination – should be hand-washing facilities in shop –
do not handle food and money – dirt on money passes to food –
sell food in rotation – check dates on packages –
refrigerators and freezers should display temperature –
if not cold enough bacteria will not be inactive in freezer –
food will spoil more quickly in refrigerator if not cold enough –
keep premises free from vermin/flies – they carry bacteria –
which pass to food – no rubbish lying around shops or stalls –
smells when rotting – food in freezers should be wrapped well –
food should not be stored above safety line in freezers –
do not sell out-of-date food – number of bacteria will be high –
risk of food poisoning etc.
(10 points to cover choice and care) (2 points = 1 mark) [5]

[Section B Total: 60]