UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2006 question paper

0648 FOOD AND NUTRITION

0648/01 Paper 1 maximum raw mark 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2006 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Section A

1 (a) carbon - hydrogen - oxygen **3 x 1 mark**

(b) Functions of fat
warmth/heat
energy
energy store
protein sparing
insulation
protection of internal organs
conveys fat soluble vitamins/vitamins A and D
formation of cell membranes
increases calorific value of food without adding bulk
high satiety value
4 x 1 mark **[4]**

(c) (i) Saturated fat
contains maximum hydrogen
single bonds
solid at room temperature
2 x 1 mark **[2]**

(ii) Examples
butter - lard - dripping - cream - coconut oil etc.
2 examples = 1 mark **[1]**

(iii) Polyunsaturated fat
can take up more hydrogen
more than one double bond in molecule
liquid/oil at room temperature
2 x 1 mark **[2]**

(iv) Examples
sunflower oil - soya oil - corn/maize oil etc.
2 examples = 1 mark **[1]**

(d) Digestion and absorption of fat
in duodenum - bile - from gall bladder - emulsifies fat -
lipase - from pancreatic juice - converts fats to glycerol - and fatty acid -
in ileum - lipase - from intestinal juice - converts fats to glycerol - and fatty acid
(allow action of lipase once)
absorbed in ileum - into lacteal - of villi - then into lymphatic system
10 points = 5 marks **[5]**

(e) Excess of saturated fat in the diet
stored as fat - under skin - as adipose tissue - hypertension
or round internal organs - causing obesity - breathlessness -
lethargy - problems during surgery - lack of self-esteem -
cholesterol - deposited in blood vessels - narrows - blocks -
heart problems/CHD etc.
8 points = 4 marks **[4]**

2 **(a)** Functions of NSP
absorbs water - makes faeces soft - and bulky - easier to expel -
stimulates peristalsis - absorbs toxins - lowers cholesterol level etc.
6 points = 3 marks

(b) Lack of NSP
constipation - diverticular disease - hernia - haemorrhoids -
cancer of colon
2 points = 1 mark **[1]**

(c) Sources of NSP
bran - wholegrain cereals - wholemeal bread - brown rice -
wholemeal pasta - pulses - green vegetables - fruit skins and seeds -
potato skins etc.
4 examples = 2 marks **[2]**

3 **(a)** Uses of water in the body
vital to life - 70% of all human body is water
constituent of body cells - 65% water in protoplasm
keeps linings of mucous membranes moist - throat/digestive tract etc.
maintains body temperature - evaporates from skin to cool body
excretion - as sweat/urine/in faeces
transports nutrients - dissolved in water in blood
digestion - food converted to liquid form/chyme
absorption - nutrients dissolved for efficient absorption
body fluids - digestive juices/blood/saliva/secretions etc.
lubricant in joints - knees/elbows etc.
5 well-explained points - 1 mark each **[5]**

(b) Water balance
input of water = output of water
OR water taken into the body in food, drinks and from respiration =
water lost from the body in urine, faeces, perspiration, breathing
1 well-explained definition - 1 mark **[1]**

4 Choice and cooking of food for the elderly
small portions - appetite reduces with age -
remove bones/skin etc. - eyesight may be poorer
may need to cut into small pieces/mince - if few teeth
fewer carbohydrate foods - less active
need protein foods - to repair worn out cells
iron - to prevent anaemia
vitamin C - to absorb iron
calcium/phosphorus - maintain bones/teeth - blood clotting -
muscle function
vitamin D - to absorb calcium
soft foods - easier to eat
low in fat - easier to digest - reduce risk of CHD
reduce salt - reduce risk of hypertension/high blood pressure
reduce sugar - tooth decay/link to diabetes
fruit and vegetables - dietary fibre - less risk of constipation
give variety of colour - flavour - texture - to add interest/make appetising
reduce spices and strong flavours/less easily tolerated
snacks should be nutritious - include plenty of milk daily - etc.
12 points = 6 marks **[6]**

[Section A Total: 40 marks]

Section B

5 (a) Nutrients in milk
protein - fat - calcium - carbohydrate/sugar/lactose -
vitamin A - vitamin D - riboflavin

6 points = 3 marks **[3]**

(b) Rules for storing milk
cool place/refrigerate
clean container
covered
away from strong smells (cheese/fish etc.)
do not mix old and new milk

4 points = 2 marks **[2]**

(c) Milk products
cheese - butter - yoghurt - cream

4 examples = 2 marks **[2]**

(d) Souring of milk
lactic acid bacteria - act on lactose - converting it into lactic acid -
curdles - separates into curds and whey -

4 points = 2 marks **[2]**

(e) (i) Pasteurising
heated to 62°C - 65°C - held there for 30 minutes -
or heated to 72°C - held there for 15 seconds -
cooled rapidly - to below 10°C
destroys pathogenic bacteria - reduces spoilage bacteria

6 points = 3 marks **[3]**

(ii) Ultra Heat Treatment
heated to 132°C - for 1 second - sealed - in foil-lined containers -
all bacteria destroyed - entry of more bacteria prevented

6 points = 3 marks **[3]**

6 (a) Reasons for cooking food

to make it safe to eat - bacteria in meat killed by heat etc.
give hot food in cold weather - soup in winter etc.
reduces bulk of food - cooked green vegetables etc.
makes food more digestible - cooked starch digested more readily than raw etc.
changes colour of food - meat from red to brown/crust on bread etc.
change of texture - egg sets on heating etc.
change of flavour - extractives in meat developed during cooking etc.
add variety of foods - eggs can be poached, fried, boiled, scrambled etc.
make new products - jam, pickles, condensed milk etc.
mix together different foods - cakes, sauces, casseroles etc.
preserves food - milk scalded, fruit made into jam etc.
smell stimulates flow of digestive juices - curry, fried bacon etc.

5 reasons + 5 examples - 10 points = 5 marks **[5]**

(b) (i) Steaming

Advantages
little attention required
food easily digested
little loss of nutrients
soft texture etc.

Disadvantages
slow
kitchen may be hot/causes condensation
flavour not developed
colour of food pale and insipid/not developed
soft texture/lacks 'bite' etc.

6 points = 3 marks **[3]**

(ii) Frying

Advantages
quick method of cooking
food becomes brown
crisp surface
flavour developed etc.

Disadvantages
adds fat to product
needs constant attention during cooking
fried food may be difficult to digest
can be a dangerous process etc.

6 points = 3 marks **[3]**

(iii) Using a microwave oxen

Advantages
quick
cook and serve in same dish
saves washing up
kitchen does not get hot
no preheating oven needed
food does not burn on dish/sides of oven
oven easy to clean etc.

Disadvantages
food does not brown.
flavours not developed
dish does not become crisp
'hot spots' may develop
food needs stirring during cooking
only suitable for thin or small pieces of food
impossible to judge when food is cooked etc.

8 points = 4 marks **[4]**

7 **(a)** Method of making and baking

cream fat and sugar - with wooden spoon/electric mixer -
until light and fluffy – traps air - beat eggs – add gradually -
beating well between each addition - sift flour – traps air/removes lumps
fold into mixture - with a metal spoon - a little at a time -
to make a soft, dropping mixture -
grease and line tin/grease and flour tin etc. - preheat oven -
gas mark 4 or 325°F/160°C - 40-45 minutes -
bake until golden brown/firm to the touch/springs back when pressed/
shrunk from sides of tin/skewer comes out clean - cool on a cooling rack

(Do not credit points on decoration)

10 points = 5 marks **[5]**

(b) Variations

cocoa - coffee - lemon/orange - coconut - cherries - chopped nuts -
currants/raisins/sultanas - vanilla essence - almond essence - pandan leaves etc.

2 examples = 1 mark **[1]**

(c) **(i)** Choice of flour

white flour - gives lighter texture - easier to raise -
soft - low gluten content - crumbly texture -
wholemeal - adds colour - flavour - texture - contains NSP -
SR flour - contains raising agent - in correct proportion

4 points = 2 marks **[2]**

(ii) Choice of sugar

caster sugar - finer crystals - dissolves easier when creaming -
soft brown sugar - adds colour - flavour

4 points = 2 marks **[2]**

(iii) Choice of fat

butter - flavour - colour - more difficult to cream -
solid at room temperature - more expensive -
soft margarine - creams easily - cheaper - colour - flavour

4 points = 2 marks **[2]**

(d) Changes during baking

fat melts - sugar melts - protein coagulates - dextrinises -
sugar caramelises - brown surface - crust forms - air expands -
carbon dioxide produced - pushes up cake/cake rises -
sets in risen shape - starch absorbs melted fat etc.

6 points = 3 marks **[3]**

Section B Total : 45 marks

Section C

8 (a) Different raising agents and their uses in the preparation of dishes.

The answer may include the following knowledge and understanding.

Principles of raising agents
gases expand when heated - mixture enlarges/expands/swells -
steam has a larger volume than water -
hot gases rise - push up mixture
heat sets risen shape - protein in other ingredients coagulates -
e.g. egg, gluten in flour etc.

Air
gives a light texture - no change in colour - or flavour -
must be introduced before cooking - expands on heating -
sieving flour - air trapped between grains of flour -
creaming fat and sugar - traps air as tiny bubbles -
rubbing-in fat and flour - air trapped as mixture falls -
whisking egg white - meringues - ovalbumin stretches -
entangles 7x own volume of air -
whisking whole egg and sugar - traps less air - due to fat in egg yolk -
used in cakes e.g. Swiss roll
folding and rolling - flaky pastry/puff pastry - air trapped between layers -
sealed to prevent air loss - expands on heating - pushes layers apart etc.

Carbon dioxide

bicarbonate of soda - with moist heat - gives off carbon dioxide -
residue of sodium carbonate - washing soda - yellow colour - bitter flavour -
used in dishes where this would be hidden - e.g. gingerbread etc.

bicarbonate of soda and cream of tartar - moist heat -
gives off carbon dioxide - colourless and tasteless residue - Rochelle salt -
e.g. scones etc.

bicarbonate of soda and sour milk - as above - acid + alkali

baking powder - contains correct proportion of bicarbonate of soda and cream of tartar -
e.g. suet pastry, scones, cakes etc.

self-raising flour - plain flour + baking powder - as above

yeast - feeds on sugar - moisture - warmth - ferments sugar - produces alcohol - and
carbon dioxide - continues to produce under favourable conditions - heat of oven kills
yeast - fermentation stops - e.g. bread etc.

Steam

used in mixtures with a high proportion of liquid e.g. choux pastry, Yorkshire puddings etc.
hot oven - water changes to steam -

8 (a)

Mark Bands	Descriptors	Part Marks	Total
High	The candidate is able to name all gases The candidate demonstrates a clear understanding of how gases are introduced Good examples used to illustrate Correct terminology used where appropriate Candidate can state clearly how raising occurs and how shape is set Comments are precise and related to named examples.	11-15	15
Middle	The candidate can name at least 2 gases Can give a few examples of how gases are introduced Factual information is sound but not always linked to specific examples to illustrate Information may be accurate but not all issues are considered	6-10	
Low	The candidate can give 1 or 2 examples of gases Action of gases may be considered in simple terms Fails to use correct terminology Information will be general and lacking in specific detail Limited knowledge of the topic will be apparent	0-5	

8 (b) Different fats and oils and their uses in the preparation of dishes

The answer may include the following knowledge and understanding.

Types of fats and oils

fats are solid at room temperature - oils are liquid at room temperature -
saturated fats hold as much hydrogen as they can - may include a diagram -
molecule has single bonds - e.g. butter, lard, suet - may include diagram -
found in animal products - e.g. milk, cream, bacon, meat etc.
cholesterol in saturated fat - deposited in arteries - narrows - blocks -
associated with coronary heart disease - excess causes obesity -
oils can be monounsaturated - one double bond - oleic acid - in olive oil -
can take up more hydrogen - at double bond - to make single bonds -
polyunsaturated fats - more than 2 double bonds - linoleic acid -
hydrogenation - nickel catalyst - hardens oils - changes uses -
oils hydrogenated to make margarine - if process not complete fat is softer -
fats and oils made up of different fatty acids and glycerol -
different fatty acids produce fats and oils of differing 'hardness' -
'soft' margarine is easier to cream – 'hard' margarine easier to rub in -
at least 40 different fatty acids known - butyric, oleic, stearic etc. -
all have different properties - taste, decomposition point etc. -
choose fat or oil according to use -
oils usually from plants - e.g. corn, sunflower, soya etc. -
some animals produce oil - fish oils, whale oil etc.
some plants produce solid fat - cocoa butter -
fats and oils have different smoke points - high smoke points for frying -
fats decompose into glycerol and fatty acid on heating - irreversible -
butter decomposes at too low a temperature for frying - corn oil at a high temp. -
fatty acids have different flavours - butyric acid in butter pleasant – etc.

Uses

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 cake-making
pastry-making - holds layers apart in flaky and puff pastry
shortening - crumbly texture of shortcrust pastry, rock buns
adding flavour - butter used in cake making
improve keeping quality - rich cakes e g. Christmas cake remains moist
sealing - melted butter/margarine on pate to retain moisture
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 etc.
vegans will not use animal fat - those with CHD choose polyunsaturated fats etc.

Mark Bands	Descriptors	Part Marks	Total
High	The candidate is able to state different types of fats and oils Can describe compositions of fats May give scientific information Can name a variety of fats and oils Can give many uses of fats and oils - Demonstrates a clear understanding of the topic Comments are precise and related to named examples Specific terminology is used where appropriate Information is generally accurate	11-15	15
Middle	The candidate can state some of the different types of fats and oils Gives some additional information in support of statements Several uses of fats and oils named Examples often given to illustrate Some scientific information may be attempted Information accurate but not all issues are considered Response tends to be factual Does not always seem to understand the points made	6-10	
Low	Can give a few facts about different fats and oils Little attempt to explain differences Does not consider a wide range of uses A few examples given Information is general and lacks specific detail Limited knowledge of the topic will be apparent	0-5	

Section C Total : 15 marks