UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2012 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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UNIVERSITY of CAMBRIDGE
International Examinations

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

(b) Examples of monosaccharides
glucose – fructose – galactose
2 points = 1 mark **[1]**

(c) 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]**

(d) Examples of disaccharides
maltose – lactose – sucrose
2 points = 1 mark **[1]**

(e) Polysaccharides
made up of many monosaccharides – insoluble in water – not sweet – not all polysaccharides can be digested – complex carbohydrates
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]**

(f) Examples of polysaccharides
starch – glycogen – pectin – gum – mucilagescellulose – NSP
2 points = 1 mark **[1]**

2 Digestion and absorption of starch

(a) in the mouth
amylase/ptyalin – from salivary glands – acts on cooked starch – converting it into maltose

(b) in the duodenum
amylase – in pancreatic juice – converts starch to maltose

(c) 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 – large surface area – 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]**

3 (a) (i) Importance of calcium
building bones/teeth
maintaining bones/teeth
clotting blood
muscle function
nerve function
4 points
2 points = 1 mark **[2]**

(ii) Sources of calcium
milk – cheese – yoghurt – bones of canned fish (or 1 named e.g. sardines, pilchards, salmon)
green vegetables (or 1 named e.g. spinach, cabbage, lettuce, Brussels sprouts)
bread – white flour (by law) – soya
4 points
2 points = 1 mark **[2]**

(iii) Deficiency disease
Rickets/osteomalacia/osteoporosis
1 mark **[1]**

(iv) Symptoms
RICKETS – leg bones deformed – bow legs – knock knees – pigeon chest
OSTEOMALACIA – soft bones – break easily – muscle weakness – pain
OSTEOPOROSIS – loss of bone density – porous – break easily – brittle bones
2 points = 1 mark **[1]**

(b) (i) Importance of vitamin D
absorption of calcium – and phosphorus – formation of bones/teeth
maintenance of bones / teeth
4 points
2 points = 1 mark **[2]**

(ii) Sources of vitamin D
milk – cheese – eggs – red meat (or named e.g.) – liver – oily fish (or named e.g.) – butter – margarine – cod liver oil – UV rays from the sun/sunlight
4 points
2 points = 1 mark **[2]**

(c) Deficiency diseases
Not calcium or vitamin D – in previous questions

Vitamin A/Retinol	Night blindness/Xerophthalmia
Vitamin C/ascorbic acid	Scurvy
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
Iron	Anaemia
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]**

4 (a) 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 CHD – varicose veins – hypertension – risk of diabetes – too much glucose in blood for insulin produced

3 reasons + 3 explanations

6 points 2 points = 1 mark **[3]**

(b) Dietary recommendations

Less fat	prevents obesity, coronary heart disease, hypertension
Less saturated fat	prevents build up of cholesterol
Less salt	prevents hypertension
More NSP	prevents constipation
More water	prevents dehydration

Five portions of fruit/vegetables – for NSP/vitamins/minerals

2 recommendations + 2 reasons

4 points 2 points = 1 mark **[2]**

5 Dietary needs of pregnant women

sufficient HBV protein	– growth of foetus
calcium and/or phosphorus	– building bones/teeth
vitamin D	– to absorb calcium
iron	– for baby's first six months – prevent anaemia in mother
vitamin C	– to absorb iron
vitamin A	– for baby's eyesight
NSP	– prevent constipation
folate/folic acid/B9	– prevent neural tube defects/spina bifida
vitamin B	– for release of energy

6 nutrients + 6 reasons – 1 points each

12 points 2 points = 1 mark [6]

[Total: 40]

Section B

6 (a) Fatless sponge cake
(3 eggs – given in question)

75g plain flour (allow SR)
75g caster sugar
2 points = 1 mark **[2]**

(b) Method of making and baking
whisk – eggs and sugar – over hot water – with electric hand mixer –
until thick and creamy – leaves a trail – to introduce air –
sieve flour – to aerate – and remove lumps –
fold in flour – with a metal spoon/palette knife – to prevent air loss –
add flour in thirds – weight of flour would press out air – use a cutting action
or figure of eight – to avoid loss of air – continue until no dry flour seen –
to give an even consistency –
pour – into greased and floured/greased and lined tin – do not spread –
air bubbles will break – tilt to give even thickness – bake in preheated oven
so rising can begin immediately –
sponge cake 200°C/400°F/gas mark 6 – for 15–20 minutes
until golden brown – firm to the touch – shrinks from sides of tin – (max. 2)
cool on wire rack – to allow steam to escape

DO NOT credit any cake decoration.
12 points 2 points **[6]**

(c) Changes during baking
air expands – gases rise – push up cake mixture –
protein coagulates – at 60°C – around air bubbles –
sets in risen shape – open texture –
sugar caramelises – Maillard browning – action of protein and sugar –
starch grains absorb water – from egg – swell – gelatinise –
flour on outside dextrinises – effect of dry heat – browns –
dries on outside – forms a crust -
steam – from egg – evaporates – helps cake to rise –
8 points 2 points = 1 mark **[4]**

(d) Reasons for a close texture
insufficient whisking
air knocked out during folding in of flour/addition of flour
did not use a cutting action to add flour – whisked/beat in flour
used wooden spoon/electric mixer for adding flour
did not use metal spoon/palette knife to incorporate flour
continued folding after all flour was incorporated
not baked immediately
oven temperature too low
insufficient baking/undercooked
4 points 2 points = 1 mark **[2]**

(e) Other baked items which can be made with this recipe
Swiss roll – sponge flan – sponge fingers
2 points = 1 mark **[1]**

7 (a) Points to consider when meal planning
(N.B. Do NOT credit 'balanced' or points on nutrition.)

climate/time of year/ – hot meals in cold weather –
e.g. soup in Winter/salads in Summer
equipment available – may need freezer for dessert/baking tins etc.
vary colour – e.g. not mince and potatoes followed by chocolate dessert/tomato soup then tomatoes in main course
vary flavour – do not repeat flavours in courses –
e.g. fish with lemon sauce followed by lemon meringue pie
vary texture – e.g. avoid pastry in two courses
meals should be attractive – use garnishes/decorations
consider cost – use LBV protein/eggs/cheap cuts of meat
season – use fruit and vegetables in season
availability of food – use left-overs/garden produce/local produce
shopping facilities – may need to buy fresh produce daily
skill of cook – may not know how to make choux pastry etc.
time available – may need to use quick methods e.g. frying/grilling
likes and dislikes – avoid food not enjoyed – low fat diets
allergies – e.g. nuts/lactose/gluten
ages of people taking meal – e.g. old may need easily digested food –
manual workers may need greater quantity of food
occasion – birthday party/packed meal/Christmas lunch
consider whole meal – not an elaborate first course then simple dessert
number to serve – quantity required – to have enough food/to avoid waste
religion – e.g. Hindus do not eat beef/Jews do not eat pork
gender – females require additional iron
5 points + 5 examples = 10 points
2 points = 1 mark **[5]**

(b) Importance of Non-Starch Polysaccharide/NSP (dietary fibre)
absorbs water – in colon – making faeces soft – and bulky –
and easy to expel – regularly – helps to clear waste –
binds food residues – stimulates peristalsis –
gives muscles something to grip –
prevents constipation – hernias – haemorrhoids – cancer of colon – diverticular disease – varicose veins
helps to remove toxins – reduces cholesterol –
gives feeling of fullness – limits intake of other nutrients
Sources of NSP
green, leafy vegetables – fruit skins – whole grain cereals – bran –
wholemeal bread – brown rice – pulses – nuts – potato skins –
celery – tomato seeds
Can include a max. 2 sources of NSP – 1 point each
10 points 2 points = 1 mark **[5]**

(c) Problems associated with a diet high in fat

Heart Disease

causes coronary heart disease (CHD) – hypertension – strokes –
poor blood circulation – linked to high levels of cholesterol –
from saturated fat – in animal foods -
cholesterol deposited on artery walls – narrows arteries – blocks -
flow of oxygen in blood stopped – angina occurs if arteries are narrow –
reduced oxygen supply – chest pain – during exercise/exertion -
heart attack – if coronary arteries blocked –
stroke – if blocked blood vessels in brain

Obesity

may be caused by over-eating – eating more than body needs -
excess stored as fat – under skin – adipose tissue – around internal organs
known as obesity if more than $^1/_3$ of body weight is fat – usually less active
less likely to burn off excess by exercise – lethargic –
inactivity may lead to more weight gain – puts a strain on the heart – hypertension – CHD – diabetes – arthritis –
problems during surgery – lack of self-esteem – breathless

10 points 2 points = 1 mark **[5]**

8 **(a)** Different uses of sugar in the preparation of family dishes

sweetening	– tea / coffee
aerating	– creaming with margarine for rich cakes
feeding yeast	– bread-making
preserving	– jam has high sugar concentration
flavour	– demerara sugar for coffee
decorating cakes	– royal icing/butter icing
confectionery	– sugar heated to form caramel
glazing	– sugar and water boiled/glaze for sweet breads
brown baked goods	– sprinkled on biscuits before baking
prevents gluten formation	– rich cakes – gives a softer result
retards enzyme action	– frozen fruit
syrup (liquid) in cakes	– melted method e.g. gingerbread / already liquid
to counteract acidity	– in tomato soup and sauce

5 uses of sugar + 5 examples of use
10 points 2 points = 1 mark **[5]**

(b) Rules, with reasons, for successful shortcrust pastry

use a weak/soft flour	– low gluten content
plain flour	– air is raising agent
use lard	– gives shortness
use margarine or butter	– for colour and flavour
mixture of lard and margarine	– gives colour, flavour and shortness
sieve dry ingredients	– to aerate – to remove lumps
lift hands out of bowl	– aerates – keeps fat cool
use fingertips	– coolest part of hand – avoid melting fat
use hard fat	– can rub into small pieces without melting
no more than ½ fat to flour	– otherwise difficult to rub in
measure / weigh accurately	– to ensure correct proportions
not too much water	– soft dough would need more flour
	– alters proportion of fat to flour
keep everything cool	– cold air expands more than warm air

use cold equipment/cold fat/cold water for mixing
– to keep everything cool
not too much flour for rolling out – alters proportions – makes pastry dry
avoid re-rolling – additional handling develops gluten – toughens
handle lightly – to avoid pressing out air
do not turn pastry over – more flour would be needed – toughens pastry
do not stretch pastry when rolling – shrinks during baking
roll with short, sharp strokes in a forward direction
– avoid stretching pastry
use light, even pressure – to avoid stretching pastry and pressing out air
allow pastry to relax in a cool place before baking -
gluten relaxes, cools trapped air, prevents shrinkage
bake in a hot oven/gas mark 7/210°C/425°F
– cooks starch so that fat can be absorbed
if oven too cool – fat melts and runs out before starch is ready to absorb it
if oven too hot – overcooked on outside before inside is cooked

10 points (including at least 2 reasons)
2 points = 1 mark **[5]**

(c) <u>HBV protein for vegans</u>
soya beans – only plant product with HBV protein –
soya products – flour – tofu – milk – tempeh – (not soya oil) (max. 2 e.g.)
TVP – spun to make fibres – resembles texture of meat –
e.g. sausages – mince – chunks – burgers (max. 2 e.g.)
mixture of LBV protein foods – cereals/nuts/pulses – in same meal –
e.g. beans on toast – lentil soup and bread etc. (max. 2 e.g.)
complementary proteins – improves overall quality of protein –
essential amino acids missing from one are compensated by the other –
HBV + LBV protein foods eaten together – e.g. soya and cereals

10 points 2 points = 1 mark **[5]**

[Total: 45]

Answer **either** 9(a) or 9(b).

9 (a) Discuss the reasons for cooking food and explain different methods of transferring heat when cooking. **[15]**

The answer may include the following knowledge and understanding:

Reasons for cooking food:
to kill harmful bacteria/make food safe to eat – e.g. meat
to destroy natural toxins – e.g. red kidney beans
to preserve – e.g. making fruit into jam
to aid digestion – cooked starch easier to digest – begins in mouth
to aid absorption – e.g. raw starch in potatoes and flour cannot be absorbed easily
to make food easier to eat – e.g. meat is tenderised
to make food more attractive – e.g. meat changes from red to brown
to develop extractives/flavour – e.g. grilled steak, toasted cheese
smell stimulates appetite/flow of digestive juices – e.g. curry
to provide hot food in cold weather – e.g. soup in winter
to reduce bulk/allow more to be eaten – e.g. cabbage
create new dishes – e.g. quiche, chocolate cake
add variety to diet – e.g. eggs can be cooked in many different ways
necessary for some cooking processes – e.g. thickening sauces, baking

Methods of transferring heat
Conduction – through solids – by contact – molecules vibrate rapidly – adjoining molecules vibrate
heat transferred within foods by conduction in microwave cooking
e.g. metal spoon in hot liquid, pan standing on hotplate
Convection – through liquids – and gases molecules rise when heated – colder molecules fall – convection currents created
e.g. boiling water In pan, heating an oven etc.
Radiation – no medium – through space or vacuum rays from source of heat – fall on food in their path – food needs to be turned
e.g. grill, barbecue

Microwave cooking
electromagnetic waves given off – by magnetron – water molecules in food vibrate – generated heat passes to adjoining molecules by conduction – quick method – oven does not need to be preheated – stays cool – so food does not burn on sides of oven – suitable for small, thin pieces of food – easy to overcook – cannot judge when food is cooked – container does not get hot – glass, china, certain plastics can be used – no metal/metal decoration – causes arcing and will damage the microwave oven

Band	Descriptor	Part marks	Total
High	– Can give several reasons for cooking. – Can give named examples to illustrate reasons. – Correctly named methods of heat transfer. – Is able to give scientific explanations of methods. – Can give suitable examples of methods of heat transfer. – May name dishes cooked by methods identified. – Can give advantages and disadvantages. – Understanding of the topic is apparent. – Information is specific and generally accurate. – All areas of the question well addressed.	11–15	15
Medium	– Will probably give at least three reasons for cooking. – A few named examples to illustrate reasons. – Some named methods of heat transfer given. – Some scientific explanations may be given. – Some dishes may be named to illustrate methods. – Gives a few advantages and disadvantages. – Information not always precise. – Has sound knowledge of some aspects. – Information lacking in detail.	6–10	
Low	– One or two reasons for cooking mentioned. – Few examples to illustrate reasons. – Mentions methods of heat transfer. – Little scientific knowledge to explain methods. – One or two advantages and disadvantages given. – Information is brief. – Not always accurate. – Emphasis is on one part of the question. – Lack of knowledge will be apparent.	0–5	

9 (b) Identify, and give examples of different types of convenience foods.
Discuss the advantages and disadvantages of convenience foods and suggest ways of using them in family meals **[15]**

The answer may include the following knowledge and understanding:

Types of convenience foods

frozen – e.g. peas, ice cream, beef burgers, fish, chips
dried – e.g. stock cubes, milk, custard powder, soup
canned – e.g. fish, baked beans, corned beef, peaches
ready to eat – e.g. biscuits, potato crisps
ready to cook – e.g. pasta, prepared vegetables, filleted fish
bottled – e.g. ketchup, fruit juice, pasta sauces
preserved – e.g. jam, chutney, pickle onions

Advantages of convenience foods

quick to prepare
easy to prepare
save fuel
easy to store
easy to transport
can be kept for emergencies
wide variety available
little waste
may have extra nutrients added
cook may have limited skill
can use foods from other countries/out of season
e.g. to illustrate the above points may be given

Disadvantages of convenience foods

more expensive than fresh equivalent
small servings
nutrients lost during processing
low in dietary fibre
high in fat
high in salt
high in sugar
artificial colourings
artificial flavourings
use of additives
long-term effects not known

Use in family meals

frozen desserts – ice cream
dried herbs, stock cubes
frozen pastry
cake mixes, pastry mix
canned fruit in desserts e.g. pineapple upside down pudding
dried fruit – currants, sultanas – in cake making
frozen fish
bottled sauces, flavourings
custard powder, blancmange
Uses in family meals should be expected for named examples of convenience foods.

NB A list of convenience foods is not acceptable since the question asks how convenience foods can be included in family meals.

9 (b)	Band	Descriptor	Part mark	Total
	High	– Can give many advantages and disadvantages of convenience foods. – Demonstrates a clear understanding of the nature and types of convenience foods. – Comments are precise and are related to named examples. – Specific terminology is used where appropriate. – Most advantages and disadvantages considered. – Many different examples are given to show the use of a variety of named convenience foods.	11–15	15
	Middle	– Can give a few advantages and disadvantages of convenience foods. – Factual content is sound but is not always linked to examples to illustrate points. – Some types and examples of convenience foods given – Information given may be accurate but not all issues are considered. – Some examples are given to show the use of convenience foods.	6–10	
	Low	– Can give some advantages and disadvantages of convenience foods but does not consider a wide range. – Some types are identified and examples given. – Information will be general and will probably lack specific detail. – Few examples of the uses of convenience foods in family meals will be given. – limited knowledge of the topic will be apparent.	0–5	