

MARK SCHEME for the May/June 2007 question paper

0648 FOOD AND NUTRITION

0648/01

Paper 1 (Theory), 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.

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.

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

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Section A

- 1 (a) carbohydrate – fat – protein
3 x 1 mark [3]
- (b) carbohydrate – 4 kcal/16 kJ
fat – 9 kcal/37 kJ
protein – 4 kcal/16 kJ
3 x 1 mark [3]
- (c) Uses of energy
basal metabolism/blood circulation – heartbeat – breathing etc.
physical activity/movement of muscles – to do work or exercise etc.
for chemical and metabolic reactions/digestion or absorption
heat/to maintain temperature
electrical energy/to transmit nervous impulses
growth
(credit each use only once)
3 x 1 mark [3]
- (d) Energy balance
energy intake = energy output
or
number of kcal taken into the body = number of kcal used
1 well-explained statement = 1 mark [1]
- (e) Too much energy-giving food is consumed
excess converted to fat – stored under skin – adipose tissue –
or around internal organs – leading to obesity – CHD –
tendency towards diabetes – lethargy – breathlessness –
high blood pressure – strokes – low self-esteem –
problems during surgery etc.
8 points
2 points = 1 mark [4]

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- 2 (a) Animal sources of iron
liver/kidney – red meat (or named example) – corned beef – eggs
2 examples – 1 point each
2 points = 1 mark [1]
- (b) Plant sources of iron
cocoa/plain chocolate – curry powder – black treacle – dried fruit (or named example) – pulses – soya beans – green vegetables (or named example) etc.
2 examples – 1 point each
2 points = 1 mark [1]
- (c) haemoglobin
1 mark [1]
- (d) Function of haemoglobin
picks up oxygen from lungs – becomes oxyhaemoglobin – transports oxygen to cells – oxidises glucose – cell respiration – energy produced – leaving carbon dioxide and water
4 points
2 points = 1 mark [2]
- (e) anaemia
1 point
- Symptoms of anaemia
pale – lethargic/tired/fatigue/lack of energy – weakness – headaches – dizziness/faint
3 points
2 points = 1 mark [2]
- 3 (a) Functions of vitamin C
clear skin – and linings of digestive system
to make connective tissue – to bind cells together/fights infection
for production of blood – and walls of blood vessels
to help heal wounds/antioxidant
growth
to build strong teeth and/or gums
prevention of scurvy
(do not allow absorption of iron – given in question)
3 x 1 mark [3]
- (b) Sources of vitamin C
citrus fruit (or 1 named example) – blackcurrants – rose hips – strawberries – melon – tomatoes – kiwi fruit – green peppers – green vegetables (or 1 named example) – new potatoes etc.
2 examples – 1 points each
2 points = 1 mark [1]
- (c) Reason for a daily supply
vitamin C cannot be stored in the body
or
vitamin C is water soluble so is easily lost from the body
1 well-explained statement = 1 mark [1]

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4 Digestion in the small intestine

in the **duodenum** – trypsin – from pancreatic juice –
 converts protein to peptones/peptides/polypeptides –
 bile – stored in gall bladder – in liver – emulsifies fat –
 breaks fat into small droplets – increases surface area –
 lipase – converts fats to glycerol and fatty acids –
 amylase – in pancreatic juice – converts starch to maltose –

in the **ileum** – erepsin – from intestinal juice –
 converts peptones to amino-acids –
 lipase – completes breakdown of fat to glycerol and fatty acids –
 maltase – converts maltose to glucose –
 lactase – converts lactose to glucose and galactose –
 sucrose – converts sucrose to glucose and fructose –
 (At least **four** points from each part of the small intestine.)

16 points

2 points = 1 marks

[8]

5 Different individual energy requirements

age – young children require energy for growth

gender – men have larger overall body size – use more energy

activity – physical work/exercise requires more energy –

sedentary workers require less energy than manual workers –

health – more energy required to repair damaged cells after accidents –

pregnancy – energy required for growth of baby

lactation – energy for production of milk

weight reducing programmes – uses reserves of fat for energy – require less energy from food

body size – more surface area needs more energy – greater heat loss from surface – energy to
 maintain body temperature –

climate – energy required to maintain body temperature in cold weather –

BMR different for everyone – amount of energy required for
 breathing, heartbeat, blood circulation etc.

6 well-explained statements

[6]

[Section A Total: 40]

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Section B

- 6 (a) Nutrients in red meat
protein – fat – iron – vitamin A/retinol –
vitamin D/cholecalciferol – phosphorus –
sulphur – vitamin B₁/thiamine – vitamin B₂/riboflavin – B₁₂/cobalamin
6 nutrients – 1 point each
2 points = 1 mark [3]
- (b) Reasons for toughness
long muscle fibres – thick muscle fibres – meat from an old animal – muscles have had most
movement – e.g. neck, leg –
muscles well-developed – animal stressed before slaughter
contains a large amount of collagen/connective tissue – and gristle/elastin
incorrect cooking method used – dry method for tough cut –
frozen meat not defrosted thoroughly before cooking –
4 points
2 points = 1 mark [2]
- (c) Methods of tenderising meat before cooking
mince/cut into small pieces – beat (with hammer/rolling pin) – shorten muscle fibres
hang – marinade or soak in wine/lemon juice/vinegar etc. –
use of enzymes/papain from papaya/bromelain from pineapple –
(do not credit use of commercial tenderiser.)
4 points
2 points = 1 mark [2]
- (d) How tough meat becomes tender during cooking
use a moist method of cooking – e.g. stewing/braising etc. –
moisture penetrates between muscle fibres –
collagen – insoluble – converted to gelatine – soluble –
muscle fibres fall apart –
8 points
2 points = 1 mark [4]
- (e) Processing of soya beans to resemble meat
Advantages
soya contains all indispensable amino-acids – HBV protein –
only HBV from vegetable source – useful for vegans/vegetarians –
more healthy than meat – meat contains saturated fat – linked to CHD
cheaper than meat – low in fat – cooks quickly – without shrinkage –
easy to transport – no preparation – dehydrated – easy to store –
takes on flavours of other foods – meat extender –
mix with meat to give a cheaper product – fortified with iron –
and vitamins from B group – meat replacement/substitute –
e.g. sausages/mince/chunks – etc.
no chance of BSE/bird flu etc.
Disadvantages
processed food – artificial additives may have been used/preservatives/colour/flavour –
e.g. colour – flavour – may not like the texture – no cooking aroma – etc.
8 points to include at least 2 disadvantages
2 points = 1 mark [4]

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7 (a) Choice of flour and fat for shortcrust pastry

Flour

plain – air is raising agent – white
soft – low gluten content – for more crumbly pastry
can use wholemeal flour or a mix with white – adds NSP – iron –
but produces a heavier result

Fat

hard fat – does not melt when rubbing in –
fat should be cold/chilled – not easily melted before baking –
margarine – good colour – and flavour – cheaper than butter
butter – good flavour – and colour – expensive
lard – crumbly/short result – because it does not contain water –
poor colour – and flavour –
mixture of lard and margarine – qualities of both fats etc.

10 points to cover both ingredients

2 points = 1 mark

[5]

(b) Method of making shortcrust pastry

sieve flour – trap air – remove lumps
cut fat into small pieces – easier to rub in
rub fat into flour – thumbs over fingertips – coolest part of hand –
lift hands high – to incorporate air – keep mixture cool –
mixture should look like fine breadcrumbs –
add cold water – all at once – measure accurately –
mix with a round-bladed knife – cool –
draw pastry together with fingertips – stiff dough – knead lightly –
to form a smooth dough – leave in a cool place/to relax before rolling – relax gluten

12 points

2 points = 1 mark

[6]

(c) Named dishes

meat/fruit pies – Cornish pasties – curry puffs – fruit flan –
lemon meringue pie – jam tarts – quiche – sausage rolls –
cheese straws etc.

4 different examples – 4 points

2 points = 1 mark

[2]

(d) (i) Pastry shrinks during baking

pastry stretched during rolling out
stretched during shaping/lining flan ring etc.
not allowed to rest before baking

2 points

2 points = 1 mark

(ii) Hard, tough pastry

conditions for making pastry not cool enough
fat not hard enough
fat melted during rubbing in
not enough air incorporated during preparation
heavy handling pressed out air
too much kneading developed gluten
pastry re-rolled too many times
too much water added to rubbed in mixture
too much flour for rolling out
pastry turned over during rolling etc.

2 points

2 points = 1 mark

[2]

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8 (a) Prevention of accidents in the kitchen

carry sharp knives point towards the floor–
 keep arm at side of body – knife would fall to floor if knocked
 pass scissors and knives with handle towards person –
 all knives stored with blades pointing in same direction –
 out of the reach of children –
 can store knives in block/sheath/with point in cork –
 keep knife blades sharp – blunt knives more likely to slip –
 do not run – small area so difficult to avoid other people –
 wipe up spills immediately – in case of slipping and falling –
 turn pan handles towards back of stove – prevent knocking down –
 keep equipment where it can easily be reached – avoid climbing –
 do not keep heavy items in high cupboards – injuries if they fall –
 oven gloves for hot dishes – may drop and burn feet etc. –
 do not use tea towels instead of oven cloth – thin/dampness scalds –
 no trailing flexes from equipment – avoids tripping –
 keep kettles, mixers etc. away from edge of bench –
 so children cannot pull them down
 do not allow steam from kettle to point towards edge of bench –
 may be at face level for children
 don't handle electrical equipment/plugs with wet hands – electric shock
 do not wear open sandals etc. – no protection from knives, scalds
 no loose sleeves – danger of catching fire from gas flame
 long hair tied back – could catch fire/get tangled in mixer etc.
 do not turn on gas before striking match – could be an explosion
 do not overheat oil/have flames too high – can ignite
 no flowing curtains near cooker–could catch fire from gas flames
 do not store poisons in unlocked cupboards – or in kitchen –
 label all containers – do not store e.g. paraffin in lemonade bottle etc.
 do not leave anything lying on floor e.g. toys –
 do not keep matches near gas flames – well lit – etc.
 (credit can be given to statements, explanations and reasons.)

10 points

2 points = 1 mark

[5]

(b) Personal Hygiene

wash hands in hot soapy water before touching food –
 and after visiting toilet – dry hands on paper towels if possible –
 bacteria collect on communal/roller towels – cross contamination –
 do not lick fingers – lick spoons and put back into food –
 bacteria in nose and throat will be transferred to food –
 do not cough/sneeze over food – no smoking – clean apron/overall bacteria breed in food left
 on clothing – no nail varnish to be worn –
 keep fingernails clean and short – dirt and bacteria collect under nails no outdoor
 clothing/shoes in kitchen – do not cook if ill –
 cover cuts with waterproof plasters – bacteria from blood to food etc.
 (credit can be given to statements, explanations and reasons.)

10 points

2 points = 1 mark

[5]

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(c) Storage of perishable foods

meat/fish in cool place – refrigerator – cover – clean container –
to prevent cross contamination – raw meat at bottom of fridge –
to prevent blood dripping onto other foods –
keep leftovers covered and in cool place – ideal for bacteria –
use within 24 hours –
cold temperature/refrigeration slows down growth of bacteria –
but does not destroy bacteria –
food will still become dangerous – and unfit to eat –
note ‘use by’ dates on packaging –
eggs should be stored with rounded end up – keeps chalazae in place –
away from strong-smelling food – absorb smells through pores in shell
do not mix old and new milk – bacteria passes to new milk –
sours more quickly – bacteria breed quickly in liquid foods –
freeze meat/fish etc. – growth of bacteria stopped – at 18°C –
wrap/cover is waterproof material – to prevent drying of surface –
label with name and date – use in rotation –
green vegetables wrapped – cool place – to prevent wilting –
root vegetables in ventilated place – prevent moulds –
potatoes in dark place – to prevent sprouting – etc.

(Credit can be given to statements, explanations and reasons.)

10 points

2 points = 1 mark

[5]

[Section B Total: 45]

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Section C

9 Points to consider when planning, preparing and cooking meals

The answer may contain the following knowledge and understanding

General points

climate/time of year – hot meals in cold weather – e.g. soup in Winter/salad in Summer
equipment available – may need freezer for dessert but none available
vary colour – e.g. not serve mince and potatoes then chocolate dessert
vary flavour – e.g. not tomato soup then tomatoes in main course
vary flavour – e.g. fish with lemon sauce then lemon meringue pie
vary texture – e.g. not quiche followed by apple pie
meals should be attractive – use garnishes/decorations
who is meal for?/how many people?
consider cost – use LBV protein/cheap cuts of meat/eggs
season – use fruit and vegetables in season – cheaper
availability of food – use left-overs/garden produce/local foods/season/weather
shopping facilities – fresh produce may need to be bought daily
skill of cook – may not have skills to make puff pastry etc.
time available – steaming takes a long time/grill, microwave quick
likes and dislikes – avoid food not enjoyed – avoids waste
special requirements – may be vegetarian, low fat diet, diabetic etc.
ages of people being fed – e.g. old may need easily digested food
occasion – could be a birthday party, family meal, packed meal
consider whole meal – not an elaborate first course then a simple dessert
quantity required – to avoid waste/preparing insufficient food for all
hygienic prep/safety considered
make sure food is thoroughly cooked/not overcooked
etc.

Nutritional points

HBV protein – growth, repair etc.
carbohydrate – energy etc.
conservation of nutrients (e.g. vitamin C)
fat – concentrated source of energy etc.
vitamin A – mucous membranes, night vision etc.
vitamin B group – release of energy from carbohydrates, fats, protein
vitamin C – healthy skin, absorption of iron etc.
vitamin D – bones and teeth, absorption of calcium
iron – haemoglobin, prevention of anaemia
calcium – bones and teeth, blood clotting etc.
NSP – efficient digestive system, prevention of constipation etc.
water – body fluids, 70% body is water etc.
low in saturated fat – linked to CHD, cholesterol etc.
low in sugar – tooth decay, diabetes, obesity etc.
low in salt – hypertension, retention of fluids etc.
fresh fruit and vegetables – vitamins, minerals etc.

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Saving time when preparing and cooking meals

collect everything needed – avoid unnecessary walking/delay
 use convenience foods – can buy in bulk – no need to wash/peel etc.
 labour saving equipment – mixer/processor/blender
 prepare and cook in bulk – mixer can take large quantities
 batch bake – use some and freeze some –
 no need to peel potatoes, carrots etc. –
 cut meat into small pieces/or mince – tenderises quicker
 cut potatoes for boiling into thin slices – remove margarine from refrigerator well before creaming – quicker
 use soft margarine for creaming – quicker and easier
 do not preheat oven for more than 10 minutes –
 use grill – or microwave – or fry foods – use pressure cooker –
 tough cuts of meat can be tenderised in a shorter time –
 choose tender cuts of meat – cook quickly by frying/grilling – marinade meat or tenderise meat before cooking
 use correct temperature – wastes time stewing meat at too low temp.
 do not prepare in advance then reheat – cook once then serve etc.

Saving fuel when preparing and cooking meals

all meal on top of stove – or all meal in oven –
 batch baking – fill oven shelves – all dishes at same oven temperature
 reduce size of flame under pan – use steamer – pressure cooker –
 microwave oven – slow cooker – lid on pan –
 small pan for small amount of food – boil just enough water for tea –
 small amount of water for boiling green vegetables – heats quickly –
 base of pan should cover hotplate – avoid wasting heat –
 pans should have flat base – close contact with hotplate –
 do not preheat oven for more than 10 minutes – use residual heat –
 do not prepare in advance then reheat – etc.

Saving money when planning, preparing and cooking meals

buy foods in season – make use of garden produce –
 use left-overs – look for special offers in shops –
 avoid waste – peel fruit and vegetables thinly –
 do not cook more than is necessary for the meal –
 use cheaper sources of HBV protein – milk/cheese/eggs –
 use cereals and pulses together – complementary protein –
 use convenience foods with care – usually more expensive than fresh –
 avoid buying biscuits/snacks – spoil appetite and waste food –
 compare prices in different – buy in shops local markets – etc.

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9	Mark Bands	Descriptors	Part Marks	Total
	High	<ul style="list-style-type: none"> – The candidate demonstrates a clear understanding of several factors to consider when planning meals. – Good examples used to illustrate. – Correct terminology used where appropriate. – States clearly some nutritional points. – May note points on economy. – Comments are precise and are related to named examples. – Candidate demonstrates a sound knowledge of the topic. – Will probably have considered all the areas of the question. 	11-15	15
	Middle	<ul style="list-style-type: none"> – The candidate can show some understanding of some of the factors to consider when planning meals. – A few examples given to illustrate answer. – Factual information sound but not always illustrated with specific examples. – Information accurate but not all issues considered. – Probably includes some nutritional information. – Has possibly not considered the topic in a broad enough way. – Demonstrates sound knowledge of some areas. 	6-10	
	Low	<ul style="list-style-type: none"> – The candidate can give a few points to consider when planning meals. – Topic will probably not be supported with examples. – Fails to use correct terminology. – Information will be general and lacking in specific detail. – Will not have considered more than one or two aspects of the question. – Limited knowledge of the topic will be apparent. 	0-5	

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10 Discuss different types of vegetables and their importance in the diet

The answer may include the following knowledge and understanding

Types of vegetables

leaf – cabbage, lettuce, spinach, watercress etc.
 root – carrot, parsnip, turnip, radish etc.
 flower - cauliflower, broccoli etc.
 tuber– potato, Jerusalem artichoke, yam etc.
 fruit – tomato, cucumber, peppers, corn on the cob, courgette etc.
 pods – mange tout, French beans, runner beans, okra etc.
 seeds – peas, broad beans etc.
 bulb – onion, shallot, leek etc.
 stem – celery, asparagus
 fungi – mushrooms

Nutrients in vegetables

LBV protein – peas, beans etc.
 HBV protein – soya beans
 starch – potatoes etc.
 sugar – onions, beetroot, parsnips etc.
 vitamin A – carrots, tomatoes, green vegetables etc.
 thiamine – pulses
 riboflavin – most vegetables
 nicotinic acid – most vegetables
 vitamin C – green vegetables, tomatoes, peppers etc.
 calcium – watercress, lettuce, spinach etc.
 iron – watercress, cabbage etc.

Other reasons for including vegetables in the diet

source of NSP – in cellulose cell walls of plants –
 function of digestive tract/prevent constipation etc. (allow 1 function)
 add bulk to meals – useful for weight-reducing diets – contain no fat –
 water – refreshing – 70% body consists of water –
 body fluids/digestion/maintains body temperature etc. (1 function) colour – make meals
 appetising – flavour – texture –
 can serve raw or cooked – snacks – wide range available –
 cook in many ways – cook quickly – add variety to meals –
 can be cheap to buy – grown at home/readily available –
 preserved in tins/by freezing etc. – easy to buy –
 need no preparation if processed – etc.

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10	Mark Bands	Descriptors	Part Marks	Total
	High	<ul style="list-style-type: none"> – The candidate is able to name several types of vegetables – Good examples used to illustrate – Several nutrients mentioned – Some other reasons for including vegetables mentioned – Correct terminology used where appropriate – Comments precise and relevant – Demonstrates a sound understanding of the topic – Will probably have considered the question in a broad way 	11-15	15
	Middle	<ul style="list-style-type: none"> – The candidate is able to show some knowledge of types of vegetables – Some examples given to illustrate answer – A few nutrients mentioned – May include other reasons for including vegetables – Factual information sound but examples not always given to illustrate – Not all issues are considered – Answer lacks depth – Demonstrates some understanding of the topic 	6-10	
	Low	<ul style="list-style-type: none"> – The candidate can state a few types of vegetables – Examples not always given to support statements – May not mention nutrients in vegetables – Other reasons may not have been considered – Information will be general and lacking in specific detail – Limited knowledge of the topic will be apparent 	0-5	

[Section C Total: 15]

[Question Paper Total: 100]