

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2010 question paper  
for the guidance of teachers**

**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, which would have considered the acceptability of alternative answers.

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## Section A

- 1 (a) Elements in fat  
carbon – hydrogen – oxygen  
3 × 1 mark [3]
- (b) Functions of fat  
energy  
energy reserve  
protects vital organs  
insulates / preserves body heat / warmth  
solvent for fat soluble vitamins / ADEK  
increases calorific value of food without adding bulk  
provides texture to food  
gives flavour to food  
gives a feeling of fullness (satiety) after a meal  
slows down digestion  
formation of cell membranes etc.  
3 × 1 mark [3]
- (c) Saturated fat  
contains maximum amount of hydrogen  
molecule has only single bonds / no double bonds  
(may show on a diagram)  
solid (at room temperature)  
usually from animals  
contains cholesterol  
3 points  
e.g. butter – lard – dripping – suet – cocoa butter – coconut – palm oil  
1 point [2]
- Monounsaturated fat  
molecule can accept more hydrogen  
molecule has **one** double bond  
(may show on diagram)  
liquid (at room temperature)  
plant origin  
3 points  
e.g. olive oil – avocado pear – rapeseed oil / canola  
1 point [2]
- Polyunsaturated fat  
molecule can accept more hydrogen  
molecule has **more than one** double bond  
(may show on diagram)  
liquid (at room temperature)  
usually plant – or fish origin  
3 points  
e.g. sesame seed oil – sunflower seed oil – maize oil – palm oil – peanut oil – oily fish (or named e.g.) – fish liver oil (or named e.g.) – soya bean oil – safflower – nut oil (or named e.g.)  
1 point [2]

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**(d) Digestion and absorption of fat**

in duodenum – bile – from liver – stored in gall bladder – emulsifies fat – increases surface area – breaks into small droplets – lipase – from pancreatic juice – converts fat to fatty acids and glycerol

in ileum – lipase – from intestinal juice – converts fat to fatty acid – and glycerol

in the ileum – finger-like projections – villi – contain lacteal – connected to lymphatic system – absorbs glycerol and fatty acid – recombine to form fats – mix with lymphatic fluid – join blood circulation – as insoluble fat

10 × 1 point

2 points = 1 mark

[5]

**(e) Reasons for reducing saturated fat**

contains cholesterol – deposited on artery walls – narrows – blocks – may cause CHD / heart attack – hypertension – strokes – excess fat is stored – under skin – as adipose tissue – around internal organs – obesity / weight gain – breathless – problems during surgery – low self-esteem etc.

8 points

2 points = 1 mark

[4]

**(f) Ways to reduce saturated fat**

less red meat / beef / pork / lamb – trim fat from meat – white meat / fish instead

do not fry foods in lard / butter / dripping – grill instead of fry – use plant oils (or named e.g.) to fry – named food e.g. bacon, sausages, chops

reduce consumption of chocolate – eat fewer cakes / biscuits / pastries – avoid avocado

reduce butter / margarine in recipes – eat fewer eggs – consume less butter / cheese – choose low-fat products e.g. yoghurt / cheese – use skimmed milk – spread butter thinly – use low-fat spreads

do not add butter to cooked vegetables etc.

6 × 1 point

2 points = 1 mark

[3]

**2 (a) 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 etc.

helps to remove toxins – reduces cholesterol – gives feeling of fullness etc.

8 points

2 points = 1 mark

[4]

**(b) Sources of NSP**

green, leafy vegetables – fruit skins – wholegrain cereals – bran – maize – wholemeal bread – wholemeal pasta – brown rice – pulses – nuts – potato skins – dried fruits – oats – oranges – wholemeal flour – celery – tomato seeds etc.

4 points

2 points = 1 mark

[2]

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3 Uses of water

absorbed by NSP – removes waste  
 forms part of protoplasm in cells – 70% of body is water  
 constituent of body fluids – saliva / blood / digestive juices / lymph  
 required in metabolic reactions – all processes take place in solution  
 aids absorption – nutrients dissolve in water for easy absorption  
 keeps mucous membranes moist – protects body from infection  
 lubricates joints – prevents ends of bones damaging each other – knees, elbows  
 maintains body temperature / cools body – lost in perspiration  
 needed during lactation – for milk production  
 maintains water balance – continually being lost – needs replacing – prevents dehydration  
 helps to eliminate waste – from kidneys as urine – makes food easier to eat / swallow  
 helps to keep faeces soft – prevents constipation etc.

4 uses – 1 point each + 4 pieces of additional information

8 points

2 points = 1 mark

[4]

4 Good eating habits in children

eat meals with rest of family – do not allow to leave table – cut food if necessary – to encourage independence – small portion – encourage to eat everything – regular mealtimes – should begin day with breakfast – start metabolism – no snacking between meals – will not be hungry for meal – do not use sweets as a reward – or punish by not giving certain foods – serve attractively – variety of colours – variety of flavours – easy to eat – no strong flavours – variety of foods – variety of textures – avoid sweet drinks before meals – avoid sugar – avoid salt  
 spoils appetite – water with meal – include fresh fruit and vegetables  
 should include 500mls / 1 pint milk daily – introduce new foods – for wide variety of nutrients – avoid oily foods  
 so they will grow up liking different foods – and will not be fussy – may be difficult to digest – encourage to use cutlery properly – avoid overfeeding – risk of obesity in later life etc.

(may illustrate with examples)

12 points

2 points = 1 mark

[6]

[Section A total: 40]

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## Section B

5 (a) Choice of flour and fat for shortcrust pastry**Flour**

plain – air is raising agent – not SR – has chemical raising agent

white – lighter texture – rises more easily

soft – low gluten content – for more crumbly pastry

wholemeal flour – or mix with white flour – adds NSP – iron – rougher texture – produces a heavier result – nutty flavour

**Fat**

hard fat – does not melt when rubbing in – fat should be cold / chilled – not easily melted before baking – margarine – butter – good colour – and flavour – butter is more expensive – lard – crumbly / short result – because it does not contain water – poor colour – and flavour – mixture of lard and margarine – has 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 – impurities

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 round-bladed knife – cool – draw pastry together with fingertips – stiff dough – not sticky

knead lightly – to avoid pressing out air – to form a smooth dough – leave in a cool place before rolling – to allow gluten to relax

12 points      2 points = 1 mark      [6]

(c) Named dishes

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

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

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(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 / kneading heavily / pressed too much when rolling  
 too much kneading developed gluten  
 pastry re-rolled too many times  
 too much water added to rubbed-in mixture – wrong proportions  
 too much flour for rolling out  
 pastry turned over during rolling etc.  
 2 points

4 points

2 points = 1 mark

[2]

6 (a) Reasons for cooking

to make it safe to eat – bacteria in meat killed by heat  
 to destroy toxins – in red kidney beans – improve appearance  
 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  
 changes colour of food – meat from red to brown / brown crust  
 changes texture – egg sets on heating etc. – tenderises meat  
 change of flavour – meat extractives developed during cooking  
 add variety of foods – eggs can be poached, fried, boiled 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 digestive juices – curry, fried bacon etc.  
 removes excess fat  
 develops aroma  
 10 points

2 points = 1 mark

[5]

(b) Advantages and disadvantages of frying**Advantages**

quick method of cooking  
 saves fuel  
 food browns  
 deep frying gives even colour to foods  
 crisp surface  
 flavour developed  
 appetising smell  
 different types of frying – 2 methods – 1 point  
   sautéing  
   dry  
   shallow  
   deep  
   stir-frying  
 if foods are coated juices are sealed in – prevents absorption of fat  
 coating holds fragile foods in shape – prevents breaking up etc.  
 high satiety value

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**Disadvantages**

adds fat to product  
 increases calorific value of food  
 needs constant attention during cooking  
 can be a dangerous process  
 can be expensive to buy enough oil for deep fat pan  
 cannot cook large amounts at once  
 cannot leave unattended  
 fried food difficult to digest  
 unhealthy method of cooking – linked to CHD / obesity  
 can be difficult to judge temperature of fat  
 if too hot food will be overcooked on outside – raw inside  
 if too cool food will absorb oil – unappetising  
 needs skill for successful results  
 must strain oil when cool to remove crumbs of food  
 decomposing / burnt food gives bitter flavour to fried foods  
 burnt crumbs leave dark specks on food  
 10 points

2 points = 1 mark

[5]

**(c) Saving time when preparing and cooking family meals**

collect ingredients and equipment required before starting to cook  
 read recipe carefully – wastes time constantly referring to books  
 use some raw dishes / courses – fruit salad / vegetable salad  
 make use of electrical equipment – mixer / blender etc.  
 microwave oven – pressure cooker – frying and grilling are quick methods  
 make use of convenience foods – e.g. frozen puff pastry  
 use soft margarine for creaming – quicker and easier  
 tenderise meat before cooking – use tender cuts – less cooking time – prepare and cook  
 food in bulk – freeze some – saves time another day  
 make stews and casseroles – require little attention – fewer pans to wash  
 do not peel vegetables e.g. carrots, potatoes – scrub to remove soil  
 cook and serve in same dish – saves washing up  
 do not cook too much food – cook when required – no time spent on re-heating  
 one-stage method of making rich cakes  
 cut potatoes etc. into smaller pieces – cook quicker  
 lids on pans – cook quicker etc.  
 10 points

2 points = 1 mark

[5]

**7 (a) Meat is cooked by a moist method**

fat melts – meat shrinks – muscle fibres contract – protein denatures  
 squeeze out extractives – pass into cooking water – flavour gravy – colour changes from red  
 to brown – oxymyoglobin to haemochrome – B vitamins dissolve in cooking liquid – thiamin  
 destroyed by heat – collagen – insoluble – changes to gelatine – soluble – easy to eat / chew  
 muscle fibres loosen – meat becomes tender – becomes firm – protein coagulates on  
 heating – at 60°C etc.

10 points

2 points = 1 mark

[5]

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**(b) A loaf of bread is baked**

rises – warmth of oven encourages fermentation – carbon dioxide produced – evaporates – water evaporates – pushes up dough – yeast is killed – no more carbon dioxide produced – gas in dough expands on heating – protein – gluten – coagulates – shape sets – starch dextrinises – gluten stretches – forms crust – browns – crust lifts off / 'oven spring' – framework formed

as carbon dioxide continues to expand after shape has set – air replaces gas which has escaped – open texture – starch gelatinises – Maillard browning – reaction between protein and sugar etc.

10 points

2 points = 1 mark

[5]

**(c) Changes taking place when a roux sauce is made**

fat melts – flour stirred into fat – fat is absorbed by starch grains – mixed to a paste – gentle heat cooks starch – sandy appearance – liquid added – absorbed by cooked starch – add gradually – to prevent formation of lumps – add liquid off heat – prevent lumps – becomes thin liquid when milk has been added – when heated – starch grains soften – swell – absorb liquid – boil – to cook starch – some starch grains rupture / burst – starch gelatinises – sauce thickens

10 points

2 points = 1 mark

[5]

**[Section B total: 45]**



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### Section C

#### 8 (a) 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 7 × 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 etc.

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 – produces CO<sub>2</sub> – colourless and tasteless residue – Rochelle salt – e.g. scones

bicarbonate of soda and sour milk – as above – acid + alkali – baking powder – contains correct proportion of bicarb. 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 CO<sub>2</sub> – continues 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 – larger volume than water – mixture rises etc. [15]

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Mark Band	Descriptor	
High	<ul style="list-style-type: none"> <li>– Candidate is able to name all gases</li> <li>– Candidate demonstrates a clear understanding of how gases are introduced</li> <li>– Good examples used to illustrate</li> <li>– Correct terminology used where appropriate</li> <li>– Candidate can state clearly how raising occurs and how shape is set</li> <li>– Comments are precise and are related to named examples</li> <li>– A clear understanding of the topic will be apparent</li> </ul>	11
Middle	<ul style="list-style-type: none"> <li>– The Candidate can name at least 2 gases</li> <li>– Can give a few examples of how gases are introduced</li> <li>– Factual information is sound but not always linked to specific examples</li> <li>– Information may be accurate but not all issues are considered</li> <li>– Scientific explanations rarely attempted</li> </ul>	6–10
Low	<ul style="list-style-type: none"> <li>– Candidate can give 1 or 2 examples of gases</li> <li>– Action of gases may be considered in simple terms</li> <li>– Fails to use correct terminology</li> <li>– Information will be general and lacking in specific detail</li> <li>– Limited knowledge of the topic will be apparent</li> </ul>	0–5

**(b) The answer may include the following knowledge and understanding.**

Reasons for following a vegetarian diet

religious beliefs

object to slaughter of animals – think it cruel

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.

Ways to ensure that vegetarians have enough HBV protein in their diet.

may be able to eat HBV protein foods from animals – if lacto-vegetarian (eggs – milk – cheese – yoghurt etc.)

can 'complement' (or pair) protein foods – essential amino acids missing from one are supplied by the other

combine LBV protein foods in same meal – cereals / nuts / pulses e.g. beans on toast – lentil soup and bread etc.

combine HBV and LBV proteins in same meal e.g. scrambled egg on toast – egg fried rice

soya is only vegetable source of HBV protein

available in many forms – tofu – milk – flour – tempeh etc. (not oil)

TVP – spun to resemble meat fibres – shaped – chunks – sausages – mince

Quorn – mycoprotein – BUT contains egg white – not for vegans – available as mince – fillets – burgers – chunks etc.

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Problems associated with vegetarian diets

may lack vitamin A – carotene in carrots / green vegetables etc.

vitamin D may be lacking – obtain from sunlight – vitamins A and D added to margarine

calcium – from pulses / nuts / green vegetables etc.

iron – green vegetables / pulses / dried fruit / cocoa etc.

B vitamins – bread / whole grain cereals / yeast extract

B<sub>12</sub> lacking – yeast extract or tablets

fat – vegetable oil or nuts

bulky – may need more meals – reduce bulk of vegetables by cooking

monotonous – vary cooking methods – use herbs and spices

high NSP content – digestive problems etc.

[15]

Mark Band	Descriptor	Part mark
High	<ul style="list-style-type: none"> <li>– can probably identify 3 or 4 reasons for following a vegetarian diet</li> <li>– usually gives details of each reason</li> <li>– mentions several ways of including HBV in diet</li> <li>– illustrates answer with examples</li> <li>– is aware of several possible problems for vegetarians</li> <li>– explains how many of them can be addressed</li> <li>– information usually accurate</li> <li>– uses technical terms appropriately</li> <li>– all parts of the question addressed</li> <li>– answers are specific</li> <li>– points are usually explained well</li> <li>– sound knowledge of the topic will be apparent</li> </ul>	11–15
Middle	<ul style="list-style-type: none"> <li>– can identify 2 or 3 reasons for vegetarian diet</li> <li>– usually gives some detail of reasons</li> <li>– information is not always accurate</li> <li>– can identify several possible HBV foods</li> <li>– probably gives examples to illustrate</li> <li>– is aware of some of the possible problems</li> <li>– may indicate how they could be addressed</li> <li>– answers may be general</li> <li>– detail lacking in some areas</li> <li>– information tends to be superficial</li> <li>– technical terms not always appropriately used</li> <li>– not all points are explained well</li> <li>– some parts of question answered at length</li> <li>– at least one part will be considered briefly</li> <li>– gaps in knowledge will be obvious</li> </ul>	6–10
Low	<ul style="list-style-type: none"> <li>– can identify at least one reason for vegetarian diet</li> <li>– may not be able to give details</li> <li>– may list sources of HBV protein</li> <li>– little attempt to explain their suitability</li> <li>– information is general</li> <li>– may consist of lists of facts</li> <li>– little use of technical terms</li> <li>– not all information given is accurate</li> <li>– may not consider all parts of question</li> <li>– response to the question will probably be brief</li> <li>– limited knowledge of the topic will be apparent</li> </ul>	0–5

[Section C total: 15]