

# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

## MARK SCHEME for the November 2005 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.

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**Section A**

- 1 (a)** Nutrients providing energy  
fat - protein - carbohydrate / starch / sugar  
3 x 1 point
- (b)** Energy value of 1 g  
fat 9 kcal or 37 kJ  
protein 4 kcal or 16 kJ  
carbohydrate 4 kcal or 16 kJ  
3 x 1 point  
points = 1 mark [3]
- (c)** Uses of energy  
heat / maintains body temperature  
movement / physical work  
nervous impulses / electrical energy  
chemical processes within cells / growth  
BMR - involuntary processes - breathing, heartbeat, blood circulation etc.  
4 x 1 mark [4]
- (d)** Basal Metabolic Rate  
energy required - to maintain body processes - involuntarily - when at rest - normal body temperature - 5 hours after a meal - different for all individuals - breathing - heartbeat - blood circulation - growth etc. (any 2)  
6 points 2 points = 1 mark [3]
- (e)** Energy intake greater than output  
converted to fat - stored - around internal organs / under the skin - obesity - lack of self-esteem - breathless - problems during surgery - diabetes - coronary heart disease (CHD)  
6 points 2 points = 1 mark [3]
- (f)** Reasons for different energy requirements  
age - energy required for growth  
body size - greater surface area requires more energy to maintain body heat  
health - energy may be required to replace damaged cells etc.  
gender - males have a higher BMR than females  
females may be pregnant or lactating - energy for growth of foetus or for production of milk  
occupation - manual workers need more energy than sedentary workers  
activity - active children or athletes use more energy  
weather - energy to maintain body temperature in cold climates  
5 well-explained points 5 x 1 mark [5]



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**Section B**

- 5 (a)** Importance of cereals  
cheap - easy to grow - easy to store - versatile - energy source -  
can be used for sweet and savoury dishes - many varieties - filling - etc.  
4 points 2 points = 1 mark [2]
- (b)** wheat - barley - oats - rye - rice - maize / corn / mealie meal - millet - sorghum  
4 points 2 points = 1 mark [2]
- (c)** Shortcrust pastry method with reasons
- |   |  |     |
|---|--|-----|
| sift flour<br>cut fat into small pieces -<br>rub in fat - with fingertips -<br>lift hands above bowl<br>should look like breadcrumbs<br>add cold water -<br>mix with round-bladed knife -<br>knead lightly - with fingertips<br>do not overhandle -<br>form into a firm dough -<br>chill -<br>time to relax before baking - | to aerate – remove lumps<br>less rubbing in required<br>coolest part of hand<br>to collect air as crumbs fall<br>shake bowl – to bring large pieces to top<br>to avoid melting fat<br>keeps everything cool<br>to avoid pressing out air<br>develops gluten - toughens<br>too much water gives hard pastry<br>hardens fat<br>easier to roll – avoids shrinkage |     |
| 10 points   | <b>Must include at least 2 reasons.</b><br>2 points = 1 mark   | [5] |
- (d)** Oven temperature for pastry  
gas mark 6 or 7 400°C – 425°F 200°C – 210°C (must give appropriate C or F)  
1 mark [1]
- (e)** Changes during baking  
fat melts - starch granules gelatinise - absorb fat - steam produced -  
air expands - separates layers - gluten coagulates - because it is protein -  
becomes crisp - browns - dextrinisation of starch becomes *crumbly*  
10 points 2 points = 1 mark [5]

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6 (a) Soya

pulse vegetable - contains all indispensable amino-acids -  
 only plant source of HBV protein - useful for vegans -  
 contains fat - iron - calcium - NSP - starch - vitamin A - vitamin D - protein -  
 HBV (1 point for each 2 nutrients) **max. 4**  
 gives variety to diet - soya oil - soy sauce - soya flour - soya milk - margarine - tofu -  
 (1 point for each 2 soya products) **max. 4**  
 can be made to resemble meat fibres - Textured Vegetable Protein (TVP) - oil  
 extracted - leaves flour - water added - extruded - coloured - flavoured - dehydrated -  
 long shelf-life - used as a meat extender - or meat substitute can mix with LBV protein -  
 e.g. with cereals like pasta or rice - to produce HBV protein - bland - takes on flavour of  
 other foods - needs seasoning / spices / herbs -  
 used for pie filling, burgers, casseroles, sausages, curries, in convenience foods e.g.  
 Pot Noodles etc. (1 point for each 2 examples) **max. 4**  
 10 points 2 points = 1 mark [5]

(b) The use of yeast as a raising agent

living organism - plant - requires warmth - blood heat - moisture - food - time - yeast  
 cells multiply - reproduces by budding - in fermentation process - can be compressed  
 yeast - dried yeast - or 'easy blend' - produces carbon dioxide - and alcohol - cold  
 temperatures slow down ! stop action of yeast - killed at high temperatures - enzymes  
 in yeast cause breakdown of sugar - maltase - converts maltose to glucose - invertase  
 sucrose - converts sucrose to glucose and fructose - zymase - converts glucose and  
 fructose to carbon dioxide and alcohol - more CO<sub>2</sub> evolved - carbon dioxide pushes up  
 dough - expands dough - gluten stretches to trap gas - kneading evenly distributes  
 yeast in dough - but some gas escapes - proving allows more gas to evolve - dough  
 regains shape - yeast killed in hot oven - sets in risen shape - gluten in flour coagulates  
 - alcohol evaporates - used in bread-making etc.  
 10 points 2 points = 1 mark [5]

(c) Different uses of sugar

sweetener - drinks, cakes sauces  
 increases energy value of foods - beverages etc.  
 preservative - high concentration of sugar prevents growth of micro-organisms  
 e.g. jam (60% added sugar)  
 improves colour of baked products - cakes with brown sugar,  
 caramelises sugar in dry heat of oven  
 retains moisture and prevents baked products drying - rich cakes  
 helps fat to incorporate air - creamed cake mixtures prevents  
 development of gluten and gives more crumbly result -  
 cakes and rich pastries  
 food for yeast - fermentation of bread dough  
 delays coagulation of protein in eggs and gluten - more time for gases to expand  
 in cakes etc.  
 strengthens protein in beaten egg white - helps to retain air - meringues  
 retards enzyme action - frozen foods  
 cake decorations - marzipan, glaze icing, butter icing etc.  
 sugar and water glaze - sticky layer on yeast buns  
 can make caramel - desserts e.g.. creme caramel, creme brulee  
 confectionery - toffee, sweets, fudge etc.  
**allow only 1 example for each use of sugar**  
 10 points 2 points = 1 mark [5]

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- 7 (a) Types of bacteria which cause food poisoning  
 E.Coli - Salmonella - Listeria - Bacillus cereus - Clostridium botulinum  
 Clostridium welchii - Staphylococcus aureus - etc.  
 2 points = 1 mark [1]
- (b) (i) -18°C bacteria dormant - no multiplication  
 (ii) -4°C slow multiplication  
 (iii) 37°C rapid multiplication  
 (iv) 70°C bacteria killed 1 denatured  
 4 points 2 points = mark [2]
- (c) Storage, preparation, cooking and serving of meat  
 in refrigerator - 4°C - slow down multiplication of bacteria -  
 store raw and cooked meat separately - raw meat at bottom -  
 prevent cross-contamination - e.g. Salmonella in poultry –  
 clean container - prevent cross-contamination –  
 cover - to prevent cross-contamination - prevent drying of surface  
 fast freeze at -25°C - small ice crystals within cells - maintain cell structure  
 in freezer - at -18°C - to stop action of bacteria  
 airtight - prevent freezer burn  
 thaw thoroughly - so that heat penetrates during cooking - kills bacteria  
 do not refreeze - bacteria will have started to multiply - risk of food poisoning  
 temperature of at least 70°C - for 2 mins - in centre / thickest part -  
 to kill bacteria - do not keep warm - ideal conditions for multiplication of  
 bacteria - do not reheat more than once - must reach 70 C for 2 mins.. -  
 use within 24 hours of cooking unless frozen -etc.  
 12 points to cover all areas 2 points = 1 mark [6]
- (d) Changes brought about by enzymes  
 oxidation - destroys nutrients - e.g. vitamin C / thiamine / carotene -  
 found in cell walls - released when cut / bruised - destroyed by high temperature –  
 e.g. boiling - protein therefore denatured - action slowed down by low temperatures -  
 ascorbase acts on vitamin C in green vegetables - damaged surface browns - when  
 exposed to air - e.g. apple - when cut / bruised ripening - starch converted to sugars -  
 develops sweet flavour - appropriate colour - in fruit and vegetables - unripe bananas  
 contain starch - change from green to brown - develop sweet flavour - soft texture -  
 over-ripen if process continues - tissues break down - flesh discolours - very soft - cell  
 walls rupture and release juice - unappetising etc.  
 12 points 2 points = 1 mark [6]

**[Section B Total: 45 marks]**

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<b>8 (a)</b>	<b>Mark bands</b>	<b>Descriptors</b>	<b>Part marks</b>	<b>Total</b>
	High	<ul style="list-style-type: none"> <li>- The candidate is able to give many points to consider when meal planning</li> <li>- can name several nutrients needed by teenagers</li> <li>- can give examples of foods containing them</li> <li>- may discuss problems associated with teenage eating habits</li> <li>- specific terminology is used where appropriate</li> <li>- comments are precise and related to topic</li> <li>- candidate shows a clear understanding of meal planning and the specific needs of teenagers</li> </ul>	11-15	15
	Middle	<ul style="list-style-type: none"> <li>- The candidate can give a few points to note when meal planning</li> <li>- factual content is sound but explanations of points may not always be given</li> <li>- Information given may be accurate but not all nutrients are considered</li> <li>- some points about teenage eating habits and associated problems may be mentioned</li> </ul>	6-10	
	Low	<ul style="list-style-type: none"> <li>- The candidate can give a few points about meal planning</li> <li>- information is general and lacks specific detail</li> <li>- few points given about teenage diets</li> <li>- limited knowledge of the subject will be apparent</li> </ul>	0-5	

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The answer may include the following knowledge and understanding.

Points when planning meals

- |                                 |   |   |
|---------------------------------|---|---|
| variety of colour               | - | use of vegetables, different colours in each course                               |
| variety of flavour              | - | avoid repetition of flavour in courses  |
| variety of texture              | - | not too soft, crispy etc. - not 2 pastry courses                                  |
| cost                            | - | consider budget - use cheap cuts of meat, foods in season etc.                    |
| time available                  | - | tough cuts of meat need long, slow cooking may need to consider convenience foods |
| equipment available             | - | microwaves, steamers, electric mixer etc.   |
| availability of food            | - | season, proximity of shops, transport   |
| skill of cook                   | - | should choose only dishes competent to cook                                       |
| occasion                        | - | party, packed meal, celebration, Christmas etc.                                   |
| season                          | - | hot food in cold weather etc.   |
| courses should be in same plane | - | do not follow an elaborate first course with a pot of yoghurt                     |
| time of day                     | - | breakfast will be different from lunch  |
| health of family                | - | consider light meals for convalescents etc,                                       |
| special diets                   | - | vegetarian, low fat etc.  |

Special needs of teenagers

HBV protein	growth spurt	meat, fish, cheese, milk, eggs
iron	menstruation	red meat, egg, liver, cocoa
	increases volume of blood	green vegetables, raisins etc.
vitamin C	absorption of iron	citrus fruit, blackcurrant, kiwi, tomatoes, green vegetables etc.
calcium	bone growth	milk, cheese, green vegetables
vitamin D	absorption of calcium	white bread, canned fish bones
starch / fat	energy	cheese, margarine, oily fish etc.
		cereals, potatoes milk, margarine etc

not too much fat      difficult to digest - obesity - if in excess of needs  
saturated fat from animals - e.g. butter, red meat (1 example) -  
associated with cholesterol - deposited in arteries - narrows - blocks –  
coronary heart disease (CHD) - hypertension - strokes  
problems later in life - peer pressure -  
tend to consume junk food - high in fat - sugar - diabetes - tooth decay - salt  
hypertension - should avoid snacking - unless on fruit -



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<b>8 (b)</b>	<b>Mark bands</b>	<b>Descriptors</b>	<b>Part marks</b>	<b>Total</b>
	High	<ul style="list-style-type: none"> <li>- The candidate is able to give many advantages and disadvantages of convenience foods</li> <li>- the candidate demonstrates a clear understanding of the nature and types of convenience foods</li> <li>- comments are precise and are related to named examples</li> <li>- specific terminology is used where appropriate</li> <li>- many different examples are given to show the use of convenience foods</li> <li>- facts are supported by explanations</li> <li>- an understanding of the topic will be apparent</li> </ul>	11-15	15
	Middle	<ul style="list-style-type: none"> <li>- The candidate can give a few advantages and disadvantages of convenience foods</li> <li>- factual content is sound but is not always linked to examples to support facts or illustrate points</li> <li>- information given may be accurate but not all issues are considered</li> <li>- many issues are dealt with superficially</li> <li>- some examples are given to show the use of convenience foods</li> </ul>	6-10	
	Low	<ul style="list-style-type: none"> <li>- The candidate can give some advantages and disadvantages of convenience foods but does not consider a wide range</li> <li>- the information is general and lacks specific detail</li> <li>- additional detail not given to clarify points made</li> <li>- few examples of the use of convenience foods in family meals will be given</li> <li>- limited knowledge of the topic will be apparent</li> </ul>	0-5	

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The answer may include the following knowledge and understanding.

Types of convenience food

tinned            beans, corned beef, tuna, peaches  
dried             milk, fruit, custard powder, herbs  
frozen            fish, peas, ice cream, sausages  
ready to eat    biscuits, yoghurt, crisps, 'take away' food    etc.

Advantages of convenience foods

save time  
easy to prepare  
some or all of the preparation has been done  
save fuel  
easy to store  
food available for emergencies  
longer shelf life than fresh  
readily available  
buy foods out of season  
food available from other countries  
easy to transport  
no waste  
little washing up  
large variety available  
cook may not have the ability to make the product e.g. puff pastry  
no need for individual ingredients to be bought  
portion control  
consistent product  
nutrients may have been added  
                      e.g. of foods to illustrate points can be given

Disadvantages of convenience foods

expensive  
packaging may cause pollution  
can be high in fat - problems of high fat diet  
can be high in salt - problems of high salt diet  
can be high in sugar - problems  
can be low in NSP - highly refined - problems of low NSP diet  
contain additives - types of additives - e.g. artificial colourings and flavourings  
allergies - hyperactivity - long term effects not known  
small portions  
loss of vitamins B and C  
loss of skills

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Use of convenience foods in family meals

e.g. cleaned, filleted and frozen fish  
frozen puff pastry for pies etc.  
canned red kidney beans  
biscuits and bread ...  
tomato puree  
bottled sauces, flavourings  
pots of yoghurt for dessert  
frozen desserts e.g. ice cream  
custard powder, blancmange  
UHT milk - dried milk - for cooking sauces etc  
canned fruit in desserts e.g. pineapple upside down pudding  
dried fruit - currants, sultanas - in cake making  
cake mixes - pastry mix  
dried herbs - stock cubes etc.

**Uses in family meals should be expected from named examples of convenience foods.**

A list of convenience foods is not acceptable since the question asks how they can be incorporated into family meals.