

**MARK SCHEME for the October/November 2008 question paper**

**6065 FOOD AND NUTRITION**

**6065/01**

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.

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## SECTION A

- 1 (a) (i) Elements in carbohydrate**  
carbon – hydrogen – oxygen  
3 × 1 mark [3]
- (ii) Uses of energy**  
mechanical energy – movement / work (or examples)  
chemical energy – metabolism / digestion / absorption  
heat energy – maintain body temperature  
electrical energy – transmission of nervous impulses  
basal metabolism – heartbeat / blood circulation / breathing, etc.  
credit general use or one example  
4 × 1 mark [4]
- (iii) bacteria – act on sugar on teeth – forms plaque –**  
sugar converted to acid – dissolves enamel – tooth decay – diabetes  
gum disease – bad breath  
excess sugar converted to fat – stored – under skin – adipose tissue –  
around internal organs – obesity – CHD – low self-esteem – breathlessness – lethargy  
(8 points) (2 points = 1 mark) [4]
- (iv) Digestion in the mouth**  
ptyalin / amylase – from salivary glands – acts on **cooked** starch –  
converts starch to maltose
- In the duodenum**  
amylase – from pancreatic juice – converts starch to maltose
- In the ileum**  
lactase – acts on lactose – converts it to glucose – and galactose  
maltase – acts on maltose – converts it to glucose  
invertase / sucrase – acts on sucrose – converts it to fructose – and glucose  
enzymes secreted by intestinal juice  
(12 points to cover all areas) (2 points = 1 mark) [6]
- (v) Importance of NSP**  
absorbs water – swells – softens faeces – making it bulky – helps remove waste –  
easier to expel – stimulates peristalsis – absorbs toxins – regularly binds waste –  
lowers cholesterol – prevents constipation – reduces blood sugar  
hernia – cancer of colon – diverticular disease – haemorrhoids  
(max. 2 e.g. from line above)  
(8 points) (2 points = 1 mark) [4]
- (vi) Sources of NSP**  
green vegetables (or named e.g.) – fruit skins and seeds (or named e.g.)  
nuts – pulses (or named e.g.) – rhubarb – celery – potato skins – dried fruit –  
wholegrain breakfast cereal – brown rice – wholemeal pasta – fruit and vegetables –  
wholemeal bread (not brown bread) – wholemeal flour – oats – bran  
(4 examples (avoiding repetition)) (2 examples = 1 mark) [2]

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**(b) (i) Vitamin C (Ascorbic acid)**

**FUNCTIONS**

to make connective tissue – heals wounds  
 absorption of iron – antioxidant  
 helps to build strong bones and teeth  
 production of blood / walls of blood vessels  
 build / maintain healthy skin  
 growth  
 (4 points)

**SOURCES**

citrus fruit (or 1 named example e.g. orange – lemon – lime – kiwi fruit, etc.)  
 rose hips – blackcurrants – melon – strawberries – green peppers – tomatoes, etc.  
 green vegetables (or 1 named example e.g. cabbage – spinach – lettuce – broccoli, etc.)  
 (3 points)

**DEFICIENCY DISEASE**

scurvy  
 (1 point)

(8 points) (2 points = 1 mark)

[4]

**(ii) Iron**

**FUNCTIONS**

formation of haemoglobin  
 red pigment in blood  
 transport oxygen to cells  
 for production of energy  
 transport carb-oxyhaemoglobin to lungs  
 (4 points)

**SOURCES**

liver – kidney – corned beef – cocoa / plain chocolate –  
 curry powder – treacle – pulses – dried fruit (or named example) –  
 egg yolk – green leafy vegetables (or named example)  
 (3 points)

**DEFICIENCY DISEASE**

anaemia  
 (1 point)

(8 points) (2 points = 1 mark)

[4]

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**(c) (i) Reasons for following a vegetarian diet**

religion – Jews do not eat pork / Hindus avoid beef, etc.  
 object to slaughter of animals – animal rights – think it is cruel, etc.  
 uneconomical use of land – expensive to rear animals – more crops could be grown if  
 land was used for cereals, etc.  
 dislike taste / texture of animal flesh  
 believe vegetarian diet is more healthy – animal fat is saturated / contains cholesterol  
 animal products are more expensive than plant products – cereals / pulses cheaper than  
 meat  
 peer pressure – follow trends  
 family upbringing – brought up to follow certain dietary pattern, etc.  
 (6 points) (2 points = 1 mark) [3]

**(ii) HBV protein in a vegetarian diet**

lacto-vegetarians – can have eggs – cheese – milk (max. 2 e.g.)  
 can combine 2 LBV protein foods – pulses – cereals – nuts – (max. 2 e.g.)  
 IAA's missing in one will be compensated by other  
 e.g. beans on toast / lentil soup and bread / rice and peas (1 e.g.)  
 can combine HBV and LBV proteins – quality of LBV protein improved  
 e.g. egg on toast / cereal and milk / cheese scones (1 e.g.)  
 soya – HBV from plant source –  
 soya products – flour – milk (not oil or soy sauce)  
 TVP – meat substitute – texture resembles meat –  
 e.g. mince / sausages / chunks (max. 2 e.g.)  
 (12 points) (2 points = 1 mark) [6]

**[Section A Total: 40 marks]**

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## SECTION B

### 2 (a) (i) **Kneading**

develops gluten – protein – in flour – forms elastic dough – stretches during rising – traps carbon dioxide – smooth dough – distributes yeast – aerates dough – stimulates action of yeast – breaks down large bubbles of gas – for even texture of finished dough – use knuckles / heel of hand for large amounts – fingertips for small pieces – (6 points) (2 points = 1 mark)

[3]

### (ii) **Proving**

warm place – just before baking – after dough has been shaped – too much heat kills yeast – dough will not rise – left for some time – cold place / refrigerator does not kill yeast – slows down process – but can prove overnight in refrigerator – replaces carbon dioxide – lost during kneading – dough doubles in size – avoid over-proving – dough will collapse – cannot recover (6 points) (2 points = 1 mark)

[3]

### (b) **Choice of flour for bread making**

strong / hard flour – high gluten content – from spring wheat – e.g. Canadian – more than 10% protein – allows dough to stretch – plain flour – yeast is raising agent – wholemeal flour – adds colour – ‘nutty’ flavour – B vitamins – NSP – has less gluten – gives closer texture – more difficult for yeast to raise – (8 points) (2 points = 1 mark)

[4]

### (c) **Changes when bread is baked**

rapid rising – enzymes work quicker with heat – more carbon dioxide produced – warmth encourages fermentation – alcohol produced – water changes to steam – more raising action – gluten stretches – gases expand when heated – heat kills yeast – no further carbon dioxide produced – gases continue to expand – with continued heat – gluten coagulates – around bubbles of gas – at 73 °C – gluten is protein – alcohol evaporates – vaporises below boiling point of water – carbon dioxide diffuses out – heat causes gases to rise on expansion – starch gelatinises – action of moist heat on starch – crust forms on outside – dry heat on starch – crust lifts off as gases continue to expand – ‘oven spring’ – browns on outside – dextrinisation of starch – caramelisation of sugar – Maillard browning (10 points) (2 points = 1 mark)

[5]

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**3 (a) Coagulation**

heat on protein – begins at 60 °C – cannot be reversed –  
 hardens / sets – chemical structure changes –  
 overheating causes protein to shrink – e.g. syneresis when scrambled egg is overcooked or  
 baked egg custard is overcooked  
 e.g. boiled egg, baked egg custard, quiche, baked bread, skin on boiled milk,  
 coating on fried fish, etc.  
 (6 points (must include **one** example)) (2 points = 1 mark) [3]

**(b) Fermentation**

yeast – produces carbon dioxide – and alcohol – with food / sugar –  
 moisture – warmth – time –  
 enzymes bring about fermentation process –  
 amylase – in flour – changes starch to maltose –  
 maltase – in yeast – changes maltose to glucose –  
 zymase – in yeast – changes glucose to carbon dioxide and alcohol  
 e.g. bread making  
 (6 points (must include **one** example)) (2 points = 1 mark) [3]

**(c) Gelatinisation**

moist – heat – on starch – grains soften – swell – absorb water –  
 some rupture – releasing starch granules – liquid thickens – irreversible –  
 e.g. roux sauce, custard, boiled rice, etc.  
 (6 points (must include **one** example)) (2 points = 1 mark) [3]

**(d) Hydrogenation**

makes fat solid – from liquid oil – e.g. sunflower / soya – unsaturated fats –  
 become saturated fats – can take up hydrogen – breaks double bond – using a nickel  
 catalyst – can stop at any time –  
 to achieve degree of hardness required – hard margarine more saturated –  
 soft / spreading margarine less saturated –  
 e.g. margarine, cooking fats  
 (6 points (must include **one** example)) (2 points = 1 mark) [3]

**(e) Pasteurisation**

heat – destroys harmful bacteria – e.g. those causing tuberculosis – and souring bacteria –  
 lasts longer –  
 does not prevent decay –  
 72 °C / 162 °F – for 15 seconds **or**  
 62 °C–65 °C / 145 °F – for 30 minutes  
 rapid cooling – to prevent bacterial growth – little change to nutritive value – e.g. milk  
 (6 points (must include **one** example)) (2 points = 1 mark) [3]

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- 4 (a) (i) Conditions for growth of bacteria**  
 warmth – moisture – food – time – suitable pH – some require oxygen  
 (4 points) (2 points = 1 mark) [2]
- (ii) Symptoms of food poisoning**  
 vomiting – diarrhoea – headache – tiredness / exhaustion –  
 abdominal pain – fever – double vision –  
 (4 points) (2 points = 1 mark) [2]
- (b) (i) Storing food**  
 clean containers – cool place / refrigerator – covered –  
 especially high risk foods – e.g. meat / fish / milk / eggs –  
 to prevent cross contamination – use in rotation – check ‘use by’ dates –  
 fresh meat / fish – use on day of purchase – follow storage instructions –  
 cool leftover food rapidly – use within 24 hours –  
 keep raw and cooked food separate – raw meat at bottom of fridge –  
 so drips do not fall onto other foods – check containers regularly –  
 weevils / rats / mice, etc. – grain off floor – dry place –  
 prevent multiplication of bacteria – check cans for bulges –  
 indicates seal has been damaged – bacteria entered –  
 food still spoils in refrigerator – action of bacteria slower –  
 do not thaw then refreeze food – bacteria will have multiplied in warmth –  
 bacteria dormant in freezer – spoilage halted, etc.  
 (8 points) (2 points = 1 mark) [4]
- (ii) Preparing food**  
 wash hands – after toilet / raw meat / vegetables with soil –  
 avoid cross-contamination – no coughing / sneezing over food –  
 do not cook if ill – so bacteria are not passed to others –  
 tie back / cover long hair – bacteria from hair could get into food –  
 no long fingernails – dirt and bacteria collect underneath –  
 clean apron – no outdoor clothes – avoid transfer of bacteria from outside –  
 do not touch face during food preparation – handle food as little as possible –  
 cover cuts with waterproof dressings –  
 bacteria will be on skin – no licking spoons / fingers –  
 bacteria from mouth transferred to food –  
 separate chopping board / knife for raw and cooked food –  
 equipment clean – work surfaces clean – wash up in hot soapy water –  
 clean tea towel / allow to dry in air – no chipped plates used –  
 avoid introducing bacteria from dirty cloths –  
 dish cloth not to be used for cleaning floor, etc. –  
 boil / bleach dish cloth regularly – kill bacteria – cover waste bin –  
 clean up spills / pools of water – to avoid attracting mosquitoes –  
 avoid insects / vermin – wrap waste tightly – bin outside kitchen –  
 no animals in kitchen – animals must not use family’s meal plates –  
 dispose of rubbish / waste regularly –  
 throw away / wash food dropped on floor – no flies, etc. in kitchen –  
 carry bacteria – etc.  
 (8 points) (2 points = 1 mark) [4]

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**(iii) Cooking food**

thoroughly cook foods – especially meat / eggs –  
 should reach 72 °C in centre – maintain for 2 minutes – to kill bacteria –  
 e.g. Salmonella – do not keep warm – reinfected with bacteria from air –  
 know source of food – danger of BSE, etc. – clean water supply –  
 should reheat until piping hot – use food probe –  
 do not reheat after 24 hours – only reheat once – danger of barbecues –  
 food overcooked on outside but not hot enough in centre –  
 warmth encourages bacterial growth – cook just before eating if possible –  
 serve immediately –  
 do not use raw eggs if possible – in mayonnaise / marzipan –  
 danger of Salmonella – do not use cracked eggs – etc.  
 (6 points) (2 points = 1 mark)

[3]

**5 (a) Safety when deep-frying**

pan not more than half full – prevent overflowing when food is added –  
 dry food thoroughly before putting into fat – water turns to steam – spits –  
 put food into pan carefully / do not throw food into pan – to avoid splashing –  
 dry utensils – wooden handles on pans / kitchen tools – poor conductor –  
 prevents burning hands – pan handle turned in – avoid knocking over –  
 pan should have flat base – sits firmly on hot plate – avoid wobbling –  
 do not overfill pan with food – fat may overflow –  
 do not overheat fat / oil – could ignite – have lid nearby – cover if ignites –  
 prevent oxygen reaching flames – do not move pan if on fire –  
 no water nearby – e.g. kettle – water may splash into fat –  
 cause spitting of fat – do not leave pan unattended –  
 do not allow children to deep fry food – make sure dangers are understood –  
 turn off heat after use – do not move pan until fat / oil is cold  
 (10 points) (2 points = 1 mark)

[5]

**(b) Microwave cookery**

microwaves penetrate up to 5 cm into food – no thick pieces of food cooked –  
 heat produced by agitation of molecules throughout food –  
 microwaves cannot be emitted once door is opened – safe to use –  
 may have different power outputs – for cooking / reheating / defrosting etc. –  
 food cooks quickly – saves time – reduces fuel costs –  
 no need to preheat oven – prevents waste – food cooked as required – food heats up  
 but oven does not – kitchen stays cooler –  
 suitable for children / disabled / elderly to use –  
 uses normal electrical sockets – various sizes available to suit needs – oven easier to  
 clean – splashes do not burn on lining of oven –  
 less destruction of nutrients – e.g. vitamin C in broccoli etc. –  
 vegetables improve in colour – and flavour – due to short cooking time – less danger of  
 food poisoning – food does not need to be kept warm – portable – can be used on any  
 convenient surface – defrosts frozen food – food can be cooked and served in same  
 dish – saves washing up – dish remains cool – can use glass / china / ceramics / paper –  
 some heat can be transferred to cooking dish by conduction



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**BUT**

easy to overcook food – careful timing needed – food will not become crisp – cakes and pastries do not have usual texture – no dry heat –  
 may not develop characteristic flavours – because of short cooking time –  
 food does not brown – no dry heat –  
 irregular shaped food may not be evenly cooked –  
 need to move food around to try to make cooking more even –  
 need to stop and stir liquids – e.g. soup / sauce / casseroles etc. – to distribute heat evenly – avoid 'hot spots' –  
 cannot use metal containers – or dishes with metal decoration –  
 no aluminium foil – causes arcing – may damage microwave oven – etc.  
 (10 points) (2 points = 1 mark)

[5]

**(c) The choice and care of saucepans**

CHOICE

variety of sizes – for different quantities – depending on use – budget – variety of types –  
 omelette – deep fat - frying pan etc. –  
 thick base – will not buckle with heat –  
 flat, ground base – for use with solid fuel or electric stove –  
 to give good contact with solid hot-plate –  
 aluminium – lightweight – dents if dropped – can buckle with strong heat copper / copper  
 base – conducts heat well – expensive –  
 may need special cleaning –  
 stainless steel – good conductor of heat –  
 no special cleaning needed – keeps shape – hard-wearing  
 handle firmly attached – prevents accidents –  
 plastic / wooden handle – poor conductor of heat – prevents burns – well-fitting lid –  
 prevents evaporation of water / burning food – saves fuel – non-stick surface – easy to  
 clean – need non-metal utensils – avoid damaging surface –  
 rounded corners between base and sides – prevents food collecting – easier to stir –  
 easier to clean –  
 lip on milk pan – easier to pour –  
 size of base should match size of hot-plate – to prevent waste of fuel – enamel –  
 colourful – patterns may match / brighten kitchen – chips if dropped –  
 gradually loses shiny surface –  
 glass – easy to clean – can see contents –  
 pans should be stable when empty – will not tip over when in use – etc.

**NB – can credit negative points e.g. Do not choose ..... because .....**

CARE

no sharp equipment – or abrasive cleaners on non-stick pans – to avoid damage /  
 removal of non-stick surface –  
 hot, soapy water – soft cloth – removes grease – avoids damage – soak before washing  
 up – to soften food stuck to surface –  
 to avoid scratching when cleaning – scratches trap food –  
 encourages growth of bacteria –  
 dry well before storing – to prevent rusting –  
 and growth of micro-organisms –  
 do not store one inside another – to prevent scratching – etc.  
 (10 points) (2 points = 1 mark)

[5]

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**6 (a) Points to consider when planning meals**

time of year – hot food in cold weather, etc. – religion – special diet/vegetarian foods in season – garden produce – availability of food – food in stock – closeness of shops – ages of those having the meal  
 variety of colour –  
 variety of flavour –  
 variety of texture –  
 occasion – packed meal / Christmas lunch / birthday party, etc. –  
 both courses in same plane – not a complex first course and simple dessert –  
 money available –  
 time available – use of convenience foods – less time but more expensive equipment available – use of labour-saving equipment – microwave –  
 skill of cook –  
 individual likes and dislikes –  
 activities of those eating meal – manual workers need more energy foods  
 state of health of those eating meal, etc.

**NB – do not credit points relating to nutrients**

(6 points) (2 points = 1 mark)

[3]

**(b) Nutritional requirements of elderly**

fewer carbohydrate foods – less active  
 protein needed – 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  
 reduce fat – reduce risk of obesity / CHD  
 reduce sugar – link to diabetes  
 reduce salt – risk of hypertension / high blood pressure

(12 points) (2 points = 1 mark)

[6]

**(c) Importance of fresh fruit and vegetables**

vitamin C – not stored – daily supply needed – for prevention of scurvy / healthy skin / absorption of iron, etc.  
 vitamin A – mucous membranes / visual purple / prevents night blindness, etc.  
 iron – green veg – pulses – prevent anaemia  
 carbohydrate – starch and sugar – energy  
 calcium – bones and teeth – green veg  
 NSP – peristalsis / makes faeces easier to expel / prevents constipation, etc.  
 water – quenches thirst – prevents dehydration / body fluids / keeps body cool / eliminates waste, etc.

**NB – allow only one function of each nutrient**

no fat (except avocado) – filling – helps to avoid sugary / fatty snacks –  
 provide variety of colour – flavour – texture – examples to illustrate –  
 many dishes can be made – soup / drinks / accompaniments / salads, etc.  
 (max. 3 uses of fruit and vegetables)

can be eaten raw or cooked – useful snack foods – easy to carry – easy to eat, etc.

(12 points) (2 points = 1 mark)

[6]

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**7 (a) Lining a pastry case and baking 'blind'**

prepare shortcrust pastry – roll to size of flan ring / tin – + depth all round – pastry needs to cover bases and sides –  
 lightly fold into quarters – place point to centre of tin – to centralise pastry – ease into corners – avoid stretching pastry – press against sides – follow fluted shape if necessary – roll across top with rolling pin – check that there are no holes in pastry – filling would pour out – to remove surplus pastry – check that there are no thick areas around top – put greaseproof paper / foil into empty case – fill with baking beans –  
 to prevent base rising – and sides collapsing – remove near end of cooking – to allow pastry to finish cooking – and to dry out –  
 bake empty – filling may not need cooking – or a different temperature etc. e.g. quiche, lemon meringue pie, fruit flan etc. (max. 1 example)  
 (10 points) (2 points = 1 mark) [5]

**(b) Rolling and folding flaky pastry**

make up dough using  $\frac{1}{4}$  fat – knead to give a soft, elastic dough – develops gluten – roll to a rectangle – length is 3 x width –  
 keep sides straight – corners square – mark into 3 equal parts –  
 dot  $\frac{1}{4}$  fat onto top two thirds – fold bottom third up and top third down – corners square – sides straight – to give equal number of layers –  
 seal sides – to trap air – turn  $\frac{1}{4}$  turn clockwise – width becomes length – avoids overstretching gluten in same direction – roll again into rectangle – repeat adding fat, folding, sealing – put into cool place / refrigerator – to allow gluten to relax – hardens fat – makes rolling easier –  
 avoids shrinking – repeat until all fat has been used –  
 roll and fold once without fat – to increase the number of layers formed – allow to relax before using  
 (10 points) (2 points = 1 mark) [5]

**(c) Coating food with egg and bread crumbs before deep-frying**

food should be dry – to prevent making egg more dilute –  
 beat egg – put onto plate – bread crumbs on sheet of greaseproof paper – or in a plastic bag without holes – brush egg onto food – thoroughly coated – so that egg sets / coagulates in hot fat – forms a seal –  
 prevents entry of fat – stops food from breaking up – protects from hot fat – lift onto bread crumbs – flick paper / shake bag – even coating – do not touch – egg and bread crumbs stick to fingers – damage coating – repeat process if necessary – shake lightly to remove loose crumbs – ready to lower gently into hot fat – gives a crisp texture – golden brown – food retains flavour – and texture – prevents loss of moisture / juices – e.g. Scotch eggs / fish / rissoles (max. 1 example)  
 (10 points) (2 points = 1 mark) [5]

**[Section B Total: 60 marks]**