

**MARK SCHEME for the October/November 2009 question paper
for the guidance of teachers**

9336 FOOD STUDIES

9336/01

Paper 1 (Theory), maximum raw mark 100

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1 (a) Define and classify fats and oils

Fats and oils are esters – result from action of acids with alcohol – made up of carbon, hydrogen and oxygen – made up of glycerol and fatty acid – 1 molecule of glycerol – 3 molecules of fatty acid – 3 hydroxyl groups of glycerol molecule – each combine with a fatty acid molecule – to create a triglyceride – simplest triglyceride is formed when all fatty acids are the same – triglycerides are found in food – usually 2 or more types of fatty acid – differences between fats and oils due to different fatty acids in structure – glycerol is present in all fats – saturated fats – hold maximum number of hydrogen atoms – solid – joined by single bonds – usually from animals – butter – suet etc. – e.g. butyric acid – palmitic acid – stearic acid – mono-unsaturated fats – have one double bond – between 2 adjacent carbon atoms – they are reactive – double bond is a weak point in structure – can take up more hydrogen at double bond – e.g. oleic acid – olive oil etc. – polyunsaturated – more than one double bond – can hold more hydrogen – unsaturated fats are liquid at room temperature – usually from plants – fish oils are unsaturated – e.g. linoleic acid – linolenic acid – from vegetable oils / soya / maize / rapeseed etc. – and fish liver oils etc.

12 points

2 points = 1 mark

[6]

(b) Plasticity

Fats do not melt at a fixed temperature – melt over a range of temperatures – because they are a mixture of fatty acids – with different melting points – some triglycerides melt as temperature rises – others remain solid – allowing some triglycerides to move within the fat – making it 'spreadable' – softer fats spread more readily – shape changes with pressure – hard fats require more pressure to change shape – rolling puff pastry – plasticity of fats affects its shortening and creaming properties – pure fats have more shortening power – they contain no water – e.g. lard – creaming power measured by capacity to incorporate and hold air bubbles – fat with large plastic range is best for creaming – hydrogenated vegetable fats better than butter – butter has a narrow plastic range – hard at room temperature – difficult to spread etc.

8 points

2 points = 1 mark

[4]

(c) Difference between trans fatty acids and cis fatty acids

Trans fatty acid – two hydrogen atoms on geometrically opposite sides of the double bond.

1 point

Cis fatty acids – two hydrogen atoms on the same side of the double bond.

1 point

Credit correct information if shown on a diagram.

2 points

2 points = 1 mark

[1]

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(d) Describe the digestion and absorption of fat

Digestion

In the duodenum – bile – stored in the gall bladder – in liver – emulsifies fat – increases surface area – breaks fat into small droplets – lipase – in pancreatic juice – converts fats into glycerol – and fatty acids – in the ileum – lipase – from intestinal juice – converts fats to glycerol – and fatty acid
(credit lipase – glycerol – fatty acid once only)

8 points

2 points = 1 mark

Absorption

In ileum – villi – in intestinal wall – increase surface area – contain a lacteal – absorbs glycerol and fatty acids – which reform into fats – pass into lymphatic system – by diffusion – and active transport – now called chylomicrons.

4 points

2 points = 1 mark

[6]

(e) Explain current dietary advice to limit the amount of fat in the diet

High fat diet may cause obesity – coronary heart disease – strokes – Hypertension – poor blood circulation – obesity – results from accumulation of fat – a person is obese if about 1/3 of the body weight is fat – by overeating – more calories than required – excess fat is stored – under skin – as adipose tissue – and around internal organs – usually less active – so calories not burnt off – more weight gain – weight puts strain on heart – and blood circulation – breathing difficulties – low self esteem – problems during surgery – saturated fat contains cholesterol – deposited on artery walls – narrows – blocks – leads to heart attack – if coronary artery blocked – or stroke – if blood vessel in brain is blocked – arthritis – additional weight on joints – hypertension / high blood pressure – when arteries are narrowed – more difficult for blood to flow – may damage artery walls – etc.

16 points

2 points = 1 mark

[8]

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2 (a) Importance of regular meals for children

Develop routine – to form good eating habits at an early age – same time every day – to learn what is expected of them at meal times – eat with family – copies / learns from other family members – eats what they eat – know the type of food to expect at certain times of the day – required amount of food spread throughout day – to prevent overfeeding / overeating – not waiting too long between meals – to avoid snacking between meals – often junk food – then not hungry at meal time – digestive system ready for meal – small stomach capacity – cannot eat large amount of food – but still need to have balanced meals etc.

8 points

2 points = 1 mark

[4]

(b) Planning and serving children's meals

At least 500 ml / 1 pint of milk per day – easily digested – contains many essential nutrients – but no iron – or vitamin C – or vitamin D – used in dishes – need not consume all as drinks – HBV protein – rapid growth – carbohydrate / starch – for energy – activities – and for growth – some fat – concentrated source of energy – small stomach capacity – full cream milk up to 5 years – because of fat content – calcium – formation of bones and teeth – blood clotting – muscle function – nerve function – phosphorus – works with calcium to form calcium phosphate – iron – formation of increased volume of blood – prevent anaemia – vitamin A – visual purple – vision in dim light – healthy skin – mucous membranes – anti-infective vitamin – vitamin D – aids absorption of calcium – prevention of rickets – vitamin C – aids absorption of iron – clear skin – vitamin B1 / Thiamine – releases energy from carbohydrate – function of nerves – prevention of beri-beri – vitamin B2 / Riboflavine – energy from carbohydrates / protein / fat – growth – vitamin B3 / nicotinic acid / niacin – energy from carbohydrate – co-enzyme – vitamin B12 / cobalamin – works with folate – to make red blood cells – folate / folic acid – manufacture of new cells – foods easy to eat – and chew – to ensure all nutrients are available – crisp – to encourage chewing – small portions – small stomach – encourage to finish everything – can give additional portion – prevent waste – small child may become over-faced by large amount of food – few sweet foods – they blunt the appetite – may cause tooth decay – not much fatty food – difficult to digest – introduce new foods – variety of colour – flavour – texture – serve attractively – to tempt appetite – snack on raw fruit and vegetables – max. nutrients – to avoid sweets – water with meals – easier to eat / digest – sweet drinks affect appetite – attractive crockery – small cutlery – to become independent.

20 points

2 points = 1 mark

[10]

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(c) (i) Marasmus

causes – too little food to eat – children usually under 1 year – intake of nutrients is less than body requires – poor diet of mother.

symptoms – thin bodies – weak – eventually die.

4 points to cover both areas 2 points = 1 mark [2]

(ii) Kwashiorkor

causes – lack of protein – of HBV – fill up on carbohydrate – after weaning usually when next baby is born.

symptoms – thin arms and legs – muscle wasting – protein not forming tissues – retarded growth – distended abdomen – caused by fluid retention in tissues / oedema – anaemia – blood is a protein – poor, thin hair – reddish colour – soft texture.

6 points to cover both areas 2 points = 1 mark [3]

(iii) Scurvy

causes – lack of vitamin C – iron cannot be absorbed efficiently – connective tissue not formed – cell walls of blood vessels weak.

symptoms – walls of blood vessels become porous – blood escapes – bruising under skin – cuts / scratches slow to heal – gums swell – teeth become weaker – teeth loosen – major blood vessels break – fatal.

6 points to cover both areas 2 points = 1 mark [3]

(iv) Rickets

causes – lack of calcium – and phosphorus – and vitamin D – lack of exposure to sun / ultra violet light – lack of milk in diet – poor diet of breast feeding mother.

symptoms

bow legs – knock knees – pigeon chest – cartilage cannot be hardened not enough calcium – phosphate from food – weight of body cannot be supported by soft cartilage – vitamin D needed to absorb calcium and phosphorus – bones set in bent shape.

6 points to cover both areas 2 points = 1 mark [3]

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- 3 Water and Non-Starch Polysaccharide (NSP) / Dietary Fibre, although not nutrients, are essential for a balanced diet.

(a) (i) Functions of water in the body

Maintain constant amount of water in body – 65–70% body weight – about 40 litres in adult male – 25 litres within cells – rest in tissue fluid – for body fluids – blood plasma – digestive juices – saliva – mucus etc. – provides a medium for dispersal of nutrients – enzymes etc. – digestion occurs in liquid medium – absorption of nutrients occurs in solution – water is absorbed by NSP – to make faeces soft – and easy to expel – oxygen and carbon dioxide are carried in blood – attached to haemoglobin chemical reactions take place in solution – essential to life – nutrients carried to cells – waste products from cells by blood plasma – which is 90% water – waste removed from blood by kidneys – excreted as urine – evaporates from surface of skin – to cool body – keeps body temperature constant – lubricates joints – prevents damage to ends of bones etc.

16 points

2 points = 1 mark

[8]

(ii) Water balance and its importance

Water balance – the amount of water taken in = amount given out water lost in perspiration / urine / respiration – must be replaced – water cannot be stored – must be continually replaced when lost.

[1]

Importance – cannot survive for more than a few days without water – water is insufficient the result is dehydration – fatigue – headaches – digestive problems – constipation etc. water is absorbed into the body from the large intestine – but some in stomach and colon – loses about 1.5 litres daily – at least 600 ml of urine – to get rid of toxic waste – more water required in high temperatures – or with heavy work – to replace water lost in perspiration.

6 points

2 points = 1 mark

[3]

(b) (i) Importance of NSP in a healthy diet

Aids process of excreting solid waste – potentially toxic to the body – absorbs water – in colon – making waste soft – and bulky – binds waste – and easier to expel – regularly – bulk stimulates intestinal muscles – peristalsis – gives something for muscles to grip – pushes waste along length of colon – can be soluble or insoluble – removes toxins – soluble NSP lowers blood cholesterol – NSP carbohydrate / polysaccharide – mainly cellulose – pectin – lignin – part of plant cell walls – indigestible – not absorbed by human body – most diets contain 10–20 g NSP per day – 30 g would be healthier etc.

12 points

2 points = 1 mark

[6]

(ii) Problems associated with a diet with a poor NSP content

If diet lacks NSP not enough water can be absorbed in colon – making faeces hard and small – muscles of colon have to contract more than usual to make faeces pass along – more difficult to expel – discomfort – constipation – inner lining of colon may become distorted – pouches develop in intestine walls – faeces collect – and retained in body – diverticular disease – may cause varicose veins (haemorrhoids) – cancer of colon – hernias etc.

8 points

2 points = 1 mark

[4]

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(iii) Ways to increase the amount of NSP in family meals

Fruit and vegetables – skins e.g. potatoes / apples – seeds e.g. tomato – whole grain breakfast cereals – bran – wholemeal flour – brown rice – oats wholemeal bread – celery – nuts – dried fruit – pulses etc.

6 points (avoiding repetition) 2 points = 1 mark

[3]

4 (a) Classify carbohydrates and describe the structure of each type identified

Monosaccharides

Simple sugar – single molecules – $C_6H_{12}O_6$ – sweet taste – water soluble – end product of digestion – absorbed into bloodstream – e.g. glucose – fructose – galactose. (max. 2 examples)

Disaccharides

Double sugars – 2 molecules of monosaccharide – 1 molecule of water lost in the reaction – condensation – $C_{12}H_{22}O_{11}$ – water soluble – e.g. sucrose – maltose – lactose. (max. 2 examples)

Polysaccharides

Simple polysaccharides – long chains of glucose molecules – e.g. starch – glycogen – **either** available polysaccharide – digested into simple sugars – and absorbed – complex carbohydrate – long chains of more than one type of monosaccharide – e.g. hemi-cellulose water lost in reaction – condensation

or unavailable carbohydrates – indigestible – insoluble in water – can be linear – e.g. amylose – cellulose – dietary fibre / NSP – or can be branched – more than one type of monosaccharide joined together – amylopectin – e.g. pectin – gum – mucilage. (max. 2 examples)

20 points for types and any other information as indicated

2 points = 1 mark

[10]

(b) Functions of carbohydrates

Sugar – energy – for BMR – mechanical – electrical – chemical – for growth etc. – starch – energy – released more slowly – NSP / dietary fibre – peristaltic – action – health of gut – high satiety value – reduces calorie intake – glycogen – in blood – or liver – energy store – converted to glucose – oxidised to give energy when required.

10 points

2 points = 1 mark

[5]

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(c) (i) Gelatinisation

Formation of a gel – for thickening mixtures – e.g. sauce – soup – gravy – custard (max. 1 example)

starch granules do not dissolve in cold water – form a suspension – amylose and amylopectin molecules packed together and resist cold water – as water heats up – water diffuses into granules – makes them swell – to 5 × size – increases viscosity – begins at 60°C – at about 85°C – starch grains rupture – colloidal sol is obtained – amylose and amylopectin completely dispersed in water – vibrational energy produced by heat breaks down weak hydrogen bonds – between – amylose and amylopectin molecules – loose irregular network formed – temperature at which sol forms varies with different starch grains – gel becomes more solid on cooling – thermal energy is reduced – hydrogen bonding is re-established – mixture thickens to form a gel.

6 points

2 points = 1 mark

[3]

(ii) Dextrinisation

Action of dry heat – e.g. during baking / grilling / toasting – on starch – starchy foods often contain dextrin – which polymerise – to form brown coloured compounds – called pyrodextrins – e.g. toast – has a slightly sweet taste.

4 points

2 points = 1 mark

[2]

(iii) The setting of jam

Pectic substances form a gel in jam-making if – 60%–65% sugar present – level of pectin is sufficient – level of acid / pH of fruit – pH can be decreased with lemon juice – pectin released by boiling – over boiling breaks down pectin chains – cooking releases pectin from fruit – pectin forms a network of molecules – which entangle water – sugar slows down this process – so is added after fruit is cooked – gel is formed – jam sets – under ripe and over ripe fruit are low in pectin – pectic acid, not pectin – some fruits are low in pectin – e.g. strawberries – others are high in pectin – e.g. plums – apples – may mix fruits to increase pectin content – e.g. strawberry and apple etc.

6 points

2 points = 1 mark

[3]

(iv) Caramelisation

Effect of heat – on sugar – occurs more quickly in absence of water – sugar solutions (syrops) caramelize if heated strongly – caramel is sweet – brown – a mixture of carbohydrate-like compounds – molecular structure changes – used in confectionery – helps to brown surface of baked cakes etc.

4 points

2 points = 1 mark

[2]

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5 (a) Availability of food

Depends on where people live – type of land – climate – hurricanes – droughts – how they affect the cultivation of particular foods – foods grown locally – land may not favour animal rearing – or growing particular crops – availability of transport to bring foods grown elsewhere – different foods grow / are available in different countries – those in developing countries may have little choice of food – no trade with others – poor countries cannot afford to import foods – depends mainly on staple food – rice / maize etc. – cannot afford agricultural developments therefore little variety – wealthy countries import food – e.g. bananas / coffee / oranges etc. – wealthier countries have developed technologically – new preservation methods – canned / dried etc. – ownership of home freezers – new storing methods – previously unknown – e.g. AFD – creation of new foods – e.g. TVP – increases availability of convenience foods – more expensive – depends on income – more people work outside the home in developed countries – more disposable income – foods in season – home-grown produce – proximity to local markets – storage facilities – left-over food to use etc.

10 points

2 points = 1 mark

[5]

(b) Culture and Religion

Choose foods liked by families – habits – conditioning – family likes / dislikes – each culture has its own eating patterns – and styles of cooking – may be influenced by availability of low-priced, locally-grown food – e.g. rice in China and India / potatoes in Britain – wheat used for pasta in Italy – and for bread in the UK – vegetarian families – children must follow – absorb same attitude towards foods – may not be able to change until old enough to make own food choices – each culture has its own foods – often based on religious beliefs – e.g. cow sacred to Hindus – Jews and Muslims must have animals slaughtered in a particular way – to conform with religious teachings – Roman Catholics eat fish on Fridays – some dishes associated with festivals – christmas cake – turkey for Thanksgiving in the USA – dishes associated with occasions – wedding cake / birthday cake with candles etc.

10 points

2 points = 1 mark

[5]

(c) Advertising and Packaging

Choice can be affected by how foods are shown to consumers – television / newspaper adverts – displays in stores – taste-testing – some advertisements appeal to children – sweets / McDonald's – children more easily persuaded than adults – pester power – sweets at till – tempted by free gifts / money off coupons / special offers – to introduce new foods – attracted by colours of packaging – endorsements – health claims – peer pressure advertising convinces people that they 'should' buy certain foods – art of persuasion packaging gives information – what is in package – some may be poor readers – serving suggestions – make food look appealing – may give nutritional information manufacturers consider their role as educators – some people choose foods with the least packaging – environmental issues – waste of resources – others find packages foods easier to store – boxes easy to stack – saves time – can be stored as soon as food is brought home protects food from damage – contamination – tampering etc.

10 points

2 points = 1 mark

[5]

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(d) Cost

Depends on money available to spend on food – need to budget – poorer people must spend a higher proportion of income on food – staple foods cheap – filling – can be basis of meals – local recipes etc. – may be a status symbol for rich people – spend more than they can afford – e.g. smoked salmon / caviar – may wish to impress – cost is not related to nutritional value – may depend on supply available – or demand for the food – cheaper foods can have high nutritive value – e.g. milk / cheese / eggs – can choose cheaper sources of HBV – pulses / cereals etc. – protein complementation – grow own produce – keep chickens for family consumption – use food in season – special offers – buy locally – reduce transport cost – foods in season are usually cheaper – make rather than buy ready-made food – careful use of convenience foods – nutritious diet may need not be expensive – reduce purchase of junk food – judge amount requires – to avoid waste – use left-over foods – poor people may receive government help – free school meals – food aid – poverty limits choice of food – those with unlimited income may make poor choices processed / convenience foods are expensive – but usually contain high fat – high sugar – high salt – risk of obesity – CHD – hypertension – low in NSP etc.

10 points

2 points = 1 mark

[5]

(e) Nutritional knowledge and skill

Food choice may be affected by its nutritional value – knowledge from school / home may depend on level of education – differs between countries – nutrition may not be taught to everyone in school – level of knowledge varies – packaging may provide nutritional information – or magazines / television – publicity campaigns in media – to increase awareness – and knowledge – need to know the functions – and dangers of food – sources of nutrients – in order to choose wisely – well publicised dangers of excess fat / sugar / salt – campaigns to encourage daily consumption of fruit and vegetables – danger of CHD / obesity / hypertension – greater in affluent countries – cheaper sources of HBV protein are just as valuable in diet – milk / cheese / eggs – cheaper cuts of meat can be tenderised – complementary proteins used – cereals / pulses / nuts in same meal – improve quality of HBV protein – skill may depend on teaching in school – or at home – younger people may lack – less time spent at home – paid work outside home – more use of processed food – reduces preparation and cooking skills – may avoid certain meat / fish / fruit etc. – do not know how to prepare and cook – may buy convenience foods – e.g. puff pastry – because cannot make it – do not see skills used at home – or may be skilled at limited dishes – choose foods to make those – lack variety – may cook as a pastime – cake decoration etc. – learn how to choose accordingly – expect success – to avoid waste – if dishes do not turn out well, will not repeat – more costly to buy ready made food – but know the result to expect – to pay for reliability – or for dishes they could not make – due to lack of skill – e.g. choux pastry etc.

10 points

2 points = 1 mark

[5]

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6 (a) (i) Advantages and disadvantages of cooking in a microwave oven

Advantages

Quick – fuel saved – no pre-heating necessary – no mess in oven – sides stay cool so spills do not burn on – saves cleaning time – same dish can be used for cooking and serving – less washing up – micro-organisms destroyed – by heating of water molecules – minimum loss of water-soluble vitamins – little or no cooking liquid – maintains colour of vegetables – quick cooking – heat produced immediately – can be used for defrosting – safer than leaving food on a warm kitchen for hours – re-heats food very quickly – less destruction of nutrients etc.

Disadvantages

No browning – no crispness of outside – no dry heat – no cooking smells – food enclosed by hermetically sealed door – not suitable for large pieces of food / joints of meat / chicken etc. – depend on an appropriate electricity supply – rays only penetrate 4 cm – no metal dishes or metal decorations on china – causes arcing – can damage magnetron – easy to overcook – because of speed of cooking – cannot easily judge when cooked – not brown / crisp to guide – standing time allows cooking to continue – therefore may overcook – bones may conduct heat – different thickness of food cook unevenly – may get dry areas – food needs to be turned / moved round frequently – may need more attention than other methods of cooking – liquids need to be stirred – for even cooking – otherwise 'hot spots' occur – only small amounts of food can be cooked at once – usually only 1 shelf – when cooking for a group of people other methods may be required in addition etc.

12 points to cover both parts 2 points = 1 mark

[6]

(ii) Advantages and disadvantages of using convenience foods

Advantages

Great variety available – many types available – tinned / frozen / dried / ready to eat – readily available in many stores – can increase the range of dishes served at home – many are prepared – some are partly or fully cooked – some ingredients may not be available – e.g. canned pineapple / frozen fish / dried spices – save preparation time – many women work outside the home – save cooking time – children can use – little skill required – cooking instructions on packaging – serving suggestions – consistent results – may not be able to cook well – or have required skills – may not have equipment to prepare – more economical than buying equipment – saves storage space – no need to buy each individual ingredient – prevents waste of unused ingredients – easy to store – longer shelf-life than fresh – can shop less often – increased freezer ownership – and microwave use – more young people eat outside the home – fast food – peer pressure – may want same types of food at home – can prepare individual meals etc.

Disadvantages

Expensive – to cover cost of marketing / packaging – over-packaged – environmental issues – portion size small – may have a high fat content – often saturated fat – associated with obesity – CHD – overweight children – high in sugar – obesity – dental caries – diabetes – high in salt – hypertension – low in NSP – more risk of constipation etc. – may contain additives – long-term effects not known – possible allergic reactions – lack of vitamins – destroyed during processing – may be addictive – loss of skills – dependency on ready prepared / cooked food – tastes change – store of food readily available – snacking – overeating – fewer family meals – loss of social skills – some people eat individually rather than as a family etc.

12 points to cover both parts 2 points = 1 mark

[6]

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(iii) Advantages and disadvantages of home freezing

Advantages

Supply of food always available – in case of illness – bad weather etc. – suitable for almost all foods – can freeze when plentiful for times of shortage – retains nutritive value – flavour – and texture – can store a wide variety of commercially frozen food – prepared before freezing – sometimes cooked – saves time – prevents waste – left-over food can be stored for later use – can batch bake – when time is available – use when short of time – but enjoy home-made products – can buy in bulk – often cheaper – food has a long storage life – shop less often – can prepare in advance for special occasions.

Disadvantages

Cost of buying freezer – need to budget for running costs / increased electricity used cost of packaging materials – space for freezer – food wasted in case of power cuts freezer burn if packaging not adequate / or damaged – high value of stored food – may not be able to afford to buy food for later use – freezer needs to be full in order to run efficiently – some foods change texture – e.g. cheese – may spend more money on meals – know that food is available – less likely to plan and prepare cheaper meals from scratch – children snack – on ice-cream and lollies etc. – high fat / sugar content – need to allow time to thaw frozen meat etc. before cooking – to allow thorough cooking – and prevent risk of food poisoning – when food is not heated to a high enough temperature to destroy bacteria – 72°C in centre – must know theory of freezing – if food is not frozen at a low enough temperature – -27°C – large crystals form within cells – rupture cell walls – loss of cell contents – e.g. strawberries become soft – must store at -18°C – to prevent multiplication of bacteria – should spend time labelling food – date / contents / weight etc. – so food is used at its best – can easily forget food at the bottom – wastes food and money – may not be packaged in useful quantities – risk of defrosting more than needed – temperature for bacteria to thrive etc.

12 points to cover both parts 2 points = 1 mark

[6]

(b) Importance of traditional methods of preparing, cooking and storing food

Knowledge of local methods – passes down through generations – become part of culture – way of showing belonging to a community / area – awareness of locally grown food – preparation of food without any cost – economical dishes – plentiful supplies – preservation by drying etc. – design of storage shelters – reasons for designs – help local understanding – often concerned with foods, which grow wild – or can easily be cultivated – understanding of use of available resources for preparing – traditional tools – local methods of cooking – wood collection – making fires etc. – important to remember roots of communities – traditional cooking may be used at times of celebration – family events – important to know how to play a part – different from local food – which is food available to buy locally – indigenous foods are nutritious – and economical – could refer back to them in times of need – make distinctions between different ethnic groups – show creative use of natural resources – traditions / rituals – group cohesion – may use foods gathered from uncultivated land – e.g. melons – use basic methods like burying food in fires in some communities – often simple methods – to show there is no need to rely on modern methods of preservation – or use of modern equipment – some people research old methods – good to be able to see them in use – to show the development of methods of preparation, cooking and storing – young people should be made aware of starting points and understand reasons for development – e.g. education – trade etc.

14 points

2 points = 1 mark

[7]

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7 (a) Causes of food spoilage and the conditions which favour spoilage

Enzymes – bring about ripening then decay – autolysis – oxidative rancidity in fats – enzymic browning – loss of vitamins C and B group micro-organisms – yeast – causes fermentation – moulds – change appearance and flavour – bacteria – contaminate food – can be toxic – require a source of food – moisture – warmth – around 37°C is ideal – time to multiply – some require oxygen – suitable pH – may be spoilt by damage during harvesting – and transportation – incorrect storage – kept too long – at unsuitable temperature – infestation by pests / weevils / rodents / birds – contamination by insecticides etc.

10 points

2 points = 1 mark

[5]

(b) Preparing, cooking and storing food so it is safe to eat

Make sure to avoid conditions required for growth of micro-organisms.

Preparing

Clean surfaces – free from bacteria – wash with hot soapy water – clean equipment – dry in open air – or with clean tea towel – wash / clean thoroughly before cooking – different equipment for raw and cooked food – to prevent cross-contamination – different coloured chopping boards etc. – high standard of personal hygiene – wash hands after visiting toilet / handling raw meat / rubbish etc. – clean apron – hair tied back / covered short / clean fingernails – no nail polish – cut covered with waterproof plaster – do not cook if suffering from infectious illness – no smoking – coughing / spitting over food – do not lick fingers – wash tasting spoon before using again – no flies in kitchen – but do not use fly spray – do not allow animals in kitchen – dogs to have own bowls, not family's – no cracked or chipped equipment – no left-over food lying around – wrap food waste – dispose of regularly – cover bin – disinfect – boil / sterilise dish cloths and tea towels – make sure frozen food is thoroughly thawed – so bacteria are destroyed by heat – do not defrost then re-freeze food – cover food – etc.

Cooking

Temperature in middle of food must reach 72°C – for 2 minutes – use probe to ensure bacteria are destroyed – e.g. salmonella in poultry – stir liquids in microwave oven – to ensure even distribution of heat – hot food, which is to be eaten raw, should be cooled as soon as possible – so it passes through dangerous temperature zone as quickly as possible.

Storage

Short term storage in cool / refrigerated place – 1–7°C – micro-organisms reproduce slower in cold conditions – clean container – covered – to prevent cross contamination – raw meat at bottom of refrigerator – so drips do not fall onto cooked food – egg points end down – to keep yolk in centre – use in rotation – observe 'use by' dates – long term storage in freezer – 18°C – bacteria dormant – water unavailable – drying – remove water – jam-making – high temperature sterilises – vacuum so no further entry of micro-organisms – high sugar concentration – use of chemicals – e.g. salt – acid – effect of osmosis – most bacteria like pH 7.4 etc.

30 points to cover all areas 2 points = 1 mark

[15]

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(c) Reasons for the increased number of cases of food poisoning

Meals eaten away from home – restaurants / fast food outlets – kept warm in catering establishments – canteens / restaurants – more take-away foods / hawker centres etc. – curries / sandwiches / pizza etc. – increased factory farming – eggs / chickens / fish – increased use of convenience foods – e.g. soups / sauces / sausages – changes in shopping habits – more food storage at home and in food stores – people shop less often – homes are often very warm – ideal temperature – poor storage temperatures and unsuitable conditions at home – lack of knowledge of safe storage conditions – untrained staff handling food in shops / restaurants / stalls – poor / no hand washing facilities – dirty clothes etc. – more mass-catering – in schools / hospitals etc. – shopkeepers want to sell all food to prevent waste – and make more profit – large supermarkets cater for large population – one batch of contaminated food will affect many people etc.

10 points

2 points = 1 mark

[5]

8 (a) (i) Types of fat and flour for shortcrust pastry

Plain flour – air is raising agent – SR flour has chemical raising agent – soft flour – low gluten content – crumbly result – white flour – wholemeal flour is heavy – not so much rising – but contains NSP – hard fat – chilled – so it does not melt easily – butter – gives colour and flavour – but is saturated fat – with cholesterol – margarine – colour – and flavour – usually from plant source – lard – no water – gives short / crumbly result – but lacks colour – white vegetable fat – suitable for vegetarians – and flavour – mixture of lard and margarine preferred – qualities of both etc.

8 points

2 points = 1 mark

[4]

(ii) Types of fat and flour for puff pastry

Plain flour – air is raising agent – hard / strong flour – high gluten content – to develop structure / layers – gluten developed during rolling and folding – traps air between layers – not wholemeal flour – too low gluten content – heavier – poor rise – hard fat – will not melt easily – plastic – changes shape when rolling and folding – hard margarine – butter – colour – flavour – does not melt easily – lard – or white vegetable fat – less than half – no water.

8 points

2 points = 1 mark

[4]

(b) (i) Changes which take place when preparing and cooking shortcrust pastry

Air incorporated – by sieving – and rubbing in – flour particles coated with fat – during rubbing in – some flour uncoated – uncoated flour absorbs water – gluten strands formed – sticky – binds dough together – bound evenly – by kneading – rolling stretches gluten – allows pastry to be rolled thinly – cooling / resting before cooking – allows gluten to relax – stops shrinkage – fat melts during cooking – absorbed by starch granules – starch granules gelatinise – air expands – water changes to steam – and expands – separate pastry into crumbly layers – become crisp – dry – as gluten coagulates – starch dextrinises on surface – browns etc.

10 points

2 points = 1 mark

[5]

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(ii) Changes which take place when preparing and cooking puff pastry

Flour particles hydrated when water added – gluten strands formed – gluten developed when dough is kneaded – forms smooth dough – gluten stretched when dough is rolled – air is trapped when fat added – and edges are sealed – air enclosed between layers – when rolling and folding – more layers are formed with each rolling and folding – air trapped between layers – and gluten developed by kneading and rolling – fat hardens – when chilled between each rolling – gluten relaxes – so pastry does not shrink during cooking – cold air expands more than warm air – fat melts on heating – absorbed by starch granules – steam produced from water – expands – air expands – forces layers apart – starch gelatinises – gluten coagulates – framework of pastry formed – dextrin forms on surface browns – crisp layers – dry – by water evaporation in hot oven etc.

10 points

2 points = 1 mark

[5]

(iii) Problems when making and baking shortcrust pastry

Fat too hard to rub in – lumps of fat remain – too much flour left uncoated – too much water needed to mix pastry overhandled – fat becomes soft and sticky – pastry difficult to roll too little water added – pastry will not become smooth when kneaded – cracks when rolled – dry and crumbly when cooked too much water added – too much gluten developed – hard, tough pastry water added unevenly – streaky pastry when rolled out – pastry blisters – steam produced unevenly – pastry kneaded heavily – too much gluten developed – tough pastry – too much flour for rolling – dough becomes dry – proportions altered – pastry may crack on rolling – over-stretching dough when rolling – long strands of gluten formed – pastry shrinks when baked – will be hard and tough – not allowed to rest – in a cool place before baking – re-rolling – gluten strands toughened – air lost – oven not hot enough – melted fat runs out – pastry pale in colour – soft and oily to taste – oven too hot – pastry too dark – may have a bitter taste – will not separate into crisp layers.

Problems when making and baking puff pastry

Fat too soft – blends with flour instead of remaining in layers – poor volume – close texture – because air is lost – not held with pieces of fat – fat too hard – forced through layers of pastry when pastry is rolled – difficult to handle – sticks to board and rolling pin – too little liquid used – dough not elastic enough – will not roll and stretch – will become dry and crack – poor volume – coarse and tough – too much water used – soft, sticky pastry – difficult to handle – over-handled when rolling and folding – softens fat – combines with dough – pastry will not form layers – if rectangular shape is not maintained – will not have same number of layers at corners – pastry will not rise evenly when baked – edges not sealed when rolling and folding – air escapes during rolling – not rested between rollings and before cooking – shrinks when baked – dough may become sticky and lose its elasticity – sharp knife to trim edges before baking – if they remain sealed they cannot separate into layers when baking – oven temperature too low – melted fat seeps out – leaving soggy and greasy underside – not hot enough to produce steam from water – or expand air quickly – oven temperature too high – top surface will burn – before inside layers are cooked etc.

14 points to cover both pastries 2 points = 1 mark

[7]