

**MARK SCHEME for the October/November 2010 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) Reasons for following a vegetarian diet

humanitarian – consider it cruel to kill animals for food
family tradition – children may continue to follow when adult
religion – e.g. Hindu religion forbids beef – cow is a sacred animal – culture of country
traditional dishes may be free from animal foods – cheaper to produce plant foods – more
crops than animals per acre – animals waste resources – crops used to feed animals –
peer group influence – teenagers often adopt a different eating pattern
health issues – BSE / bird 'flu etc.
animal fats usually saturated – contain cholesterol – linked with CHD
animal foods more expensive than plant foods – e.g. meat is not as cheap as cereals –
can grow own crops food – but may not be able to rear animals – plant foods easier to
store – etc.

10 points

2 points = 1 mark

[5]

(b) Problems associated with a vegan diet

lack **vitamin A / retinol** – add red or orange vegetables (or e.g.) – green vegetables (or
e.g.) – margarine fortified with vitamin A – supplied as beta-carotene – converted to
vitamin A in body

lack **vitamin B₂ / riboflavin** – include nuts / cereals / pulses / potatoes

may lack **vitamin B₁₂** – deficiency causes pernicious anaemia – supplied by yeast
extract – added to breakfast cereals

ensure **vitamin D** – to absorb calcium – in fortified margarine – sunshine – animal fats /
butter / cheese etc.

may lack **calcium** – fortified breakfast cereals – nuts / pulses / cereals

may lack **iron** – fortified breakfast cereals / soya / green vegetables

iron supplied as non-haem iron to vegans – converted from ferric to ferrous by vitamin C –
to give haem iron

ensure **vitamin C** – to ensure absorption of iron – from citrus fruit

may lack **energy** – because fruit and vegetables are high in water

bulky – due to cellulose – cannot eat enough to supply all nutrients

cook some fruit and vegetables to reduce bulk

eat snack – cereals / nuts / fruit / vegetables – energy dense

may be monotonous – use herbs and spices – vary cooking methods

packaged processed foods may contain 'animal' products – e.g. gelatine / fat etc.

check ingredients list – know E numbers to avoid

may cause **digestive problems** – e.g. diarrhoea – because of high cellulose diet – etc.

20 points

2 points = 1 mark

[10]

(c) (i) Importance of soya in a vegetarian diet

HBV protein – only plant source

contains all indispensable amino acids

can consume as flour – milk – tofu etc.

can mix with LBV foods – complementary protein

IAs missing from LBV protein supplied by HBV protein

to improve quality of protein in meal

e.g. soya milk and cereals – soya flour to thicken sauces etc.

bought as dried pulses – cheap – easy to store – versatile

can use in casseroles – stir fries – soups etc.

10 points

2 points = 1 mark

[5]

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(ii) Production of TVP – its advantages and disadvantages

oil extracted from bean – ground – to produce soya flour – mixed with water
 a dough – colouring and flavouring added – forced through a nozzle under pressure
 spin into fibres – resembling meat – moulded to form sausages – mince – chunks
 to replace meat

Advantages

texture similar to meat – similar nutritive value to meat – can fortify with iron – little
 fat – unsaturated – without cholesterol – dry – light in weight – easy to store –
 easy to transport – cheap – quick to cook – no preparation needed – no shrinkage
 when cooked

Disadvantages

bland flavour – but can add flavouring to resemble different meats – chunks or meat
 very regular in size – colouring is artificial – use of additives
 texture not the same as meat – flavour 'artificial' – limited number of uses etc.

10 points

2 points = 1 mark

[5]

2 (a) Vitamin A (retinol)

Functions

growth – metabolism of all body cells – formation of rhodopsin (visual purple) –
 pigment – in retina – aids vision in dim light – for healthy skin – and moist mucous
 membranes – e.g. cornea / digestive tract / respiratory tract

6 points

Sources

fat soluble – butter – cheese – milk – oily fish – fish liver oil – liver – red meat –
 eggs etc.

carotene – orange pigment in fruit and vegetables – converted to retinol in the body –
 less valuable source – beta-carotene is most important – carrots – green leafy
 vegetables – apricots – yam etc.

6 points

Deficiency

retards growth – body cannot make rhodopsin – reduced vision in dim light – night
 blindness – resistance to infection lowered – dry skin – poor condition of mucous
 membranes – dry and inflamed membranes in front of eye – ulcerated cornea –
 blindness – xerophthalmia

6 points

18 points

2 points = 1 mark

[9]

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(b) Vitamin C (ascorbic acid)

Functions

formation of collagen – main protein of connective tissue – protects organs
 absorption of iron – converts ferrous ions to ferric ions – non-haem iron to haem
 4 points

Sources

fresh fruit and vegetables – blackcurrants – rose hips – citrus fruit – strawberries –
 melon etc.
 cabbage – spinach – lettuce – new potatoes – green peppers etc.
 6 points

Deficiency

scurvy – spontaneous bruising – as small blood vessels break – haem under skin –
 gums become black – and spongy – loose teeth – slow healing of wounds – and
 fractures – caused by failure to form connective tissue – anaemia – failure to absorb
 iron – inability to form red blood cells
 6 points

16 points

2 points = 1 mark

[8]

(c) Vitamin D (cholecalciferol)

Functions

growth – and maintenance of bones and teeth – absorption of calcium – promotes uptake
 of calcium – and phosphorus – by bones and teeth
 4 points

Sources

sunlight – by action of ultra-violet light – on skin – fat soluble – animal fats / oils – oily
 fish – fish liver oil – milk – butter – cheese – eggs – margarine – added by law
 6 points

Deficiency

rickets in children – bones remain soft – bend under weight of body – forming bow legs –
 and knock knees – osteomalacia in adults – bones become soft and weak – painful –
 calcium withdrawn from bones – for blood clotting / nerve function / muscle function
 6 points

16 points

2 points = 1 mark

[8]

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3 (a) Primary and secondary structure of proteins

Primary structure

protein chain is a sequence of amino acids
 amino acids combine through their amino and carboxyl groups – by peptide bonds
 give simplest / most basic protein structure
 two amino acids condense to form a dipeptide – water eliminated – polypeptides formed
 when many amino acids combine
 polypeptides are chains of hundreds or thousands of amino acids
 about 20 different amino acids in foods – linked in a variety of combinations – to make
 many different proteins
 6 points

Secondary structure

primary structure of proteins is folded – to form an alpha-helix – and a beta-pleated sheet –
 stability of structure depends on presence of hydrogen bonds – secondary structure is further
 folded – held by hydrogen bonds – ionic linkages – and disulfide linkages
 6 points

12 points

2 points = 1 mark

[6]

(b) Compare globular and fibrous proteins

globular proteins

are bonded or compact shaped molecules

albumins

e.g. ovalbumin (egg white), lactalbumin (milk and blood plasma) – soluble in water – and
 dilute salt solutions – coagulated by heat

globulins

e.g. lactoglobulin (milk, egg white, muscle cells, blood plasma) – insoluble in water –
 dissolve in dilute solutions of electrolytes – coagulated by heat

fibrous proteins

fibrous molecules – many twisted helices – to give elasticity – others are in the form of
 pleated sheets – insoluble in water – and dilute salt solutions

collagens

e.g. connective tissue of meat, fish

inelastic – high tensile strength – converted to gelatine – by prolonged contact with moist
 heat – gelatine is soluble – and more susceptible to enzymic digestion

elastins

present in elastic tissues – e.g. artery walls, skin, tendons

unchanged by cooking

4 types of protein – 4 × 1 point

4 examples – 4 × 1 point

comparison of shape

globular is round ball – fibrous is twisted and pleated

2 points – award marks for diagrams

comparison of solubility

albumin soluble – globulin insoluble

collagen soluble with moist heat – elastin insoluble

2 points

comparison of coagulation

both coagulate on heating – but elastin remains unchanged

2 points

14 points

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(c) (i) Digestion and absorption of protein

stomach – pepsin – converts protein to peptides – in acidic conditions – HCl – in gastric juice
duodenum – trypsin – converts proteins and peptides – and dipeptide molecules – trypsinogen – from pancreatic juice – is activated by enterokinase – in intestinal juice – to become trypsin
ileum – peptides and dipeptides – broken down to amino acids – by erepsin – in intestinal juice

amino acids absorbed through microvilli – of ileum – by active transport – into blood capillaries – of villi – taken by hepatic portal vein – to liver

14 points

2 points = 1 mark

[7]

(ii) Use of absorbed nutrients

amino acids used to form structural and functional proteins – for growth – repair – maintenance of body tissues – antibodies – hormones – enzymes are proteins – which regulate processes – e.g. digestion, growth, metabolic rate etc.
bring about changes in the body – excess amino acids are deaminated – in liver – nitrogen removed – as urea – and excreted via kidneys – remainder available for the production of energy – by oxidation during respiration – stored as fat – lipogenesis – changed into glucose or glycogen – gluconeogenesis

10 points

2 points = 1 mark

[5]

4 (a) Classification of vegetables

roots	carrot – parsnip – turnip – radish etc.
tubers	potato – yam – Jerusalem artichoke etc.
bulbs	onion – garlic – leek
leaves	cabbage – spinach – lettuce etc.
flowers	cauliflower – broccoli – globe artichoke etc.
stems	celery – asparagus etc.
fruits	courgettes – marrow – avocado – cucumber etc.
Pods	runner beans – French beans – mange tout – peas etc.
seeds	peas – broad beans etc.
caps and stalks	mushrooms

Types of vegetable 5 × 1 point

2 examples of each type = 1 point 5 × 1 point

10 points

2 points = 1 mark

[5]

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(b) Nutritional importance of vegetables in the diet

HBV protein – in soya beans – LBV protein – in peas – beans – lentils – (peas)
 growth – repair – energy – enzymes etc.

starch – peas – beans – lentils – potatoes – yam etc.
 energy – for growth – movement – basal metabolism etc.

sugar – beetroot – parsnips – onions etc.
 energy

fat /oil – soya beans
 energy – insulation – protection etc.

vitamin A – as beta carotene – carrots – lettuce – spinach etc.
 visual purple – mucous membranes – healthy skin etc.

vitamin C – new potatoes – lettuce – cabbage – green peppers etc.
 absorption of iron – formation of connective tissue etc.

calcium – cabbage – spinach – watercress etc.
 clotting of blood – muscle function etc.

iron – spinach – cabbage – soya beans etc.
 haemoglobin – energy – prevention of anaemia etc.

sodium – kidney beans – beetroot – carrots – celery etc.
 formation of all body fluids – to prevent muscle cramps etc.

NSP – potato skin – cabbage – broccoli etc.
 stimulates peristalsis – prevention of constipation etc.

20 points

2 points = 1 mark

[10]

(c) Other factors

high water content – 70% body – constituent of body cells – temperature control – water
 removal – transport of nutrients

add colour – e.g. carrots – broccoli – kidney beans – beetroot etc.

add flavour – e.g. raw and cooked vegetables give different flavours

variety of textures and shapes – e.g. peas – carrots – peppers – mushroom

add bulk – feeling of fullness – useful when controlling kcal intake

can be cooked in many ways – e.g. boil – roast – steam – fry

can be preserved in many different ways – pickles / canned / dried / frozen

thirst quenching because of high water content e.g. lettuce / raw carrot etc.

inexpensive – can be grown at home – buy in bulk and store / freeze

large variety available – can be imported from other countries

low in energy value – valuable in calorie-controlled diet

useful snack food – easy to carry – easy to eat – e.g. celery – carrot etc.

20 points

2 points = 1 mark

[10]

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5 (a) Nutritive value of red meat

HBV protein – actin and myosin in fibres – collagen, elastin and reticulin in connective tissue – all IAAs – growth – repair = maintenance – enzymes / hormones / antibodies
fat – saturated – solid at room temperature – contains cholesterol – linked to CH₂ energy – warmth – insulation – convey fat-soluble vitamins – forms part of cell membrane etc.

vitamin A (retinol) – fat soluble – formation of rhodopsin (visual purple) – ability to see in dim light – healthy skin – moist mucous membranes – prevention of / night blindness etc.

vitamin D (cholecalciferol) – fat soluble – absorption of calcium – formation of bones and teeth – and maintenance of bones and teeth – prevention of rickets / osteomalacia etc.

vitamin B2 (riboflavin) – water soluble – co-enzyme – release of energy in body cells – by oxidation of glucose – prevents red and swollen tongue – cracks at corners of mouth – conjunctivitis

nicotinic acid – water soluble – co-enzyme – release of energy in body cells – by oxidation of glucose – prevents pellagra

vitamin B6 (pyridoxine)

concerned with synthesis of protein

vitamin B12

for formation of red cells – prevents pernicious anaemia

iron

production of haemoglobin – red pigment in blood – transports oxygen to cells – as oxyhaemoglobin – for cell respiration – and production of energy – removes carbon dioxide – as carboxyhaemoglobin – prevents anaemia

14 points

2 points = 1 mark

[7]

(b) (i) Factors which cause meat to be tough

thickness of muscle fibres – age of animal – young animals have short, fine muscle fibres – older animals have long, thick muscle fibres

amount of connective tissue – older animals have more – because they have been more active

well-used parts produce thicker fibres – and more collagen

treatment of animal before slaughter – must be rested beforehand – without stress –

method of cooking inappropriate – tough meat requires moist heat – dry methods do not make tough meat tender etc.

8 points

2 points = 1 mark

[4]

(ii) Ways of tenderising meat before cooking

hanging / ageing / conditioning – for several days – glycogen – in muscle tissues – turns to lactic acid – pH falls from 7.4 to 5.5 – partial denaturation of fibrous protein – enzyme action – breaks down proteins – bromelain – from pineapple – papain – from papaya – may be found in tenderising powders – acid marinade – wine / vinegar / lemon juice – coagulates protein – pounding – separates fibres – cutting into small pieces / mincing – shortens fibres – breaks up connective tissue

10 points

2 points = 1 mark

[5]

(iii) Tenderisation of meat during cooking

moist methods of cooking – stewing / braising / boiling – at 80°C to 100°C – converts insoluble collagen – to soluble gelatine – fibres loosen – allow moisture to penetrate between fibres – for further breakdown of collagen to gelatine – method chosen must be suitable for cut of meat chosen – tough cuts cannot be tenderised by dry methods of cooking – since tenderisation depends on collagen dissolving with moist heat – allowing fibres to loosen

6 points

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(c) Changes taking place when meat is cooked

colour changes from red to brown – above 65°C – myoglobin – changes to metmyoglobin – hemichrome – smell produced – as volatile aromatic substances are released – connective tissues are destroyed – making meat safe to eat – texture becomes firmer – proteins coagulates – above 50°C – overcooking gives a hard and dry texture – collagen contracts at 60°C – meat juices squeezed out – extractives – contain protein, minerals and vitamins – and attractive flavour – meat shrinks – and loses weight – depending on cooking method – dry methods lose more than moist methods – water evaporates – juices pass into cooking liquid – during moist cooking – will dry on outside if dry method used – to give brown coating – which has a strong flavour – fat melts – keeps meat moist – dripping used to baste – to prevent drying – reduces moisture loss in dry methods – less fat melts at lower temperature of moist methods – collagen changes to gelatine in moist methods – meat tenderises etc.

12 points

2 points = 1 mark

[6]

6 (a) (i) Food labelling

name of product
description
weight / amount

manufacturer
address of manufacturer
country of origin
ingredients

storage instructions
cooking instructions
'sell by' / 'use by' date
picture
serving suggestion
special claims

vegetarian symbol
wheat ear
recycle symbol / litter man
price
nutritional information

so consumer knows what it is
e.g. in tomato sauce
to know how much to buy
to calculate the unit price
in case of complaint
to be able to contact
may want to avoid for health / political
in case of allergies
in descending order – by weight
to keep in good quality for longer
for best results
so product can be used when safe
to attract consumer / show what it is
shows product's use with other foods
e.g. low fat / sugar free
appeal to health of consumer
suitable for vegetarians – not vegans
gluten free – for coeliacs
encourages care of the environment
if a special offer – can compare
for controlling nutrient intake
saturated fat / salt / sugar content
check if product suits diet
calculate kcal value
can compare similar products
helps consumer make choices
creates awareness etc.

12 points

2 points = 1 mark

[6]

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(ii) Functions of additives in processed food

additives are substances not normally found in a particular food – may maintain nutritional quality of food – replace lost vitamins – preservatives – improve appearance – quality – e.g. sulfur dioxide – benzoic acid etc.
 antioxidants – prevent oxidative rancidity in fats – e.g. butter – must not disguise faulty processing – or deceive the consumer – can be natural substances – e.g. ascorbic acid – or biologically produced – e.g. lecithin from soya beans – may be artificial compounds – with no natural counterpart – emulsifiers – disperse oil in water – prevent separating – ice-cream stabilisers – prevent breakdown into two layers – mayonnaise – colourings – make food more attractive – e.g. canned peas – flavourings – may be natural or artificial – e.g. strawberry flavour (natural) – or strawberry flavoured (artificial)
 flavour enhancers – MSG – made from fermenting soya beans – sweeteners – reduce intake of sugar – intense sweetness – saccharin
 flour improvers – used to strengthen doughs – e.g. potassium bromate humectants – absorb water – help to prevent food from drying out – e.g. glycerol added to sweets – firming and crisping agents – added to tinned and bottled fruit – e.g. calcium chloride – flour bleaching agents – to whiten flour – e.g. benzoyl peroxide – acids, buffers and bases – to adjust or control pH of food – solvents – flavourings and colourings dissolved before adding – list of permitted additives has to be drawn up – those permitted by EU have E prefix – smallest possible amount used to give desired effect – must be listed on ingredients list – usually by code number – need further literature to investigate nature of additives – because chemical names are complicated etc.

16 points

2 points = 1 mark

[8]

(iii) Possible effects of processed food on health

processed food is any food not served in its natural state – includes convenience foods – preserved foods etc.
 high in sugar – diabetes – obesity – CHD – tooth decay
 high in saturated fat – contains cholesterol – blocks arteries
 link to CHD – obesity – breathlessness – low self-esteem
 high in salt – hypertension – water retention – kidney failure
 low in NSP – constipation – diverticular disease – cancer of colon
 low in vitamin C – heat sensitive – lost during processing
 risk / benefit analysis on additives – usually benefit outweighs risk
 often ensures food is safe to eat – micro-organisms destroyed by heat
 allows perishable foods to be kept – less risk of food poisoning
 foods can be transported from other countries – e.g. orange juice – vitamin C is a health benefit – vary diet – maybe more balanced
 some additives are not approved – long-term effects not known – or publicised – so do not know effects on health – are they stored in the body or eliminated?
 can cause allergic reactions – e.g. aspartame –
 associated with hyperactivity – children not concentrating at school – most people suffer no effects – consider them safe
 people do not recognise names – no need to identify in some countries
 GM ingredients – controversial – may be difficult to avoid – not aware of problems immediately – can affect DNA – future problems etc.

12 points

2 points = 1 mark

[6]

(b) Explain why some foods are packaged before they are sold

- | | |
|---------------------|--|
| gives information | name of product, weight, ingredients etc. |
| preserves | prevents moisture loss, entry of bacteria etc. |
| protects | from damage during transport – and storage – reduces waste |
| hygienic | prevents contamination by handlers – shoppers |
| tamperproof | seals to avoid customers opening packages etc. |
| easier to transport | saves time during transport – regular shapes etc. |
| easier to stack | improves storage in shops – safer – do not fall |
| | regular shapes make display easier and neater |
| | easier stock control – easier to count |
| same weight | saves time – no need to weigh out food |
| attracts consumers | colourful packaging – easily recognised |
| advertises | customers recognise – may influence choice etc. |

5 well-explained points × 1 mark

[5]

7 (a) Give reasons for the preservation of food

- to prevent decay – by enzymes from within food – autolysis
- to prevent the growth of micro-organisms – yeasts – moulds – bacteria
- to cope with a glut of seasonal foods
- food is cheaper when plentiful – use later when expensive
- to keep food for longer
- to store for later use
- useful in emergencies
- to prevent waste
- to add variety to the diet
- for easier transport
- to enjoy foods from other countries
- to make new products
- commercially preserved food is easier to distribute
- food can be imported and exported etc.

10 points

2 points = 1 mark

[5]

(b) (i) Deep freezing

- e.g. meat, fish, baked goods, vegetables etc.
- freezing converts water in food to ice crystals – water does not freeze at 0°C – because dissolved solids lower freezing point
- all water will be frozen when temperature is –10°C
- micro-organisms are unable to grow, remain dormant – become active again when food thaws
- enzyme action slowed down – not destroyed
- store frozen food at –18°C – blanch vegetables before freezing – to destroy enzymes which cause rapid decay
- rapid freezing is necessary – to form large numbers of tiny ice crystals – which cause less damage to cell walls – liquid retained in cells when food is thawed – slow freezing creates one large ice crystal – damages cell wall
- foods lose flavour, texture and nutritive value – juice lost – water unavailable to bacteria – because it has formed ice
- temperature too low for bacteria to reproduce
- so conditions for bacterial growth are not met

8 points

2 points = 1 mark

[4]

(ii) Jam making

strong sugar solution formed – 60% added sugar
 water removed from cells by osmosis
 sugar acts as a preservative – because bacteria cannot survive if concentration is 40%–50%
 but yeast and moulds can develop – so 60% sugar is needed
 fruit is cooked – boiling destroys bacteria etc.
 jars heated to sterilise – so bacteria are not introduced
 jam boiled to reach setting points – when sugar is at correct %
 jars filled leaving small space – waxed disc covers surface – melts to form a seal on top of jam
 cover firmly attached when jam still hot – jam shrinks when cool – pulls cover tightly in place – no air trapped – could contain bacteria
 fruit boiled to destroy bacteria
 60% sugar removes water from cells by osmosis – cell contents too concentrated for bacterial growth – sealed jars to prevent entry of bacteria etc.
 8 points
 2 points = 1 mark

[4]

(iii) Dehydration

e.g. pulses, fish, milk, currants etc.
 water removed – one of the conditions for bacterial growth
 food can be laid in the sun – traditional method
 or heat is applied in a controlled flow of air
 temperature not too high otherwise food will cook
 or outside may become hard – and water remains trapped inside
 food is then too concentrated for bacteria – vegetables are washed – dried – and blanched – to destroy enzymes
 retains colour – and improves retention of vitamin C
 meat can be cooked – e.g. biltong
tunnel drying – conveyor belt – warm air tunnel
spray drying – e.g. milk and eggs – food sprayed into top of chamber
 water evaporates – powder falls to bottom
roller drying – applied as thin paste to surface of roller – dries – scraped off roller with knife – e.g. potato and breakfast cereals
 8 points
 2 points = 1 mark

[4]

(iv) Irradiation

e.g. spices, strawberries
 inhibits microbial growth
 cannot eliminate all bacteria without causing undesirable changes in food
 spores resistant so survive
 gamma rays can pass through large containers
 food can be irradiated in packaging
 quick process – does not involve heat – no damage to foods
 kills microbes and insects – in foods sensitive to heat
 used on frozen food – concern that poor quality food will be sold on cannot detect etc.
 6 points
 2 points = 1 mark

[3]

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(c) Problems with local supply of food – remedies

depends on where person lives
different foods available in different countries – little choice in developing countries
local staple food with little variation
traditional patterns of food choice
depends on climate and type of land
may not be suitable for rearing animals or growing certain crops
country may not have money for food imports
no variety because foods not available from other countries
no money for expensive agricultural developments
wealthy countries can afford to import food not available locally
so local supply depends on income of inhabitants
e.g. UK imports bananas, oranges, tuna etc.
wealthier countries have benefited from technological developments
e.g. new methods of preserving
availability of seasonal food depends on storage facilities – increased availability of canned, dried and frozen foods
creation of new foods – TVP – instant desserts – easy to store for emergencies
people need to have facilities to store food for later use
may be a town or village facility
education – teach how to make better use of resources etc.
new crops – new uses etc.

Other problems – failure of harvest – cyclones – pests – poor people cannot afford to buy luxury foods
nutritious diet does not have to be expensive – poor people have to spend a higher proportion of their income on food
government may give food aid – free school meals – welfare centre – poverty limits availability and choice
10 points
2 points = 1 mark

[5]

8 (a) Reasons for cooking food

make food safe to eat – destroy micro-organisms – e.g. meat
extend shelf-life – destroy micro-organisms / inactivate enzymes – e.g. fruit in jam
make food more digestible – meat tenderised / cellulose in fruits
food softened – starch gelatinised in potatoes and flour etc.
make food easier to eat – meat tenderised / vegetables softened etc.
reduce bulk – can eat more of those which supply valuable nutrients – e.g. cabbage (vitamin C)
flavour improved – fresh young vegetables – flavour strengthened
flavours changes – extractives developed when meat cooks
flavours blended – e.g. meat and vegetables in a casserole
texture changes – fruit and vegetables soften
eggs / meat / fish become firmer – protein coagulates
baked products become crisper – fried foods crisper
colour improved – raw meat red – cooked meat brown
baked foods brown – fried foods brown (chips?)
volatile substances released – e.g. smell of onions – stimulates flow of digestive juices
increases variety in diet – many ways of cooking e.g. potatoes
new dishes created – ingredients mixed for cakes, biscuits etc.
hot food in cold weather – soup more acceptable than cold food
10 points – to include reasons, explanations and examples
2 points = 1 mark

[5]

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(b) Different methods of heat transference

Convection

movement of heated particles – of gases – or liquids – particles expand on heating – become less dense – rise – colder particles sink to take their place – creating convection currents – which distribute heat – e.g. boiling water for hot drinks
 used in heating an oven – for baking – roasting etc.
 for cooking in liquid on hob – boiling – stewing – poaching etc.
 cooking in steam – water vapour is a gas – rises from boiling water – heat transferred to food or container etc.

Conduction

transferring heat through a solid – by contact
 metals transfer heat more quickly – are good conductors – used for pans and oven shelves – wood – is a poor conductor – used for spoons and pan handles etc. – used to transfer heat from solid hotplate to base of pan – close contact necessary for efficiency – e.g. flat base to pan – and used to cook food in contact with base of pan – e.g. pancakes – fried egg etc. and in oven for baking – oven shelf to baking tin to food e.g. cake

Radiation

heat passes from source – e.g. flame or hot coals or grill – in direct rays – in straight lines – falls onto an object in its path – only one side of food is affected at a time – food needs to be turned – thin pieces of food should be used – rays only penetrate a little – food needs to be turned – to allow other side to cook – for even result e.g. barbecue – grill – toaster
 microwave oven uses radiant waves – produced by magnetron – wavelength 1mm – 30cm – travel at speed of light – penetrate all around food to a depth of 4cm – heat generated in food – by rapid vibration of water molecules – water attracts molecules – thick products cooked by conduction of heat through food – no browning – may need to colour food – e.g. chocolate sponge – no dry heat as traditional radiation – no crispy surface – can use for re-heating – or heating liquids – e.g. soup

Most cooking uses more than one process – e.g. baking a cake uses conduction and convection – boiling soup uses conduction and convection – barbecuing uses radiation and conduction etc.

28 points to cover all methods of heat transfer

2 points = 1 mark

[14]

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(c) Ways of conserving fuel when preparing meals

- microwave oven – no preheating – quick
 - steaming – one burner for several tiers – steam rises to cook all layers
steam condenses and falls back into pan to be reheated
 - pan to fit hotplate – no waste of fuel around base of pan – lower gas flame –
 - flat heavy pan base – to make good contact with electric plate – conducts heat better
 - pressure cooker – increased pressure raises boiling point of water
many foods can cook at the same time
little water so cooking can begin quickly
quickly tenderises foods which need long, slow cooking
 - slow cooker – minimum fuel – large capacity – meat and vegetables together in one vessel
 - fill all oven shelves – same heat for many dishes – use zones of heat – preheat for minimum time
 - use residual heat – electric cookers retain heat – well insulated – can switch off 10 minutes before end of cooking time
 - fan oven – many shelves – all at same temperature – circulates heat – can fill oven – setting lower than normal oven – do not open oven door unnecessarily – or leave open – cook more than one type of vegetable together in one pan – peas and carrots
 - use a small pan for a small amount of food – boil only enough water for needs e.g. cup of coffee – boil egg with boiled potatoes?
 - lids on pans – water heats quicker – less fuel needed – avoid overcooking – avoid reheating unnecessarily – cook when needed – cut food in to small piece e.g. potatoes for boiling – quicker
 - use tender cuts of meat – quicker cooking methods – frying and grilling etc.
- 12 points
2 points = 1 mark

[6]