

**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

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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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
IAAs 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 – forms 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 – aids 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 – to 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

2 points = 1 mark

[7]

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(c) (i) Digestion and absorption of protein

stomach – pepsin – converts protein to peptides – in acidic conditions – created by 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 – (pulses)
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 CHD – 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

2 points = 1 mark

[3]

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(c) Changes taking place when meat is cooked

colour changes from red to brown – above 65°C – myoglobin – changes to hemichrome – smell produced – as volatile aromatic substances are released – bacteria are destroyed – making meat safe to eat – texture becomes firmer – protein 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 the nutritional quality of food – replace lost vitamins – preservatives – improve keeping 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]

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(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]

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(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

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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]