

Mark Scheme (Results)

Summer 2015

Pearson Edexcel
GCE Design & Technology: Food
Technology
6FT03/01

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Publications Code UA041234

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1(a)	<p>Up to a maximum of one mark naming the micro–nutrient required to absorb iron and a maximum of one mark for giving a good source.</p> <p>Name - Vitamin C / Ascorbic acid (1)</p> <p>Source – Citrus fruits(1) berries (1) kiwi (1) black / red currants(1) green vegetables (1) peppers (1) tomatoes (1) potatoes (1)</p> <p>Accept any relevant correct good source</p> <p>(2 x 1)</p>	(2)
1(b)	<p>Up to a maximum of one mark naming the micro–nutrient required to release energy from carbohydrate foods and a maximum of one mark for giving a good source.</p> <p>Name – Thiamin / Vitamin B1 (1)</p> <p>Source – Wholegrains (1), nuts (1),(named) meat (1), fortified breakfast cereals (1), milk (1) <i>allow</i> fruit and vegetables (1) yeast extract (1) white flour (1) pulses (1) eggs (1)</p> <p>Name – Riboflavin/ Vitamin B2 (1)</p> <p>Source – Wholegrains (1), nuts (1),(named) meat (1), fortified breakfast cereals (1), milk (1) <i>allow</i> fruit and vegetables (1) yeast extract (1) white flour (1) pulses (1) eggs (1)</p> <p>Name – Niacin/ Nicotinic Acid/Vitamin B3(1)</p> <p>Source – Wholegrains (1), nuts (1),(named) meat (1), fortified breakfast cereals (1), milk (1) <i>allow</i> fruit and vegetables (1) yeast extract (1) white flour (1) pulses (1) eggs (1)</p> <p>Accept any relevant correct good source</p> <p>(2 x 1)</p>	(2)
1(c)	<p>Up to a maximum of one mark naming the micro–nutrient required to produce the thyroid hormones thyroxine and triiodothyronine and a maximum of one mark for giving a good source.</p> <p>Name – Iodine (1)</p> <p>Source – Milk (1), Seafood (1), edible seaweeds (1) Iodized salt (1) Sea salt (1)</p> <p>Accept any relevant correct good source</p> <p>(2 x 1)</p>	(2)
1(d)	<p>Up to a maximum of one mark naming the micro–nutrient needed to synthesise proteins required for normal blood clotting and bone structure and a maximum of one mark for giving a good source.</p> <p>Name – Naphthoquinone / vitamin K (1)</p> <p>Source –</p>	

	Green leafy vegetables (1) dairy foods (1), meat (1), vegetable oils (1), cereals (1) Accept any relevant correct good source (2 x 1)	(2)
Total for question		(8)

Question Number	Answer	Mark
2(a)	Any of the following to describe the changes which occur during the mixing of ingredients stage of the bread making process, up to a maximum of two marks. <ul style="list-style-type: none"> • Ingredients (named) mixed- strong flour, yeast, and salt (1) • Warm water added (1) to form a dough (1) • Glutenin and gliadin combine with water to form gluten (1) • Water hydrates gluten in the strong flour (1) • Water hydrates the starch (1) <p style="text-align: right;">(2 x 1)</p>	(2)
2(b)	Any of the following to describe the changes which occur during the kneading stage of the bread making process, up to a maximum of two marks. <ul style="list-style-type: none"> • The dough stretches, gluten develops(1) • During stretching in the dough conversion of sulphhydryl groups (SH) • to disulphide bridges (-S-S-) (1) • Yeast is evenly distributed through the dough(1) <p style="text-align: right;">(2 x 1)</p>	(2)
2(c)	Any of the following to describe the changes which occur during the proving stage of the bread making process, up to a maximum of two marks <ul style="list-style-type: none"> • Fermentation commences (1) • During fermentation amylases break down starch to maltose (1) • Maltose and other sugars fermented by yeast (1) • Carbon dioxide produced(1) and alcohol is produced as a by-product (1) • Dough increases in size/rises (1) <p style="text-align: right;">(2 x 1)</p>	(2)
2(d)	Any of the following to describe the changes which occur during the baking stage of the bread making process, up to a maximum of two marks <ul style="list-style-type: none"> • Initial rapid rise (spring) (1) • Starch gelatinises (1) • Protein coagulates (1) • Maillard reaction (1) leads to browning of crust (1) • Glaze is formed on the crust (1) because of steam injection (1) • Yeast is killed(1) <p style="text-align: right;">(2 x 1)</p>	(2)
Total for question		(8)
Question	Answer	Mark

Number		
3(a)	Any two from the following naming two natural sources of sugar (sucrose) Sugar beet (1) Sugar cane(1) (2 x 1)	(2)
3(b)	Any four of the following, up to a maximum of four marks, outlining the sugar refining process: <ul style="list-style-type: none"> • Mix (1) raw sugar with sugar syrup (1) to produce semi – solid mixture of syrup and crystals (1). • Centrifuged (1) to force syrup out leaving crystals behind/ (affination) (1) • Sugar is dissolved in water / (melting) (1) and treated with milk of lime and carbon dioxide (1) to remove impurities (1) • Followed by treatment with charcoal (1) to decolourise (1) the solution • Vacuum evaporation (1) to crystallise the sucrose (1) • When crystals are required size (1) they are separated (1) from any syrup in a centrifugal machine (1) • Damp sugar is dried (1) (4 x 1) 	(4)
3(c)	Any four of the following to explain the requirements for successful preserve making, up to a maximum of four marks: <ul style="list-style-type: none"> • Preserves are gels (1) made from sugar solutions and pulped/whole fruit (1) • Gel formation only occurs when the concentration of sugar (1) pectin (1) and acidity/pH (1) lie within certain limits (1) –<i>sugar, pectin and acid must all be mentioned to achieve marks</i> • Some fruits, which are rich in pectin and acid (1), can easily be made into jam (1) e.g currants, damsons, bitter oranges (1 mark maximum for correct example). • Other fruits e.g strawberries, cherries (1 mark max for correct given example) which contain little pectin (1) should have added pectin or more acid added to ensure successful set (1) • Under ripe fruit is best for gel formation (1) as pectin can only form a satisfactory gel when the pH is at 3.5 or less (1). • Jam must contain 67% sugar (1) as this level inhibits the growth (1) of yeasts and /moulds (1) (4 x 1) 	(4)
Total for question		(10)

Question Number	Answer	Mark
4(a)	<p>Any four of the following describing the impact that business confidence can have on food product development, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Business confidence is most fundamental of market factors within which products are bought and sold(1) • It governs the financial climate within which business activity takes place(1) • Producers are more likely to take risks when the economy is strong(1) • Producers invest money and/ resources risks when the economy is strong (1) <p>Factors such as:</p> <ul style="list-style-type: none"> • Stability in the stock market (1) • Strength in the stock market (1) • Favourable interest rates (1) • Favourable foreign exchange rates (1) • Strong national economy (1) <p>all positively affect the potential for new products/mean more products are developed(1)</p> <p>(4 x 1)</p>	(4)
4(b)	<p>Any eight of the following outlining the response of Food manufacturers to the growing number of elderly people in the UK population, up to a maximum of eight marks.</p> <p>Food manufacturers have responded by providing ranges of foods such as:</p> <ul style="list-style-type: none"> • Frozen ready meals / chilled ready meals (1) which can be small size (1) single portion (1) with accompanying vegetables (1) • Frozen meals which can be stored easily (1) and are relatively non-perishable (1) • Luxury pre-made meals etc (1) for consumers with high disposable income (1)/ • Economy branded meals/products (1) for consumers with low disposable income ie. state pension(1) • Food which requires no shopping for ingredients (1) or little or no preparation (1) on the part of the consumer. All that is required is that they are heated and served (1) eg microwave meals. • Foods which meet different dietary requirements (1), such as diabetic, gluten free, low fat, low salt (1 mark max for given dietary need) • Foods which are recognized as 'traditional'(1) such as British pies, casseroles and puddings/ cakes (1 mark max for given correct example) reminding consumers of 	

	<p>younger lives(1)</p> <ul style="list-style-type: none"> • Food from other cultures widely available (1) which reminds them of previous travel experiences (1) • Strong flavours for lower sensory perception (taste buds/sense of smell) (1) • Some meals are provided as 'tender' or pureed (1) for ease of consumption (1) • Health promoting foods / functional foods / food with an added health benefit/ (1) to help older people ' extend' their healthy years (1) • Home delivery (1) • Labelled food ie. days of the week (1) for consumers with memory issues (1) 	(8)
(8 x 1)		
Total for question		12marks

Question Number	Answer	Mark
5(a)	<p>Any four of the following describing the chemical changes which occur as meat deteriorates, up to a maximum of four marks:</p> <ul style="list-style-type: none"> • The process is caused by the action of anaerobic bacteria (1) that were present in the animal when it was alive (1) • Change in colour (red to brown) (1) due to the oxymyoglobin (1) changing to myoglobin (1) due to lack of oxygen (1) • Putrefaction (1) is the decomposition of organic matter/proteins (1) that results in the breakdown of cohesion (1) between tissues (1) and the liquefaction of most organs (1). • As the proteins are broken down (1) gases and/ or amines are released (1) which carry a putrid/foul smelling odour (1) <p style="text-align: right;">(4 x 1)</p>	(4)
5(b)	<p>Any four of the following describing the chemical changes which occur as milk sours, up to a maximum of four marks:</p> <ul style="list-style-type: none"> • Lactic acid bacteria (1) break down lactose (1) to lactic acid (1) • Lowering of pH/ increase in acidity (1) results in casein precipitation/ coagulation of protein (1) resulting in separation (1) of curds and whey causing the texture to change/curdling (1) • Also results in change in sensory qualities (1 mark max for any description of sensory change) 	(4)

	(4 x 1)	
5(c)	<p>Any four of the following describing the chemical changes which occur as fruits spoil, up to a maximum of four marks:</p> <ul style="list-style-type: none"> • autolysis (1) due to cellular breakdown (1)/ enzymic activity causes cellular breakdown(1)/ rots (1)/ browning (1) • microbes (1) breakdown organic compounds (1)/ produce signs of mould (1) • Chill injury for appropriate named fruits (1) Below certain temperatures (1) the fruit's metabolism is disrupted (1) Some enzymes stop working (1) Toxic chemicals accumulate (1) Cells die (1) Discolouration/change in colour/ browning(1) Flavour and texture change (1) • Transpiration (1) results in loss of turgor(1) <p style="text-align: right;">(4 x 1)</p>	(4)
	Total for question 5	12

Question Number	Answer	Mark
6(a)(i)	Ovo vegetarian diets consist of foods of plant origin and eggs (1) Do not accept "no meat or fish" without further detail.	(1)
6a(ii)	Lacto-Ovo diets consist of foods of plant origin, eggs and dairy products (1) Do not accept "no meat or fish" without further detail.	(1)
6(b)	<p>Maximum of 4 marks per nutrient.</p> <p>Protein –</p> <ul style="list-style-type: none"> • HBV protein provided by soya /tofu/t.v.p/quinoa. (1) • Complementation of LBV proteins to provide HBV protein(1) • eg any combination of pulses, cereals, nuts and seeds (1) • Protein sources are low in saturated fat (compared to ovo-lacto) (1) • Most protein sources are high in dietary fibre (1) • Suitable sources of protein are inexpensive(1) and often sustainable (1) • To ensure adequate provision of HBV protein, this diet needs to be planned well to ensure a variety of plant proteins are eaten each day. (1) • Consequences: A lack of HBV protein can affect growth in children (1). The diet can be bulky/heavy so child will be full before enough nutrients are taken in (1). High fibre intake affects the absorption of other nutrients (1). <p>Vitamin D-</p> <ul style="list-style-type: none"> • Vegans may have low intakes of vitamin D (1) • Can be sourced from fortified margarine (1) vegetable oil (1) fortified alternative milk sources(1) • The action of sunlight on the skin(1) is an important source for vegans(1) • Supplements could be advised (1) • Consequences: A lack of Vitamin D can affect absorption of calcium (1)- long term implications include brittle bones/rickets/ osteoporosis/osteomalacia (1) 	(8)
Total for question		(10)

Question Number	Answer	Mark
7	<p>A maximum of 10 marks discussing encapsulation technology, giving examples to show how it has contributed to NPD.</p> <ul style="list-style-type: none"> • Encapsulation technology incorporates active ingredients (1) which are protected by a capsule (1); encapsulation is a barrier technology (1), preventing ingredients from reacting prematurely (1) with their environment or degrading (1) during processing or storage (1). When conditions are favourable they release the active ingredient(1). • Encapsulated flavours (1) are used for enhanced sensory appeal (1) eg. jelly beans (1). • Some breads use encapsulated leavening agents (1) to prevent premature release and reaction (1). • Specially formulated 'sports' bars/other correct example (1) are fortified with encapsulated nutrients (1). • Addition of vitamins and minerals to foods through fortification enhances their nutritional value (1) and helps consumers to achieve a healthy diet (1). Scientific research is uncovering other micronutrients which offer health benefits (1). However, fortification of foods and drinks with these nutrients may be difficult (1). Encapsulation of nutrients enables the delivery of unstable nutrients (1) in a range of foods and drink where they can be protected from damage during preparation/processing (1) or deterioration whilst on the shelf (1). • Encapsulation of these nutrients allows them to be delivered to the intestine (1), and not broken down in the stomach(1) to increase the uptake of the nutrient.(1) • Encapsulation has been used to add water-insoluble nutrients to beverages (1) without causing cloudiness (1), and to mask the taste (1) of the nutrients so that they do not spoil the flavour of the drink (1). <p>Discussion point</p> <ul style="list-style-type: none"> • With the increasing desire for clean labels/ more natural foods(1) some consumers may avoid foods with encapsulated ingredients(1) • Consumers need to have information to enable an informed choice to be made(1) 	(10)
	Total for question	(10)