

Mark Scheme (Pre-Results) Summer 2016

Pearson Edexcel GCE
in D&T Food Technology (6FT03/01) Paper 1

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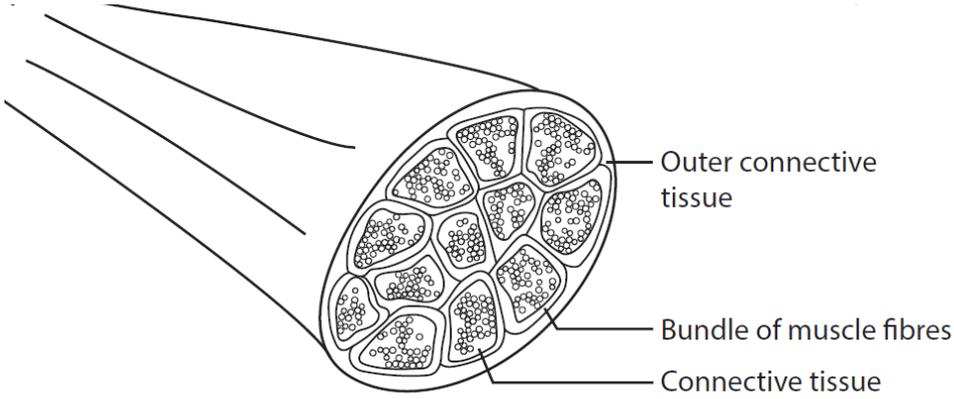
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General Marking Guidance

- 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><i>Any four of the following advantages of genetically modifying crops, up to a maximum of four marks:</i></p> <ul style="list-style-type: none"> • greater yields (1) • boost to economy (1) • reduce use of chemicals (1) • environmentally friendly (1) • ability to grow in adverse conditions e.g. drought (1) • ability to grow out of season (1) • improved sensory characteristics (1) • improved nutritional status / specific named example (1) • reduced wastage (1) • possible ability to feed growing world populations/(1) • possible ability to prevent starvation/ solve world hunger (1) • ability to resist pests, weeds and disease (1) • ability to stay ripe for longer / longer shelf life (1) • Traditional selective breeding can take many years (1) • GM can achieve changes in a couple of generations (1) <p style="text-align: right;">(4x1)</p>	(4)
1(b)	<p><i>Any two of the following explaining disadvantages of genetically modifying crops</i></p> <p>disadvantages:</p> <ul style="list-style-type: none"> • Emotive/ controversial/ perception issue/ interfering with nature (1) therefore consumers won't buy/avoid GM crops(1) • long term effects on health (1) or the environment (1) not known(1) • possible cross-pollination to different species of plants, (1) e.g. weeds resulting in 'super weeds'(1) • possible contamination (1) of organic crops / non GM crops (1) • encouraging the emergence of new pathogens e.g. bacteria (1) with possible production of toxins (1) • Expensive - poor countries cannot / struggle to afford it (1) • Control of crops may be limited to large companies who can afford the process / this might affect fair trade (1) <p style="text-align: center;">(2x2)</p>	(4)
Total for question 1		8

Question Number	Answer	Mark
2(a)	 <p data-bbox="284 770 1267 842"><i>Four marks for any description that makes reference to four of the following:</i></p> <ul data-bbox="331 848 1374 1227" style="list-style-type: none"> • composed of microscopic fibres / myofibrils (1) of varying length (1) • myofibrils made up of actin (1) and myosin (1) • fibres held together by connective tissue to form bundles (1) • Each individual muscle fibre surrounded by sheath, (sarcolemma)(1) the whole muscle is surrounded by connective tissue (1) • connective tissue consists of elastin (1) and collagen (1) • fatty deposits (marbling) (1) and blood vessels are found between bundles of fibres (1) • length of fibre indicative of tenderness of meat (1) longer fibres = tough / shorter fibres = tender (1) <p data-bbox="1262 1267 1337 1301">(4x1)</p>	(4)

2(b)	<p><i>Four marks for evaluating the nutritional contribution of red meat from the following:</i></p> <p>Advantages:</p> <ul style="list-style-type: none"> • HBV protein (1) • Haem iron (1) • good source of zinc (1) • B group vitamins (1) except folate (1) • vitamin A (1) • zinc (1) <p>Disadvantages:</p> <ul style="list-style-type: none"> • fat mainly saturated(1) but depends on cut of meat (1) • no carbohydrate (1) dietary fibre (1) • little vitamin D (1) • No vitamin C (1) • poor source of calcium (1) <p>Both advantages and disadvantages must be considered for full marks. Simple lists are unable to access full marks.</p> <p style="text-align: right;">(4X1)</p>	(4)
	Total for question 2	8

Question Number	Answer	Mark
3(a)	<p><i>Any two from the following outlining the changes which occur during the pasteurisation of milk in the cheese making process, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> • Milk heated to 72° C for 15 seconds(1) • Pathogenic bacteria destroyed (1) • Leaving milk safe to accept bacterial starter culture and for it to grow(1) without danger of pathogenic bacteria growing (1) <p style="text-align: right;">(2x1)</p>	(2)
3(b)	<p><i>Any two from the following outlining the changes which occur during the addition of the starter culture in the cheese making process, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> • (Accept bacterial names <i>Lactococcus cremoris</i> and <i>lactis</i>)(1) to convert lactose (1) to lactic acid (1) • pH falls to achieve the correct acidity for the rennet to be added (1) <p style="text-align: right;">(2x1)</p>	(2)
3 (c)	<p><i>Any two from the following outlining the changes which occur during the addition of rennet in the cheese making process, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> • The coagulated protein(1) forms curds (1) • Resulting in separation of liquids / whey from solids (1). <p style="text-align: right;">(2x1)</p>	(2)
3 (d)	<p><i>Any two from the following outlining the changes which occur during the maturing of the cheese, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> • Enzymes break down large molecules(1) • Proteins hydrolysed by proteolytic enzymes/ Proteins to release amino acids (1) • Lipids broken down by lipases/Fats to release fatty acids (1) • Flavour compounds formed (1) • If most of the protein is hydrolysed the cheese will become soft and creamy (1) <p style="text-align: right;">(2x1)</p>	(2)
Total for question 3		8

Question Number	Answer	Mark
4(a)	<p><i>One mark for correctly identifying the DRV for energy in the UK.</i></p> <p>Estimated Average Requirement for Energy / (EAR) (1)</p>	(1)
4(b)	<p><i>Three marks for correctly defining BMR</i></p> <p>(BMR) is the rate at which a person uses energy (1) to maintain the basic functions of the body / breathing, keeping warm, keeping the heart beating (1) when at complete rest (1)</p> <p style="text-align: right;">(3x1)</p>	(3)
4(c)(i)	<p><i>Maximum of two marks for evaluating the provision of energy in the diet from protein.</i></p> <ul style="list-style-type: none"> • Protein provides 4kcal (17kJ)/g (1) • However the primary function of protein is for growth and repair of body tissues (1) • It is a relatively expensive source of energy (1) • Complementary value (HBV and LBV protein combinations linked to carbohydrate content) (1) • High satiety value (1) <p style="text-align: right;">(2 x 1)</p>	(2)
4(c)(ii)	<p><i>Maximum of two marks for evaluating the provision of energy in the diet from fat.</i></p> <ul style="list-style-type: none"> • Fat is the most energy dense nutrient (1) • provides 9kcal (37kJ)/g (1) • However too high levels of fat in the diet could lead to obesity and CHD / other obesity-related diseases (1) • Government recommendations are to reduce the amount of fat in the diet, especially saturated fat (1) • Guidance regarding increasing PUFA and mono- unsaturated fatty acids within recommended fat intake (1) • Government recommendations are no more than 33% of energy intake from fats (1) <p style="text-align: right;">(2 x 1)</p>	(2)

4(c)(iii)	<p><i>Maximum of two marks for evaluating the provision of energy in the diet from carbohydrate.</i></p> <ul style="list-style-type: none"> • Providing 3.75kcal (16kJ)/g. [A value of 4 kcal is used for food labelling purposes and is allowed as a measurement] (1) • Carbohydrate (starch and sugars) is the least energy dense nutrient (1) • Government guidelines for a healthy diet are to base our meals on starchy foods (1) • Government recommendations are 50% of energy intake from carbohydrates (1) • Sugar provides energy but no other nutritional value / empty calories (1) • Reference to speed of energy release (1) • Implication of sugar intake linked to tooth decay (1) • Implication of sugar intake linked to health conditions e.g. diabetes type ii/ other recently highlighted nutritional disorders (example needed) (1) <p style="text-align: right;">(2 x 1)</p>	(2)
Total for question 4		10

Question Number	Answer	Mark
5(a)(i)	<p><i>Any from the following outlining coeliac disease, up to a maximum of two marks.</i></p> <ul style="list-style-type: none"> • Coeliac disease is a lifelong autoimmune disease (1) • Caused by intolerance to gluten (1) • Gluten damages the small intestine (1) • Prevents the body from absorbing all the nutrients it needs from food (1) • Symptoms include diarrhoea, stomach pain and indigestion, weight loss, stunts growth of children (1) <p style="text-align: right;">(2x1)</p>	(2)
5(a)(ii)	<p><i>Any from the following outlining lactose intolerance, up to a maximum of two marks.</i></p> <ul style="list-style-type: none"> • People with lactose intolerance don't produce enough lactase (1) • Therefore cannot break down the disaccharide (1) lactose into glucose and galactose / monosaccharides (1) • Lactose stays in the digestive system where it is fermented by bacteria(1) • Leads to the production of various gases (1) • Symptoms include diarrhoea, fatigue, stomach pain, weight loss (1) 	(2)

5(b)	<p><i>Any from the following guidelines to suggest advice for people wishing to improve their diet to prevent coronary heart disease, up to a maximum of eight marks</i></p> <ul style="list-style-type: none"> • It is important to maintain a healthy body weight / BMI (1). People who are overweight or obese tend to have increased levels of blood cholesterol and high blood pressure which can contribute to CHD (1) • Aim to eat at least two portions of fish each week, at least one of which should be oily fish (1). Oily fish contains omega 3 fatty acids that help protect the heart.(1) • Eat less saturated fat (1) to keep blood cholesterol down (1) • LDL cholesterol is beneficial to reducing CHD over time (1) • HDL cholesterol increases likelihood of CHD (1) • Use oils and fats that are high in unsaturated fat (monounsaturates and polyunsaturates) (1) thought to reduce blood cholesterol (1) • Eat wholegrain and high-fibre products (1) recommendation 18-24g of fibre a day (1) • Foods such as oats and pulses (peas, beans, lentils) contain soluble fibre which may help to reduce blood cholesterol levels (1) • Salt is the main source of sodium in the diet, a high intake of which is related to high blood pressure (1) • Adults should be aiming for no more than 6g of salt each day (1) • Eat at least 5 portions of fruit and vegetables every day (1), as these are low in fat (1) high in fibre (1) • Eat regularly foods with added plant stanols and sterols which can help lower raised blood cholesterol level (1) • Follow recommended guidance on alcohol limits (1) • Reference to changing cooking methods in line with healthy eating (1) 	(8)
Total for question		12

Question Number	Answer	Mark
6(a)	<p><i>Three of the following, explaining the effect of controlled atmosphere during storage on the ripening of fruit, up to a maximum of three marks:</i></p> <ul style="list-style-type: none"> • By reducing the oxygen (1) or increasing CO₂ levels (1), respiration can slow down and ripening be delayed (1) increasing shelf life (1) • However if gas levels are incorrect (1), e.g. too high CO₂ level (1) or too low oxygen level (1) , anaerobic respiration (1) can occur leading to the accumulation of damaging toxic compounds in the fruit (1) (3x1) 	(3)
6(b)	<p><i>Three of the following, explaining the effect of the presence of ethylene during storage on the ripening of fruit, up to a maximum of three marks:</i></p> <ul style="list-style-type: none"> • Ethylene is produced in the fruit at the beginning of the climacteric peak (1) • Ethylene acts as a plant hormone (1) and stimulates the ripening process (1) • Ethylene can be applied externally to cause ripening (1) (3x1) 	(3)
6(c)	<p><i>Three of the following, explaining the effect of atmospheric pressure during storage on the ripening of fruit, up to a maximum of three marks:</i></p> <ul style="list-style-type: none"> • Atmospheric pressure is reduced (1) which lowers the oxygen level (1) and causes ethylene to diffuse out of the fruit (1) thus delaying ripening (1) (3x1) 	(3)
6 (d)	<p><i>Three of the following, explaining the effect of temperature during storage on the ripening of fruit, up to a maximum of three marks:</i></p> <ul style="list-style-type: none"> • Respiration slows down (1) as the temperature of the environment decreases (1) and thus ripening and / senescence are delayed (1) • However chill injury (1) below certain temperatures can occur damaging some fruits, especially tropical fruits (1) 13°C - 16°C (1) (3 x 1) 	(3)
Total for question 6		12

Question Number	Answer	Mark
7a)	<p><i>Three from the following to explain what is meant by Biodegradable packaging -</i></p> <ul style="list-style-type: none"> • Composed of materials that break down naturally (1) after disposal into common elements such as carbon, oxygen and hydrogen (1) with the aid of micro-organisms (1), when placed in a composting area(1). • Example to explain(1) (3 x 1) 	(3)
7b)	<p><i>Nine from the following discussing the relationship between food miles and sustainability. Up to a maximum of nine marks.</i></p> <p>Discussion could include the following points</p> <p>Sustainability is concerned with preserving the earth's resources for future generations (1)</p> <p>The original food miles concept concerns the distance that farm produce had travelled before consumption (1)</p> <p>(Maximum of two marks for two correct definitions)</p> <ul style="list-style-type: none"> • Buying local produce/ reducing food miles reduces carbon dioxide emissions from freight / other forms of transport (1) is thought to cause less damage to the ozone layer/ reducing global warming. (1) • Buying local produce strengthens local economies (1) by protecting small farms,/ local jobs/ local businesses/local shops(1) It can help to connect consumers with where food comes from (1) • Buying local produce increases national food security(1)but could be a ruse to justify protectionism(1) • Encourages greater demand for seasonal foods (1) reducing reliance on imports (1) • Food miles alone, or the distance food has travelled, is not a good way to judge whether the food we eat is sustainable (1) • Buying local food damages third world economies which rely on food exports(1) • Food miles are only a small part of food emissions(1) Measuring the carbon dioxide emissions of food freight / transport ignores the total environmental impact of food production and consumption(1) • Co2 emissions can be produced at every stage of the food life cycle- from seeding to harvest,(1) processing to storage(1) and from shopping to food preparation. (1) Food grown in 	

	<p>areas where there is a high use of oil-based fertilisers and tractors using diesel is not carbon friendly(1)</p> <ul style="list-style-type: none"> • Foods grown abroad, e.g. Kenyan beans, can be grown using manual labour which is carbon friendly (1), manure as fertiliser, again carbon friendly (1) and with low tech irrigation systems which are environmentally friendly (1). These systems provides employment for many people in the developing countries which is highly sustainable (1) • Methane, from cows and sheep is far more damaging a greenhouse gas than carbon dioxide (1). • Local foods can cost more and can make fresh foods/ fruit and vegetables prohibitive for some (1) • Buying local food limits Fair Trade/ other ethical programmes / social growth of third world countries (1) resulting in increased poverty (1) • The amount of energy used to chill- store vegetables from the UK for many months overtakes the carbon cost of shipping them from abroad (1) • Summer vegetables grown in the UK during the winter in greenhouses or poly-tunnels which require heating use more energy than shipping the same product from a hot country (1) • It could be argued that Lifecycle Analysis(1), which brings together a wide range of different environmental criteria(1), is the most efficient way of assessing the environmental impact of food from production to consumption (1) <p>(9x1)</p>	(9)
Total for question		12