



Mark Scheme (Results)

Summer 2018

Pearson Edexcel GCE A-Level
In Design and Technology: Food
Technology
6FT03/01

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Publications Code 1806_6FT03_01

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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)	<i>Any three of the following properties stating the properties egg proteins have making them useful in food preparation.</i> • Coagulation/bind/set/coat/thicken (1) • Foaming/aeration (1) • Emulsifying (1) • Browning / Maillard reaction/ glaze (1) • Add nutritional value (1) • Allow anti-bacterial(1) if mentioning enzyme lysozyme 3 x 1	(3)
1(b)	<i>Any one of the following explanations to a maximum of 3 marks.</i> • The air space increases in size (1). This is due to the loss of water (1) through the porous shell (1) and its replacement by air (1) which indicates a loss of freshness /staleness (1) • Water passes from the white to the yolk (1) due to osmotic pressure exerted by the yolk (1). The yolk becomes enlarged (1) and membranes surrounding it weaken (1). • Thick white(1) gradually (1)converts to thin white (1) because of pH changes (1) due to loss of CO₂(1) resulting in thick albumen protein structure changing (1) • The pH of both the white and yolk increases (1) due to a loss of CO₂(1) through the shell (1) • Bacteria can enter the egg (1) through porous shell (1)producing protein breakdown (1) giving rise to typical 'bad egg' smell(1) due to presence of hydrogen sulphide (1)	(3)
1(c)	<i>Frozen whole egg is produced for use in food manufacturing. Describe the process.</i> • Eggs are washed (1). Any bacteria on the surface are destroyed by chlorine (1) • Eggs are broken mechanically (1) • Homogenised (1) • Pasteurised (1) Temperature lower than normal pasteurisation temp(63 for 60 secs) (1) as egg proteins coagulate between 58C – 66C (1) • Any shell pieces filtered out(1) • Liquid egg filled into cans/ pouches / containers (1) • Frozen in blast freezer (1)	(4)
Total for question 1		(10)

Question Number	Answer	Mark
2(a)	<i>Identify the marketing plans for each of the following stages in the product life-cycle.</i> • Introduction – New product launch (1), advertising / specific examples of advertising (1) reference to cost (1) (2 x 1)	(2)
2(b)	<i>Identify the marketing plans for each of the following stages in the product life-cycle.</i> • Growth – develop production (1) and distribution capacity (1) increase retail outlets (1) to make sure the product is widely available (1) (2 x 1)	(2)
2(c)	<i>Identify the marketing plans for each of the following stages in the product life-cycle.</i> • Maturity – Marketing to sustain brand image (1) promotions to fight off competition (1) Special offers/BOGOF/any relevant promotions (1) extend the range (1) (2 x 1)	(2)
2(d)	<i>Identify the marketing plans for each of the following stages in the product life-cycle.</i> • Decline – rebrand (1) repackaging (1) relaunch (1) redevelop/improve (1) withdraw from market and replace with new product (1) extend the range (1) e.g (1) (2 x 1)	(2)
Total for question		(8)

Question Number	Answer	Mark
3(a)	<i>Any four from the following to correctly define obesity</i> • Obesity is a chronic disease (1) characterised by excessively high body fat (1) in relation to lean body tissue (1) which can lead to adverse effects on health. (1) • Obesity is classified as having a Body Mass Index (BMI) >30 (1) • Being overweight is classified as having a BMI >25 (1), with more body fat than is optimally healthy (1) • Morbid Obesity is defined as having BMI >35 (1). • Severe obesity defined as having BMI >40 (1) • Allow one mark for reference to BMI with no specific figures if the context is correct (1) • (4 x 1)	(4)

3(b)	<i>An explanation to include two of the following, up to a maximum of four marks</i> • Obesity reduces life quality (1) Allow one example from list below (1) • Obesity reduces life expectancy (1) Allow one different example from list below (1) • Obesity also has wider implications and costs for society (1) Allow one different example from the list below (1) • Reference to childhood obesity with explanation (1) • Type 2 diabetes(1) • Cardiovascular disease(1) • Some cancers (1) • Gall stones (1) • Arthritis (1) • Depression and mental health issues (1) (4 x 1)	(4)
	Total for question	(8)

Question Number	Answer	Mark
4(a)	<i>Discuss how the composition of hard wheat and soft wheat determines their use in food production.</i> • Hard wheats/ Spring Wheats have a high gluten content (1) more than 10% protein (1) and tend to produce strong flour (1) which produces a dough that is strong and elastic (1) has good gas retaining qualities (1) so is suited to bread making/yeast mixtures (1) • Soft wheats / Winter wheats have a lower gluten content/ less than 10% protein (1) and produce a weak flour (1) better used where a finer, shorter texture (1) is required as in cakes / pastries / biscuits / scones / soda bread (1) where a developed gluten network is undesirable (1) • Durum (1) wheat which has a high protein content (1) and tough endosperm (1) which is milled into semolina and mixed with water (1) to make a stiff dough from which many shapes can be made (1) The high protein content ensures the shape is retained during cooking (1) it also allows the firm texture desired for 'al dente' cooked pasta (1) Unique to durum is the yellow endosperm giving pasta it's characteristic golden hue/ colour (1) For full marks, a minimum of one mark per wheat variety. (8 x 1)	(8)
	Total for question	8 marks

Question Number	Answer	Mark
5(a)	<i>Any of the following explanations of the changes that take place during ripening in climacteric fruit, up to a maximum of four marks:</i> • Enzymes become active (1) • Ethylene production (1) activates enzymes responsible for ripening processes (1) • Becomes sweeter due to breakdown of starch and production of sugars (1) and decrease in acids (1) (sugars — glucose/fructose/sucrose and/or acids — malic/citric/tartaric (1) (one mark maximum for name) • Softening of texture due to polysaccharides in cell wall breaking down (1)/ progressive break down of pectin/ lignin/ cellulose (1) • Change in colour — chlorophyll (1) pigment breaks down revealing other pigments e.g. carotenoids (1) • Some pigments are synthesised during ripening (1) e.g. anthocyanins (1) • Amino acid methionine broken down (1) • Reference to increased respiration(1) and impact on ripening in climacteric fruit (4 x 1)	(4)
5(b)	<i>Any four of the following describing the process of commercial juice extraction from fruit and vegetables, up to a maximum of four marks:</i> • The product is macerated (1) to form a pulp (1) which is pressed (1) to release the juice. • Centrifuges are sometimes used to increase yield (1) • Pectolytic enzymes / amylases (1) are added to clear the juice (1) • Suspended particles are removed by filtration (1) • Juice can be pasteurised (1) before bottling or placing in a carton (1). • In high viscosity juices - fruit is macerated and heated to 85C to inactivate the pectolytic enzymes (1) which yields the higher viscosity(1)	(4)
5(c)	<i>Four of the following to identify the differences between the production of red wine and the production of white wine, up to a maximum of four marks:</i> <i>Answer to include max 2 points from each</i> Red: • Red wine uses red or black grapes (1) • grapes are crushed - skins are retained (1) • fermented with their skins to obtain the red colour/ anthocyanin (1) White • white wine is made from any grapes (1) • grapes are crushed and skins removed (1) • fermentation of extracted juice only (1)	(4)
Total for question 5		12

Question	Answer	Mark
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Number		
6(a)	<i>A maximum of four marks for outlining the functions of fat in the diet</i> • Energy (1) Providing 9 kcalories/ 37 kj per 1 g fat (1) • Insulation of the body (1) • Provision of fat soluble vitamins (1) • Provision of EFAs (1) • Protection of vital organs (1) (4 x 1)	(4)
6(b)	<i>Eight points to discuss the relationship between essential amino acids and protein quality.</i> • Different foods contain different amounts of protein (1) and different combinations of amino acids (1) of the 20 or so amino acids in foods, eight are known as essential (1) as the body cannot synthesize them (1) • In children there are other amino acids which are considered to be essential / indispensable (1) e.g. arginine, glutamine histidine (1), because children are unable to make enough to meet their needs. (1) These are referred to as 'conditionally' essential. (1) • There may also be certain disease states during adult life when a particular amino acid becomes conditionally essential. (1) • When a protein contains the essential amino acids in a proportion similar to that required by the body (1), and contains all the essential amino acids, it has a high biological value (HBV). (1) Biological value is a measure of protein quality (1) • When one or more of the essential amino acids are missing or present in low numbers, the protein has a low biological value (LBV) (1). • The amino acid missing in a foodstuff is known as the 'limiting amino acid' (1) • Proteins from animal sources tend to have a higher biological value than proteins from plant sources (1). This is because the pattern of amino acids in animal cells is comparable to the pattern in human cells (1). Plant protein foods typically have one amino acid missing (1) • A combination of plant proteins tends to have a complementary (1) effect boosting their overall biological value (1) The amino acids of one protein may compensate for the limitations of the other resulting in a combination of higher biological value (1). • In some countries where protein intakes are low, the complementary action of proteins plays an important role in helping individuals meet their nutritional requirements (1). For example, the tradition of combining lentils with rice/ any correct combination of LBV foods (1). • Protein requirements in vegan diets can be met through the complementary actions of protein (1) or through the use of soya which is a plant HBV protein food (1). • Reference to correct use of amino acids in the body (1)	(8)
Total for question		(12)

Question Number	Answer	Mark
7	<i>Any of the following explaining how biotechnology has influenced the development of food products, up to a maximum of 12 marks.</i> • <i>Traditional biotechnology</i> has played a key role in the production of food for thousands of years (1). The process of fermentation (1) has used micro-organisms/ (yeasts (1) and bacteria (1) to make breads (1) beer / wine (1), yogurt / cheese (1) pickles (1) any correct example (1). To a maximum of 3 products - 3 marks • e.g to describe any developments from these products (1) Biotechnology can lead to the production of new ingredients which can be used in new products, not previously possible (1) • e.g. xanthan gum (1) produced by the bacterium <i>Xanthamonas campestris</i> (1) used for a range of functions eg stabiliser (1) thixotropic properties(1) can produce rapid flavour release (1); used in sauces, toppings, dressings and sweets (1) • fermentation technologies (1) producing new products eg Mycoprotein “Quorn” (1) which can be used as ingredients or modified to make new products (1) in vegetarian meals (1) as an alternative protein source/ (1) low fat meals (1) • probiotic yoghurts (1) using special bacteria (1) to colonise the gut in a beneficial manner (1) allows development of a number of ‘health food products(1). • genetic modification (1)): using ingredients that have been genetically engineered / changing of DNA (1) to improve flavour (1), to improve nutritional status (1) e.g. contain a vitamin (1), ingredients changed to perform particular function (1) • chymosin an enzyme that behaves like rennin (1) in cheese making (1) but has been produced from a genetically modified source (1) but is not a GM food (1) allows for cheeses for vegetarians (1)	12
	Total for question	(12)

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