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Mark Scheme (Results)
Summer 2010

GCE

GCE Design and Technology (A2)
6FT03
Paper 01 Food Products, Nutrition and Product.

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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.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that means is clear

  ii) select and use a form and style of writing appropriate to purpose and to comp0lex subject matter

  iii) organise information clearly and coherently, using specialist vocabulary when appropriate

Question Number	Answer	Mark
Q01(a)	Only answers: • Actin**(1)** • Myosin **(1)** **(2X1)**	**(2)**
Q01(b)	When a muscle contracts, the myosin filaments are drawn towards the 'Z' line **(1)** with the actin filaments sliding over them **(1)**. This is repeated throughout the length of the myofibril and the whole muscle **(1)**. Also accept: • Role of ATP to supply energy **(1)** • Release of calcium ions **(1)** **(3X1)**	**(3)**
Q01©	**Three** of the following: When muscle is converted to meat, the muscle contracts in rigor mortis **(1).** Glycogen is converted to lactic acid**(1)** and the Ph falls **(1).** Enzymes break down large molecules **(1)** leading to softening **(1)** **(3X1)**	**(3)**
	Total for question	**8**

Question Number	Answer	Mark
Q02(a)	Only answers: • Pepsin • Rennin **(2X1)**	**(2)**
Q02(b)	Bile emulsifies **(1)** fat as part of digestion, facilitates absorption of fat-soluble vitamins **(1)** Makes it easier for fat to be broken down **(1)** **(2X1)**	**(2)**
0Q02©	**Two** of the following: (a) amylase **(1)** breaks down starch **(1)** (b) sucrase **(1)**(invertase alternative name) breaks down sucrose**(1)** © lactase **(1)** breaks down lactose **(1)** (d) trypsin **(1)** or chymotrypsin **(1)**break down protein **(1)** (e) peptidases **(1)** break down polypeptides **(1)** (f) lipases **(1)** break down fat **(1)** **(2X1)** **(2X1)**	**(4)**
	Total for question	**8**

Question Number	Answer	Mark
Q03(a)	**Four** of the following: • fruit softens **(1)** • chlorophyll lost **(1)** • other colours exposed or synthesised **(1)** • starch broken down **(1)** • pectin broken down **(1)** • cell wall polysaccharides degraded **(1)** • acid levels reduced **(1)** • sweetness increases **/** sugars increase **(1)** **(4x1)**	**(4)**
Q03(b)	Discussion to include **six** the following: • Temperature **(1)** • affects rate of respiration**(1)** • chilling extends storage **(1)** • Tropical fruits may be damaged by low temperatures **(1)** • Storage atmosphere **(1)** • low oxygen levels **(1)** • or high carbon dioxide levels **(1)** extend storage **(1)** • Climacteric fruits **(1)** • ripen quicker therefore more difficult to store **(1)** • Non-climacteric fruits easier to store **(1)** for longer • Ethylene (ethene alternative name) triggers ripening **(1)**thus reducing storage time. **(6x1)**	**(6)**
	Total for question	**10**

Question Number	Answer	Mark
Q04(a)	Biotechnology can lead to the production of new ingredients **(1)** which can be used in new products, not previously possible **(1)** eg xanthan gum **(1)**which shows thinning on shaking **(1)**. Other topics, (a) fermentation technologies **(1)** producing new products eg Mycoprotein "Quorn" **(1)**which can be used as ingredients or modified to make new products **(1)** eg by texture modification **(1)**. (b) production of probiotic yoghurts **(1)** using special bacteria **(1)** to colonise the gut **(1)** in a beneficial manner **(1)**. (c) use of genetic modification **(1)** to improve flavour **(1)**, nutrition **(1)**, and ripening of tomatoes or melons **(1)**, produce left over **(1)**	**(4)**
Q04(b)	**Six** points from the following but must include three from for and three from against. For genetic modification: • improved growing characteristics **(1)** ability to grow in inhospitable environments, out of season **(1)** • increased yield **(1)** • reduced use of pesticides **(1)** • reduced wastage **(1)** Against: • risk of cross pollination **(1)** • transfer of characteristics to weeds **(1)** • contamination of organic crops **(1)** • possible allergic reactions **(1)** • transfer to bacteria creating new pathogens **(1)** • long term effects unknown **(1)** **(3x1)** **(3x1)**	**(6)**
	Total for question	**10**

Question Number	Answer	Mark
Q05(a) i	RNI- the amount of nutrient **(1)** that is enough to ensure the needs of nearly all the group are being met **(1)** **(2x1)**	**(2)**
Q05(a) ii	GDAs- guidelines for healthy adults and children **(1)** about the approximate amounts of calories or nutrients required for a healthy diet **(1)** **(2x1)**	**(2)**
Q05(b)	**Three** of the following vitamins: • vitamin A- retinol **(1)**- maintains healthy eyesight or skin **(1)** • vitamin B1- thiamin **(1)**- component of enzyme system or helps in providing energy **(1)** • vitamin B2- riboflavin **(1)**- helps release energy from food **(1)** • vitamin C- ascorbic acid **(1)**- necessary for protein formation that give structure muscles and blood vessels **(1)** boost immune system **(1)** absorption of iron **(1)** • vitamin D- cholecalciferol **(1)** strong bones and teeth / essential for calcium absorption **(1)** • vitamin E- tocopherol **(1)**- antioxidant that promotes healthy cell membranes **(1)** • vitamin K- napthoquinone **(1)**- essential for clotting the blood **(1)** **(2x1)** **(2x1)** **(2x1)**	**(6)**
	Total for question	**10**

Question Number	Answer	Mark
Q06(a)	Only answer: • casein (1) • lactalbumin (1) • lactoglobulin (!) **(3x1)**	**(3)**
Q06(b)	Cheese making: **nine** points from the following: • starter culture of lactic acid forming bacteria added **(1)** • Produce lactic acid **(1)** • Increases acidity **(1)** • milk temperature around 25C **(1)** • rennet (or chymosin) added (1) when acidity correct **(1)** • allowed to coagulate milk protein for about 20 minutes **(1)** • curd formed **(1)** • curd cut into cubes **(1)** • increase temperature to around 40C **(1)** • whey drains off **(1)** • curd cubes coalesce into slabs **(1)** • slabs turned (cheddaring) **(1)** • slabs milled into small pieces **(1)** • salt added **(1)** • filled into moulds **(1)** • pressed for 24-48 hours **(1)** • allowed to ripen/age **(1)** **(9x1)**	**(9)**
	Total for question	**12**

Question Number	Answer	Mark
Q07	Bread making: **Process - Six** points from the following: • ingredients mixed- flour, yeast, and salt **(1)** • water added at around 27C **(1)** • kneading to stretch the gluten **(1)** • put dough in warm place **(1)** • fermentation commences **(1)** • dough 'knocked back' after 2hours **(1)** • allow to rise for further hour **(1)** • divide into portions **(1)** • rest for 15 minutes **(1)** • known as 'first proof' **(1)** • mould into final shape **(1)** • 'second proof' for 45 minutes **(1)** • bake at 230-260C **(1)** • steam inject into oven to give glaze to crust **(1)** **Chemical - Six** points from the following: • Water hydrates gluten in the strong flour **(1)** • During stretching in the dough conversion of sulphydryl groups (SH) to disulphide bridges (-S-S-) **(1)** • During fermentation amylases break down starch to maltose **(1)** • Maltose and other sugars fermented by yeast **(1)** • Carbon dioxide produced and alcohol is produced as a byproduct **(1)** • During baking starch gelatinises **(1)** • During baking protein coagulates **(1)** • Maillard reaction leads to browning of crust **(1)** **(6x1)** **(6x1)**	**(12)**
	Total for question	**12**

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