Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCE
In Design and Technology (6FT03)
Paper 1 Food Technology

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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)	Any one of the following: 1. Growth (1) 2. Repair (1) and maintenance (1) 3. Secondary source of energy (1) 4. Formation of hormones (1) and enzymes (1) (1 x 1)	**1**
1(bi)	Any three of the following examples to identify the nutritional functions of calcium, up to a maximum of three marks: 1. to develop and maintain healthy bones (1) and teeth. (1) 2. regulation of metabolic processes, (1) 3. transmission of information via the nervous system,(1) 4. control of muscle contraction (including the heart) (1) 5. blood clotting(1) (3 x 1)	**3**
1(bii)	Any one of the following examples to identify one medical condition that would result from a deficiency of calcium. 1. Rickets (1) 1. Osteomalcia / brittle bones(1) 2. Osteoporosis (1) (1 x 1)	**1**
1(c)	Any three of the following examples to describe the effect a deficiency of ascorbic acid would have on the body: 1. Deficiency is associated with fatigue/weakness (1), aching joints/muscles. (1) 2. Symptoms of scurvy (1) are due to impaired collagen synthesis (1), characterized by bleeding gums (1), poor wound healing (1), unhealthy skin (1). 3. Poor absorption of iron (1) leading to anaemia (1) 4. Reduced antioxidant properties (1) leading to reduced resistance to infection (1) 5. Reduced effectiveness of immune system (1) and disease fighting capacity(1).	**3**
	Total for question	**8**

Question Number	Answer	Mark
2(a)	Any six of the following examples to outline the malting process in producing beer, up to a maximum of six marks: Malt is obtained by 1. Steeping/ soaking(1) barley (1) in water 2. allow the barley to stand in warm air(1) 3. barley allowed to sprout/ germinate (1) under moist warm conditions(1) 4. enzymes /amylases(1) become active and start to break down the starch / endosperm (1) to sugars (1). 5. drying/ kilning the sprouted barley (1) is carried out to stop germination process (1) 6. When the desired amount of maltose has been produced(1) the malt is extracted (1) for use in beer making 7. Before malt can be used for beer, it must be ground (1) then soaked in warm water to develop the right proportion of malt for the type of beer (1) (6 x 1)	**6**
2(b)	Any six of the following examples to outline the fermentation process in pickling, up to a maximum of six marks: 1. Nearly all vegetables(1) can be fermented by lactic acid bacteria (1) to produce lactic acid (1) which will increase the acidity/ decrease pH(1) 2. This, together with salt (1) will be used to preserve(1) and flavour (1) the pickle 3. The lactic acid and salt reduces the activity of enzymes (1), inhibits oxidative chemical changes (1) and inhibits the growth of spoilage micro-organisms(1) 4. Some products are allowed to ferment in a weak brine solution, e.g. dill cucumbers (1). Some products are fermented in high salt solutions.(1) 5. Some vegetables will be pickled in vinegar (1) (6 x 1)	**6**
	Total for question	**12**

Question Number	Answer	Mark
3(a)	Any three points stating three factors which affect an individual's energy requirements 1. Metabolism (1) 2. Body size (1) 3. Age (1) 4. Activity (1) 5. Occupation (1) 6. Gender (1) 7. Climate (1) 8. Life stage e.g pregnancy (1) 9. Health and wellbeing (1)	**(3)**
3(b)	Any one point to explain how an individual who is obese can reduce their body mass index making reference to energy balance. 1. By reducing energy input (1) compared to energy output(1) 2. or increasing energy output (1) in relation to energy input (1) 3. By changing positive (1) energy balance to negative (1) (2 x 1)	**(2)**
3(c)	Five marks to evaluate the use of Dietary Reference values (DRVs) by health professionals in assessing diets. Candidates need to identify both an advantage and disadvantage. Advantages 1. Dietary Reference Values (DRVs) are used to guide / recommend the energy (1) and nutrient requirements (1) for optimum health(1) make changes to eating habits(1). 2. for large groups of people/populations (1) 3. Named example of DRV as part of the evaluation(1) 4. Named group with application (1) Disadvantages 5. should not be applied to individuals(1) 6. due to the large variation in physical activity (1) and energy expenditure (1) observed between people (5 x 1)	**(5)**
	Total for question	**10**

Question Number	Answer	Mark
4(a)	Any four of the following examples to compare and contrast the production of evaporated milk with condensed milk, up to a maximum of four marks. Both similarities and differences should be mentioned for full marks. **Similarities** 1. Both are concentrated milk(1) 2. Both heated (1)?under vacuum (1) until 60% of water (1) evaporated (1) 3. Both are canned products (1) 4. Both use homogenised milk (1) 5. Both have long shelf life (1) **Differences** 6. Evaporated milk is sterilised (1)for preservation 7. During the evaporation process (1) condensed milk is concentrated with sucrose syrup for preservation (1). It should have 40 – 45% minimum sugar content (1) (4 x 1)	**4**
4(b)	Any two of the following examples to describe the process of drying milk, up to a maximum of two marks: 1. Milk is first concentrated under vacuum (1) at a low temperature (1) 2. Dried by spraying (1) in the form of minute droplets in hot air (1) water evaporates (1) and solid particles remain (1) as a powder(1). 3. In most instances milk is skimmed (1) prior to the drying process to aid processing (1) (2 x 1)	**2**
4(c)	Any four of the following examples to analyse the effects of the drying process on the quality of milk, up to a maximum of four marks: 1. When reconstituted the product differs little from fresh milk (1) 2. Little loss on nutritive value (1) Specific reference to effect of heat on vitamin C or B vitamins (1) 3. Flavour change (1) 4. Dried full cream milk develops a tallow flavour after being stored for 9 -24 months (1) due to oxidative changes (1) 5. Overheating will cause significant vitamin loss (1) protein damage (1) and encourage the Maillard reaction (1) 6. Increase shelf life (1) (4 x 1)	**4**
	Total for question	**10**

Question Number	Answer	Mark
5(a)	Discuss the factors which affect fish quality **Prior to catch** 1. Time of year/season (1) and place of catch (1). Some fishing grounds may be low on food (1). Spawning occurs at certain times. Fish caught during these times will be out of condition (1) 2. Glycogen reserves may be low (1) as fish cannot be rested before death and tend to use up glycogen reserves (1) resulting in little lactic acid (1) causing pH to be high (1) leading to soft flesh (1) and rapid deterioration (1) of fish 3. Age of fish (1) will affect the sensory characteristics (1) 4. Breed/species of fish (1) 5. Method of catch (1) 6. Pollution in water (1) **During chilled storage** 1. Melting ice (1) for initial storage to delay growth of surface bacteria (1) and assist with washing the fish (1) and keeping it moist (1) 2. Time between catch and chilling (1) minimise spoilage/reduce enzyme activity (1) 3. Storage temperature below 5 degrees centigrade (1) to keep fish out of danger zone temperature range (1) 4. Duration of chilled storage (1) prevent deterioration linked to the different fat content of oily and white fish (1) 5. Rancidity (1) 6. Reference to possible cause of fish odours (1)	**(6)**
5(b) i	Any two of the following to explain the importance of Vitamin A 1. Vitamin A is essential to the normal structure and function of the skin and mucous membranes (1) such as in the eyes /lungs / digestive system (1). 2. it is vital for vision (1) makes visual purple (1) deficiency can lead to night blindness/total blindness (1) nyctalopia /xerophthalmia (1) 3. deficiency will slow down growth/cellular development (1) 4. anti-oxidant vitamin (1) to prevent free radical formation (1), to assist the immune system (1) One mark maximum for named deficiency (2 x 1)	**2**

5(b)ii	Any two of the following to explain the importance of Vitamin D Vitamin D is needed for the absorption of calcium (1) and phosphorous(1) both of which are required to form / and maintain bones and teeth (1) (2 x 1)	**2**
5(b)iii	Any two of the following to explain the importance of omega-3 polyunsaturated fatty acids 1. Omega 3 fatty acids are associated with good heart health/regulation of heart rhythm (1) Prevention of blood clots (1) and lower cholesterol over time (1) 2. Studies support evidence that they may help protect against inflammation (1) in people with rheumatoid arthritis (1) 3. They are important during pregnancy and/ breastfeeding (1) to support child development (1). 4. Important for good brain function (1) (2 x 1)	**2**
	Total for question	**12**

Question Number	Answer	Mark
6	Any eight of the following examples to discuss the influence of cultural changes on product development and food innovation, up to a maximum of eight marks. Initial comments could refer to a time poor society (1), globalisation (1) multi cultural society / increased ethnic population (1) travel experiences (1) **Examples of influence** 1. ready meals (which reflect these influences)/ example of (1) 2. Shopping for convenience (1) 3. Consumers want more variety (1) 4. Change since WW2/ last 50 years (1)More family members working leaving little time for food preparation(1) 5. Ethnic influence with typical associated food (product) (1) (e.g. Mediterranean influence – pasta dishes, olive oil, herbs) 6. snack products (which reflect these influences)/ example of (1) 7. fusion foods / hybrid foods (1) 8. import of exotic foods/ traditional foods from other countries (1) 9. British /regional foods (1) 10. food assembly kits (1) 11. takeaway ranges (1) 12. dining-in range (1) 13. pop-up restaurant (1) 14. 'on the go' food (1) 15. Meal habits related to patterns in culture (timings/style of food eg tapas, grazing habits). 16. Street food (1) 17. foods to celebrate customs /festivals/religious celebrations (1) 18. Using Halal meat in products to supply needs of Muslim community (1) Kosher food for Jewish culture (1) 19. Wide variety of different bread products (1) 20. Positive dietary influences from ethnic diets (1) e.g Mediterranean diet promoted as being better for heart health/ any correct example (1) 21. Celebrity chefs promoting products using ethnic ingredients (1) 22. Opening of many shops specialising in ethnic ingredients for immigrant communities (1) 23. Luxury market (8 x 1)	**8**
	Total for question	**8**

Question Number	Answer	Mark
7	Any 10 of the following, explaining why and how different types of modified starch have been used by food manufacturers **Why?** 1. Unmodified starch is widely used in cooking however has limited use in industrial food manufacture (1) 2. Starch consists of two types: amylose and amylopectin (1). When gelatinised starch solutions are allowed to stand for a few hours, they begin to show changes in their properties (1). They lose viscosity (1), concentrated gels become rubbery (1) and exude water / syneresis(1). 3. Manufacturers require processed products to remain in good condition on the shelves for several days.(1) to reduce food wastage (1) and save money(1). If products such as pie fillings, sauces or pizza toppings (1) start to display syneresis they become less desirable to the consumer (1) 4. Starch can be modified to improve or repress its inherent properties. (1) to provide consistent results, (1) according to the needs of the product (1) eg use as a stabiliser (1) in low fat creamy products or use in other accurate named examples (1) 5. Modified starch is used to prevent retrogradation (1) 6. Increase the product range (1) for manufacturers. **Any accurate link to the following modified starches will be credited.** **Cross-bonded (linked)** 1. Cross-link between starch chains with phosphate (1) to strengthen tender starches (1) /starch with high proportion of amylose (1) 2. takes on properties of starches with higher amylopectin (1). 3. Cross-linking helps control texture of starch (1) and provides tolerance to the effects of heat (1), acid (1) and agitation (1) 4. It helps to prevent separation or syneresis which occurs after freezing (1) or heat processing (1). 5. Canned foods or HTST processed foods **Pre-gelatinised starches** 1. Starch is previously gelatinised (1) then thickens instantly (1) when in contact with water (1) without the need for heat (1)	**10**

	Stabilised starches 1. Starches electrostatically charged with same charge (1) so starch molecules repel each other (1) and prevent retrogradation and separation (1). 2. High water holding capacity (1) 3. Used in frozen products (1) as have freeze / thaw stability (1) **Acid-modified** 1. Starch is treated with acid producing lower viscosity (1) and clearer starch pastes (1), 2. used for products which are filled or pumped (1) such as pie fillings/ sauces/jelly sweets/imitation cheese spreads(1) as a replacement for fat in low fat products (1) **Oxidised** 1. Oxidation of starch improves its binding qualities (1) for instance increasing the adhesion qualities of foods such as batter on fish (1)	
	Total for question	**10**

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