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General Certificate of Education (A-level)
January 2011

Design and Technology: Food Technology FOOD1

(Specification 2540)

Unit 1: Materials, Components and Application

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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1 **Name two functions of carbohydrates in the body.**
Energy, to aid digestion, acts as a protein sparer

(2 marks)

2 **Name two food sources of retinol in the diet.**
Liver, fish oils, dairy foods, margarine, animal fats, carrots, green vegetables, peppers

(2 marks)

3 **What are the effects of too much sodium in the diet?**
Hypertension, heart disease, oedema (excess fluid in tissues)

(2 marks)

4 **Name two macro nutrients.**
Protein, carbohydrates, fats

(2 marks)

5 **Describe two effects of Vitamin C deficiency in the body.**
Scurvy, poor absorption of Iron, wounds not healing, poor skin and gums

(2 marks)

6 **State two functions of water in the diet.**
Hydration, bodily functions, transportation of nutrients to cells, transportation of waste, digestive juices, mucus, saliva, blood, lymph, sweat, urine, cleans the body.

(2 marks)

7 **Describe the factors affecting BMR (Basal Metabolic Rate) in the body.**
Age, body size, activity level, activity of thyroid gland
1 factor + a description = 2 marks
4 factors = 4 marks

(4 marks)

8 **Explain, with examples of specific food products, the function of emulsifying agents.**
2 marks for examples of food products – e.g. salad dressings, low fat spreads, ice cream
2 marks for the function – e.g. emulsifiers are used to enable oils to be dispersed in water or water to be dispersed in oil. They are able to link two immiscible liquids to form a colloid (1 mark for a partial or poorly explained response).

(4 marks)

9 (a) **Discuss the significance of social trends and changes in lifestyles on food product development.**

Answers will give examples such as identifying the needs of various groups of consumers. Special diets – vegetarianism, food allergies, food intolerances, low fat, salt intake. Influence of social (and cultural, if candidates make the relevant links, e.g. increase in ethnic foods in school canteens) factors (including media campaigns etc): religion, environmental issues, current issues – grazing, dashboard dining, 'eating out is the new eating in', travel and tourism, regional and international influences, locally sourced products, single households, the elderly, students. Any well justified point will be credited. Also credit students who argue against the proposition if they provide suitable examples to justify their points.

Candidates must link social trends and changes in lifestyle to food product development directly in order to obtain the highest marks.

Mark Range 8-10: responses will reflect a full discussion with at least 5 points justified
Mark Range 4-7: responses will include a discussion of 3-4 justified points, or up to 8 superficial points included which are not justified fully
Mark Range 1-3: responses will be superficial, with little or no justified points raised and may not necessarily 'discuss' the issue raised in the question
Mark Range 0: no points worthy of credit

(10 marks)

9 (b) **Describe the testing and evaluation techniques that could be used to assess the viability of a food product.**

Answers should consider such information as the range of sensory techniques, nutritional values, cost, target audience, diet analysis . Different techniques may include digital image, photographs, diagrams, sensory analysis, chart, star profiles – ideal and actual.

Candidates can describe using surveys / questionnaires (open / closed questions) if linked to evaluation techniques

Candidates must link testing and evaluation techniques to food product viability directly in order to obtain the highest marks. Candidates may or may not specifically refer to industry – either method is acceptable if they answer the question set.

Mark Range 8-10: responses will reflect a full description with at least 5 points justified
Mark Range 4-7: responses will include a description of 3-4 justified points, or up to 8 superficial points included which are not justified fully
Mark Range 1-3: responses will be superficial, with little or no justified points raised and may not necessarily 'describe' the issue raised in the question
Mark Range 0: no points worthy of credit

(10 marks)

10 (a) **Describe how world food resources and transportation affect the opportunities for food product development.**

Candidates will consider issues such as climatic changes and the effect on crops etc, population growth, air miles, carbon footprint, food mountains, ways of extending the shelf life in transportation, Fair Trade, local / seasonal foods, different methods of transport.

For the highest marks candidates must consider both positive and negative points and must link food resources and transportation to food product development directly in order to obtain the highest marks.

Mark Range 8-10: responses will reflect a full discussion with at least 5 points justified
Mark Range 4-7: responses will include a discussion of 3-4 justified points, or up to 8 superficial points included which are not justified fully
Mark Range 1-3: responses will be superficial, with little or no justified points raised and may not necessarily 'discuss' the issue raised in the question
Mark Range 0: no points worthy of credit

(10 marks)

10 (b) **Discuss the nutritional considerations when designing ready meals for the elderly.**

Responses will include well justified points relating to nutritional requirements of the elderly and may include:

Protein – complementary action of low biological proteins, biological values
Fats – use of unsaturated fats, reducing saturated fat content
Carbohydrates – effects of excess, energy requirements
Water soluble vitamins – sources of B group to release energy, Vitamin C for colds and flu
Fat soluble vitamins – sources of retinol, and D
Calcium – working with Vitamin D, sources, prevents decalcification
Iron – working with Vitamin C, prevents anaemia, tiredness
Trace elements – reduce salt, avoid hypertension, heart disease
Water intake prevents dehydration, aids bodily functions
High fibre – avoids digestive disorders

Candidates must link nutritional considerations for a food manufacturer to ready meals for the elderly directly in order to obtain the highest marks.

Mark Range 8-10: responses will reflect a full description with at least 5 points justified
Mark Range 4-7: responses will include a description of 3-4 justified points, or up to 8 superficial points included which are not justified fully
Mark Range 1-3: responses will be superficial, with little or no justified points raised and may not necessarily 'describe' the issue raised in the question
Mark Range 0: no points worthy of credit

(10 marks)

11 (a) **Describe how a cheese and tomato pizza could be developed to:**

- **increase iron and Vitamin C content (5 marks)**
- **improve flavour (5 marks)**
- **reduce saturated fat content (5 marks)**
- **increase NSP (5 marks)**

Increase Iron – addition of, wholemeal flour, vegetables
Flavour – types of cheese, addition of peppers, onions, pepperoni, pineapple – any suitable ingredient
Reduce fat content – change cheese to lower fat content, edam , cottage cheese
Increase NSP

(20 marks)

11 (b) **Discuss, with reference to examples, what is meant by 'high', 'medium' and 'low' risk food categories.**

Responses will make reference to different food risk categories and ways of preventing food poisoning in food products. For the highest marks, candidates must refer to all three categories.

High – foods more prone to bacterial infection, e.g. raw or cooked meats, raw or cooked fish, eggs, cooked rice and lentils, gravies and soups
Medium – foods that may contain pathogenic organisms but will not normally support their growth; or which are unlikely to contain pathogenic organisms but may support the formation of them or growth of toxins, e.g. fruits and vegetables, canned meat, dairy products
Low – foods unlikely to contain pathogenic micro-organisms and will not normally support their growth due to food characteristics, e.g. grains and cereals, bread, alcohol

Reference will be made to controlling the development of bacteria. Time – food should be eaten very soon after it has been made, or cooled quickly. Moisture should be removed, PH changed from neutral, temperature below 5C or above 72C.

Mark Range 8-10: responses will reflect a full discussion with justified points raised in each category with reference to preparation, cooking and storage
Mark Range 4-7: responses will include a discussion of justified points with reference to preparation, cooking and storage but quite superficially (or look at very few points but in depth)
Mark Range 1-3: responses will be superficial, with little or no justified points raised
Mark Range 0: no points worthy of credit

(10 marks)

11 (c) **Explain, with examples, the role of Computer Aided Design (CAD) and Computer Aided Manufacture (CAM) in food product development.**

Responses will make reference to:

CAD – research from various sources, nutritional analysis, modelling costs, risk assessment, HACCP charts, modelling to changes to recipes, scaling up recipes, sensory evaluations, digital cameras, data logging

CAM – weighing and measuring during production, light refractor to identify foreign objects, cooked or uncooked products, light detector and viscosity of products, temperature tolerances, control of mixers, tunnel ovens, depositors, packaging

Reference will be made clearly to the importance of both in food product development – candidates may link to their coursework – any justified point will be credited.

For the highest marks candidates must explain CAD and CAM and link to food product development directly in order to obtain the highest marks.

Mark Range 8-10: responses will reflect a full explanation with at least 5 points justified
Mark Range 4-7: responses will include an explanation of 3-4 justified points, or up to 8 superficial points included which are not justified fully
Mark Range 1-3: responses will be superficial, with little or no justified points raised and may not necessarily 'explain' the issue raised in the question
Mark Range 0: no points worthy of credit

(10 marks)