

Design and Technology

General Certificate of Secondary Education **1954/04**

Food Technology Paper 4

Mark Scheme for June 2010

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question Number			Expected Answers	Mark	Additional Guidance
1	(a)		<p>State two ways a manufacturer could use a computer in the development of a new ready meal food product.</p> <ul style="list-style-type: none"> • Researching information both primary and secondary • Producing questionnaires/surveys • Product profiles/models of design ideas • Food labels/packaging information • Recording sensory testing results/Spider diagrams/star charts • Packaging designs/nets • Nutritional analysis • Digital photography • Costing/spreadsheets • Modifying recipes • HACCP/charts for safety checks • Presenting results • Mood board/image board • Scaling up a recipe 	[2]	<p>2 x 1 mark</p> <p>The question is about development not manufacture.</p> <p>Research must be qualified</p> <p>Do not accept manufacturing</p>
1	(b)		<p>State two advantages to the manufacturer of using a Just in Time (JIT) production process for the ready meals</p> <ul style="list-style-type: none"> • Products are made to demand therefore no wastage/stock ordered when it is needed • No space needed for storage of ingredients/products are dispatched as soon as they are produced (no storage) • Can respond to consumer demand/special occasions/seasonal. • Efficient use of equipment/machinery. • Can vary the type of product (flavour/colour, etc.). • Can bulk buy ingredients so save money/reduce overall cost • Equipment can be used to make other types of products. • Staff are semi-skilled/involved in production (job satisfaction) makes full use of staff/can be more interesting for staff. • Flexibility e.g. easier to alter number in batch to meet changes from client. • Controls cash flow 	[2]	<p>2 x 1 marks</p> <p>Do not accept:</p> <p>Saves time Saves money Cheaper Quicker Faster Unless qualified</p>

Question Number			Expected Answers	Mark	Additional Guidance
1	(c)	(i)	State one advantage of continuous flow to the manufacturer <ul style="list-style-type: none"> • Only need a few staff • Inexpensive to run • Non stop 24/7/Equipment used all of the time • Repetition of skills so can employ less skilled staff/less training needed for staff • Consistent quality of products/All the products are the same • A lot of products can be made in a time scale as there is no setting up time/a lot of products can be produced quickly/quicker to produce the product 	[1]	1 x 1 mark Do not accept: Saves time Saves money Quicker Faster Cheaper Unless qualified
1	(c)	(ii)	State one disadvantage of continuous flow to the manufacturer <ul style="list-style-type: none"> • Expensive to set up • Dedicated to one process only/cannot be adapted to make other products • If something goes wrong it can be expensive/wasteful of ingredients/expensive to repair • If the machinery breaks down all production stops • Must maintain equipment to keep the plant running/high maintenance costs 	[1]	1x 1 mark Do not accept "more expensive" (cost must be qualified)

Question Number			Expected Answers	Mark	Additional Guidance
1	(d)		<p>State two quality control checks that could be carried out by sensors</p> <ul style="list-style-type: none"> • Weight sensors/load sensors to weigh ingredients • Temperature for storage /cooking/cooling/chilling/freezing • Viscosity of mixtures • Thickness e.g. dough/pastry • Flow rates e.g. chocolate coating • Volume sensors to make sure consistent amounts are used/portion size/ weight of finished products • To detect colour changes/control the colour • To detect metal/foreign bodies • To detect microbiological content/check whether the food product is safe to eat • Moisture content of products • Acidity level of products • Electronic eye to count the number of products manufactured/count into packages 	[1]	<p>2 x 1 mark</p> <p>Must state the use of the sensor</p> <p>Do not accept just the name of a sensor e.g. metal detector</p> <p>Do not accept general phrases e.g.: Visual checks Taste testing Looking the same Same amount Same size Whether they are cooked</p>
1	(e)		<p>Explain how the use of CAD and CAM has affected the number of people employed in the food industry.</p> <ul style="list-style-type: none"> • Less jobs for less skilled/lower paid workers – this is all done by machinery controlled by computers • Highly skilled people need to use the computers – to set the systems up to start with, e.g. engineers needed – to maintain the equipment • Highly trained operators required – to ensure that the equipment is working efficiently 	[2]	<p>1 x 1 mark for simple statement 2 marks for detailed explanation which includes either 2 points or one fully explained.</p>
			Total	[10]	

Question Number			Expected Answers	Mark	Additional Guidance
2	(a)		<p>Suggest a target group for cod in batter</p> <p>Children/students/families/parents/adults/single people/elderly</p> <p>Reason</p> <ul style="list-style-type: none"> • 4 portions in a pack/multipack • Requires no preparation/no skills required • Easy for people to cook/ no skill required • Individual portions convenient for single people/elderly • Quick to cook/ • Not a lot of equipment required • Economical to buy • Can use part of pack and keep the rest frozen • Easy for a person to eat. • Easy to store in the freezer • Meets named nutritional need of the target group stated • Prefer to eat fish when it is in batter 	[1]	<p>1 x 1 mark</p> <p>The mark is for the reason only.</p> <p>Reason must relate to the target group</p> <p>Do not accept:</p> <p>Cheaper</p> <p>Faster</p> <p>Easier</p> <p>Healthier</p> <p>Quicker</p> <p>Easy</p> <p>Appealing</p> <p>unless qualified</p> <p>Do not accept 'easier to digest' as the fish is coated in batter</p>
2	(b)		<p>State two nutrients found in fish</p> <ul style="list-style-type: none"> • Protein • Vitamin A • Vitamin D • Omega 3 • Omega 6 • Group B vitamins • Fat • Calcium • Iodine • Phosphorus 	[2]	<p>2 x 1 mark</p> <p>Do not accept vitamins /minerals unless named</p>

2	(c)		<p>Give three ways that you could change this meal to make it healthier</p> <ul style="list-style-type: none"> • Cod in batter – Grill/dry fry/oven bake/make batter with wholemeal flour or skimmed milk/ • Remove batter/Use fish/baked/steamed/micro waved/poached /dry fried/oven baked/use breadcrumbs • Change to oily fish • Chips – Oven cook/larger chips/potato wedges/sweet potatoes • Change chips to boiled/ baked /microwave/mashed/crushed/ wedges/roast/sweet potatoes /boiled rice /couscous or pasta • Add a salad/garnish/named vegetable/parsley sauce 	[3]	<p>3 x 1 mark</p> <p>Do not accept: Reduce fat Reduce salt Increase fibre</p>
2	(d)		<p>Explain the function of the batter casing.</p> <ul style="list-style-type: none"> • Protects the fish-When heated the egg coagulates/sets-preventing the fat from being absorbed by the fish during cooking. • Protects the fish from disintegrating/falling apart whilst cooking- as fish is delicate due to its structure • Improves the taste/texture by giving a crispy/crunchy coating • Improves the colour/appearance –batter is golden brown and looks appetising • Improves the satiety value-it absorbs fat takes a long time to digest - batter is mainly carbohydrate/filling • Bulks/ekes out the fish-increases the portion size/makes it more filling 	[2]	<p>1x 1 mark for simple statement 2 x 1 mark for detailed explanation which includes either 2 points or one fully explained.</p>

Question Number			Expected Answers	Mark	Additional Guidance
2	(e)		<p>Describe one method of freezing carried out in industry.</p> <p>Blast Freezing</p> <ul style="list-style-type: none"> Fish placed on trays i.e. fish fingers Air is circulated around a freezing compartment – reducing temperature quickly. <p>Cryogenic Freezing</p> <ul style="list-style-type: none"> Uses liquid nitrogen (-196°C) – food passed through a tunnel Gas is sprayed downwards – it freezes very quickly. Used on expensive foods e.g. prawns. <p>Plate freezing</p> <ul style="list-style-type: none"> Fish is placed between two plates which make contact with the food's surface – Ideal for fish fillets/boil in the bag/fish products. 	[2]	<p>1x 1 mark for simple statement 2 x 1 mark for detailed explanation which includes either 2 points or one fully explained.</p>
			Total	[10]	

Question Number			Expected Answers	Mark	Additional Guidance
3	(a)		<p>Identify three characteristics that need improving and state how this could be done</p> <p>Colour of the product</p> <ul style="list-style-type: none"> • addition of any named red vegetable to the soup • increase quantity of tomato puree/carrot/chopped tomatoes • use tomato juice instead of stock. • add tinned tomatoes/sauce/paste/ketchup/red wine/red pesto • use fresh red chilli/paprika <p>Smooth texture</p> <ul style="list-style-type: none"> • Liquidise the soup/puree/process/blend • Push through a sieve <p>Spiciness</p> <ul style="list-style-type: none"> • increase the quantity of chilli - dried or fresh • add any other suitable named hot spice (paprika/coriander/cumin/turmeric). • add balsamic vinegar 	[3]	<p>3 x 1 mark</p> <p>Do not allow mark for stating the area to be improved</p> <p>Colour of product Peppers must be red Do not accept food colouring/artificial Do not accept other coloured vegetables. The soup is spicy tomato.</p> <p>Smooth texture Do not accept chopping vegetables/cook longer</p> <p>Spiciness Do not accept herbs</p>
3	(b)		<p>State one reason why the manufacturer has not included salt in the soup recipe</p> <ul style="list-style-type: none"> • People in the UK have too much salt in their diet/Govt guidelines to reduce salt intake • Linked to high blood pressure • Can lead to heart disease/stroke/kidney damage/osteoporosis • Stock cube has salt in it/seasons the soup enough • To sell as a low salt product. • Customer demand for low salt products • Level of spice provides enough flavour 	[1]	<p>1 x 1 mark</p> <p>Do not accept heart attack/problems or unhealthy or 'to make healthier'</p>

Question Number			Expected Answers	Mark	Additional Guidance
3	(c)		Explain the process of gelatinisation <ul style="list-style-type: none"> • Cold milk /liquid mixed with starch/flour • Starch grains swell when heated in liquid and make a gel • Starch grains burst when sauce is boiled/100°C • If not cooked it may taste raw as the grains of starch have not burst • If not stirred, the starch grains will not remain in suspension, instead settling and the sauce will become lumpy • Forms an opaque gel. 	[2]	2 marks for detailed explanation 1 x1 mark for brief description. Do not accept use of gelatine
3	(d)		Explain two ways the results of sensory testing are used by manufacturers <ul style="list-style-type: none"> • Identify areas for improvement -check that the product matches the design/product specification -to meet the needs of the user group -compare results with previous testing • Match the product against other products – to see how it compares and whether it will sell • Identify areas for development– colour/flavour/texture/appearance/ aroma • Determine whether it appeals to the target group/like the product – must know that there is a market or a lot of money will be wasted • To check that any improvements carried out have worked – can the panel identify the difference? • To compare different design ideas- to choose the best one to develop • To identify market trends- to ensure that they product they develop will sell well/meets gap in the market • To gain information that will benefit future product design – this will reduce the time spent in product development • To plan further testing and trailing – to ensure the product meets the target group's requirements. • Gain information for advertising/packageging – for describing sensory qualities 	[4]	2 x 2 marks for detailed explanation 2 x 1 mark for brief descriptions. The answers must be directly related to the sensory analysis.
			Total	[10]	

Question Number			Expected Answers	Mark	Additional Guidance
4	(a)		<p>Explain one reason why males have different energy needs to females.</p> <ul style="list-style-type: none"> • Occupation – Men with active/physical jobs need more energy than those with sedentary(office) jobs or female equivalent • Body size. Men have a larger body size/more muscle – Muscles use a lot of energy- therefore have a higher metabolic rate • Physical activity. Men tend to do more physical activity – Sport/exercise uses greater amounts of energy. 	[2]	<p>2 marks for a detailed explanation 1 mark for a brief description</p> <p>Maximum 1 mark for an unqualified statement Question asks for one explained reason Do not accept 'burn off energy quicker than females' unless a reason given</p>
4	(b)		<p>Explain what may happen if a child's intake of food and the energy they use does not balance.</p> <p>Explanation could include:</p> <ul style="list-style-type: none"> • If food intake is greater than energy output child will gain weight/develop obesity/tiredness/lethargy/inability to exercise - joint problems/coronary heart disease (CHD) and/or diabetes in later life • If food intake is less than energy use child will loose weight/lead to anorexia/tiredness/lethargy may lead to vitamin deficiency A,D,E,K which leads to Rickets 	[2]	<p>2 marks for a detailed explanation 2 x 1 mark for brief descriptions</p> <p>To maintain a constant body weight the energy input from food must equal the energy output by the body</p>

Question Number			Expected Answers	Mark	Additional Guidance
4	(c)		<p>Explain how schools are encouraging students to have healthy lifestyles.</p> <ul style="list-style-type: none"> • Physical activity. PE Lessons/after school sports clubs/teams – encourages physical activity/develops good habits. Move away from computer games etc. • Drink more water. Water fountains/water bottles in lessons – to maintain fluid levels. Recent introduction to encourage pupils to drink more water. • PHSE/Food Tech lessons on healthy eating. Changes in the curriculum/Eatwell plate/Licence to cook/cooking clubs/Get Active Kids Award /Lets get cooking all introduced to encourage healthy eating and an interest in food and develop skills. Some schemes involve the whole family. • School meals .Healthy School Award. School meals/improved/more fresh fruit available/award systems for a healthier lunch choice. Higher proportion of carbohydrates in meals. Traffic light coding on meals/ chips just once a week/wider range of complex carbohydrates Posters around school encouraging healthy eating • Media influence Jamie Oliver's influence/celebrity influence/much more publicity/Local authorities are now putting funding into schemes. E.g. schemes such as 'Ministry of Food'/Vending machines. No Fizzy drinks machines/high sugar snack vending machines– replaced with water fountains/fruit • Free fruit in primary schools to encourage/support 5 a day campaign Encouraging children to taste a wide range. • Breakfast clubs. Encouraging pupils to start the day with breakfast. • Growing vegetables. Using in food lessons – encourage children to try new vegetables and take an interest in where food comes from • Cycling/walking to schools. More fresh air/more exercise • PHSE/science lessons on dangers of smoking, drugs, alcohol, sexual relationships. 	[6]	<p>(6 marks) 3 x 2 mark for detailed explanation 3 x 1 mark for brief descriptions</p> <p>This response must have some detail</p> <p>Do not award 1 mark for just stating the headings bolded in the answer scheme</p>
			Total	[10]	

Question Number			Expected Answers	Mark	Additional Guidance
5	(a)	(i)	<p>State what is meant by the term ‘lactose intolerant’</p> <ul style="list-style-type: none"> Person who is unable to digest Lactose/milk sugar/cannot eat dairy produce/allergic to dairy produce/allergic to lactose 	[1]	<p>1 x 1 mark</p> <p>Do not accept “allergic to milk”</p> <p>Please note: Intolerance is not an allergy but candidates use “allergy” so that they do not repeat the word intolerant in the question. Award a mark.</p>
5	(a)	(ii)	<p>Alternative product:</p> <ul style="list-style-type: none"> Lactolite/Milk from soya/rice/oat/coconut/barley/hemp Dairy free/lactose free - ice cream/Baby foods/Yoghurt/Cream Soya cheese/tofu Soya margarine/vegetable margarine/use of oils Named dairy free product e.g. ‘Free From’ 	[1]	<p>1 x 1 mark</p> <p>Any food that will substitute for a dairy food e.g. vegetable margarine</p> <p>Do not accept just “soya”</p>
5	(b)		<p>Explain one problem that a coeliac may have when they are eating in a restaurant</p> <ul style="list-style-type: none"> A person who is intolerant/allergic to gluten/wheat Food not labelled whether they contain gluten Many foods contain gluten and the staff may not be aware You cannot see gluten and therefore do not know whether it is in the food Sauces/soups/coatings and all thickenings may be gluten based and you cannot see it. Limited choice of gluten free available for them to choose from. 	[2]	<p>1 x 1 mark for a statement</p> <p>2 x1 mark for detailed explanation</p> <p>The candidate must clearly show that they understand what a coeliac is. Answers must refer to gluten/wheat/flour and flour products</p>

Question Number			Expected Answers	Mark	Additional Guidance		
5	(c)		Explain how a vegan can ensure they have a balanced diet.			6 x 1 mark 3 x 1 mark for points 2 x 1 mark for 2 explanations 1 x 1 mark for an example To gain high marks the candidate must show a good understanding of nutritional information supported by relevant and appropriate information. Note Cannot eat Quorn as it contains egg Reference to supplements must be specific with nutrients clearly named	
			Point	Quality of Explanation			Specific Example
			Will only eat foods from plant source – no animal products at all	Presents a problem HBV proteins/calcium/iron/vitamin B12 are mainly found in animal foods			Deficiency can lead to diet related problems/deficiency diseases
			Need to eat a wide variety of foods to get a correct balance of nutrients	Relies on cereals, nuts, fruits, vegetables and seeds			May need to seek professional dietary advice.
			Animal foods provide an excellent source of protein	Most HBV proteins are found in animal foods Only soya provides HBV protein Combination of LBV/complimentary proteins – they need a variety to take in all essential amino acids			beans/peas/tofu Soya cereals, nuts, and vegetarian products (eg cheese)
			Dairy produce are a good source of calcium	Obtained from soya alternatives needed for formation of strong bones and teeth, prevents rickets.			green leafy vegetables, bread, dried fruit, tofu, cheese, nuts, cereals
			Red meat is the main source of iron in the UK diet	Needed to prevent anaemia, can be a problem, not easily absorbed. Supplied in fortified products. Needs vit C to aid absorption			cereal foods, green leafy vegetables, nuts, bread

			<p>High fibre bulky diet can be monotonous</p> <p>Fat/carbohydrate/vitamins are easily supplied from a plant source diet</p> <p>Vitamin B12 is found naturally in animal foods</p> <p>Easily supplied nutrients include: Vitamin A and D Found mainly in dairy products</p> <p>Vitamin C Fibre</p> <p>Carbohydrates Fats</p>	<p>A vegan diet can be too high in fibre and be too bulky. Resulting in a deficiency of fat and protein</p> <p>A good mixed diet will provide an adequate supply</p> <p>Obtained from fortified foods as it does not occur naturally in plant foods</p> <p>Vegans may need to take a supplement of named Nutrient</p> <p>Fat soluble in Veg oils</p> <p>Fruit and vegetables Vegan diet will be bulky and high in fibre</p> <p>Starchy foods/pulses/cereals Vegetable oils</p>	<p>Children are at particular risk of this</p> <p>Vitamins A&D from plant oils, vitamin C from fruit & veg.</p> <p>Cereals, breakfast cereals, yeast extract, soya milk, soya mince, sunflower margarine</p> <p>margarine, sunlight</p> <p>Named fresh fruits and vegetables</p>		
			Total			[10]	

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