

# Mark Scheme Summer 2014

GCE

GCE D&T Food Technology  
(6FT03)

## 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)                        | <p><i>Any two of the following naming two component proteins found in animal muscle, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> <li>• myosin (1)</li> <li>• actin (1)</li> <li>• actomyosin (1)</li> </ul> <p style="text-align: right;">(2x1)</p>   | 2        |
| 1(b)                        | <p><i>Any six of the following outlining the changes that occur in fish after death, up to a maximum of 6 marks:</i></p> <ul style="list-style-type: none"> <li>• rapid rigor mortis (1)</li> <li>• <b>Muscles contract and flesh becomes stiff (1)</b></li> <li>• little glycogen present used up (1)</li> <li>• little lactic acid produced (1)</li> <li>• high pH (1)</li> <li>• rapid bacterial spoilage (1)</li> <li>• soft flesh produced (1)</li> <li>• ammonia produced (1)</li> <li>• odours produced (1)</li> <li>• trimethylamine oxide changed to trimethylamine (1)</li> <li>• rancidity (1) may develop in fatty fish (1)</li> <li>• inosinic acid (1) breaks down to hypoxanthine (1)</li> <li>• sunken/dull eyes (1)</li> <li>• gills changing colour (1)</li> <li>• skin turns slimy (1)</li> </ul> <p style="text-align: right;">(6x1)</p> | 6        |
| <b>Total for question 1</b> |  | <b>8</b> |

| Question Number             | Answer   | Mark     |
|-----------------------------|--|----------|
| 2(a)                        | <p><i>Three marks for naming specific enzymes important in the breakdown of fat, protein and carbohydrate.</i></p> <p>(i) Lipase (1)</p> <p>(ii)</p> <ul style="list-style-type: none"> <li>• Pepsin (1)</li> <li>• Rennin (1)</li> <li>• Trypsin (1)</li> <li>• Chymotrypsin (1)</li> <li>• Protease (1)</li> </ul> <p><i>(One mark maximum)</i></p> <p>(iii)</p> <ul style="list-style-type: none"> <li>• Amylase / Salivary amylase / Pancreatic amylase (1)</li> <li>• Sucrase (1)</li> <li>• Maltase (1)</li> <li>• Lactase (1)</li> </ul> <p><i>(One mark maximum)</i></p> <p style="text-align: right;">(3x1)</p> | 3        |
| 2(b)                        | <p><i>The following only, identifying the final components for each of the named nutrients.</i></p> <p>(i) Glycerol and free fatty acids / named fatty acid (1)</p> <p>(ii) Amino acids / named amino acid (1)</p> <p>(iii) Monosaccharides / named monosaccharide (1)</p> <p style="text-align: right;">(3X1)</p>   | 3        |
| 2(c)                        | <p><i>Two from the following outlining the role of bile in the digestion of fat, up to a maximum of two marks.</i></p> <p>Bile emulsifies fat (1)</p> <p>This makes it easier for fat to be broken down (1) and exposed to the enzymes (1) in the pancreatic juices (1)</p> <p style="text-align: right;">(2X1)</p>  | 2        |
| <b>Total for question 2</b> |  | <b>8</b> |

| Question Number             | Answer   | Mark      |
|-----------------------------|--|-----------|
| 3(a)                        | <p><i>Four from the following, comparing the changes that occur during the storage of climacteric fruit and non-climacteric fruit, up to a maximum of four marks:</i></p> <ul style="list-style-type: none"> <li>• Climacteric fruits show rapid rise in respiration rate (1) after harvesting (1) whereas non-climacteric fruits show gradual change (1)</li> <li>• Climacteric fruits show rapid ripening followed by spoilage (1) whereas non-climacteric fruits have long keeping qualities (1)</li> <li>• climacteric fruits show rapid ripening (1) whereas non-climacteric fruits show gradual ripening (1)</li> <li>• climacteric fruits 'fleshy' (1)</li> <li>• enzymes more active in climacteric fruits (1)</li> <li>• and cell wall polysaccharides broken down more quickly (1)</li> <li>• softening quicker in climacteric fruits (1)</li> <li>• and colour changes more obvious (1)</li> <li>• non-climacteric fruits have a longer shelf life (1)</li> </ul> <p style="text-align: right;">(4x1)</p> | 4         |
| 3(b)                        | <p><i>Any of the following explanations of the ripening process in fruit, up to a maximum of six marks:</i></p> <ul style="list-style-type: none"> <li>• Enzymes become active (1)</li> <li>• Ethylene production (1) activates enzymes (1) responsible for ripening processes</li> <li>• Becomes sweeter (1) due to breakdown of starch and production of sugars (1) and decrease in acids (1) ( sugars – glucose/fructose/sucrose (1) and/or acids – malic/citric/tartaric (1) mark (maximum) for name</li> <li>• Polysaccharides in cell wall (1) break down softening the texture (1)</li> <li>• There is also a progressive break down of pectin (1) softening the fruit (1)</li> <li>• Change in colour (1) – chlorophyll (1) pigment breaks down revealing other pigments e.g. carotenoids (1)</li> <li>• Some pigments are synthesised during ripening (1) e.g. anthocyanins (1)</li> <li>• amino acid methionine broken down (1)</li> </ul> <p style="text-align: right;">(6x1)</p>                         | Max 6     |
| <b>Total for question 3</b> |  | <b>10</b> |

| Question Number | Answer  | Mark |
|-----------------|---|------|
| 4(a)            | <p><i>Any four from the following outline of how cultural changes have impacted new food product development, up to a maximum of four marks.</i></p> <ul style="list-style-type: none"> <li>• Different types of food have become far more available(1) (in the past 60 years/ recent time)</li> <li>• multi cultural society / increased ethnic population (1)</li> <li>• travel experiences (1)</li> </ul> <p><b>Examples of impact</b></p> <ul style="list-style-type: none"> <li>• ready meals (which reflect these influences)/ example of (1)</li> <li>• snack products (which reflect these influences)/ example of (1)</li> <li>• fusion foods / hybrid foods (1)</li> <li>• import of exotic foods/ traditional foods from other countries (1)</li> <li>• British regional foods (1)</li> <li>• food assembly kits (1)</li> <li>• takeaway ranges / <b>food on the move</b> (1)</li> <li>• dining-in range (1)</li> <li>• pop-up restaurant (1)</li> <li>• <b>Street food (1)</b></li> <li>• foods to celebrate customs /festivals/religious celebrations (1)</li> <li>• <b>Using Halal meat in products to supply needs of Muslim community (1)</b></li> <li>• <b>Kosher food for Jewish culture (1)</b></li> </ul> <p style="text-align: right;">(4x1)</p> | 4    |
| 4(b)(i)         | <p><i>Any named two stages in a product lifecycle as follows, up to a maximum of two marks :</i></p> <ul style="list-style-type: none"> <li>• Introduction (1)</li> <li>• Growth (1)</li> <li>• Maturity(1)</li> <li>• Decline(1)</li> </ul> <p style="text-align: right;">(2x1)</p>  | 2    |
| 4(b)(ii)        | <p><i>Maximum of four marks describing the marketing plans implemented at the two product lifecycle stages named in (i).</i></p> <ul style="list-style-type: none"> <li>• <b>Introduction</b> - New product launch (1), advertising (1) specific examples of advertising (1) (expensive) (1)</li> <li>• <b>Growth</b> - develop production (1) and distribution capacity (1) increase retail outlets (1)</li> <li>• <b>Maturity</b> - Marketing to sustain brand image (1) promotions to fight off competition (1) Special offers/BOGOF/(1) extend the range (1)</li> <li>• <b>Decline</b> - rebrand (1) repackaging (1) relaunch (1)</li> </ul>  |      |

|                 | redevelop/improve (1) withdraw from market and replace with new product (1) extend the range (1) <b>specific example (1)</b><br>( 2x2)   | 4         |
|-----------------|--|-----------|
|                 | <b>Total for question</b>  | <b>10</b> |
| Question Number | Answer   | Mark      |
| 5(a)(i)         | <p><i>Two functions of iron in the diet from the following, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> <li>• Formation of haemoglobin/<b>red blood cells</b> (1)</li> <li>• Formation of myoglobin (1)</li> <li>• Required in all body cells where it is involved in enzyme systems (1)</li> <li>• To prevent anaemia(1)</li> </ul> <p>(2x1)</p>   | 2         |
| 5(a)(ii)        | <p><i>Any one from the following stating a good food source of haem iron, up to a maximum of one mark.</i></p> <ul style="list-style-type: none"> <li>• Named Red meat/red meat (1)</li> <li>• Offal/liver/kidney/heart (1)</li> </ul> <p>(1x1)</p>  | 1         |
| 5(a)(iii)       | <p><i>Any one from the following stating a good food source of non-haem iron, up to a maximum of one mark.</i></p> <ul style="list-style-type: none"> <li>• Dark green leafy vegetables (1) named green leafy vegetable</li> <li>• Egg yolk (1)</li> <li>• Dried fruit /correct named dried fruit (1)</li> <li>• Nuts (1)</li> <li>• Seeds (1)</li> <li>• Tofu (1)</li> <li>• Pulses (1)</li> <li>• Whole grain cereals (1)</li> <li>• Cocoa/dark chocolate (1)</li> <li>• Fortified breakfast cereals (1)</li> </ul> <p>(1x1)</p>   | 1         |
| 5(b)            | <p><i>Any six from the following, discussing the role of dietary fibre ( Non-Starch Polysaccharide) in the diet, up to a maximum of six marks:</i></p> <ul style="list-style-type: none"> <li>• NSP found in cell walls of plants(1)</li> <li>• Includes insoluble cellulose (insoluble fibre) and soluble pectins, hemicelluloses and gums (soluble fibre)(1)</li> <li>• Recommended intake -18g to 24g /day (1)</li> <li>• Part of the government 5 a day scheme (1)</li> <li>• It cannot be broken down by human digestive enzymes (1)</li> <li>• Reduces constipation (1) NSP has a water holding capacity (1) therefore facilitates the muscular movement/peristalsis of the gut (1) <b>speeds up removal of waste products from the body (1)</b></li> <li>• <b>Keeps digestive tract healthy/ working correctly (1)</b></li> <li>• Can help to prevent obesity (1) as it swells in the stomach to give a full feeling (1) but is not absorbed (1) adds bulk to food (1)</li> </ul> |           |

|                        |  |             |
|------------------------|--|-------------|
|                        | <ul style="list-style-type: none"> <li>Increased NSP intake associated with decreased risk of diseases of intestine(1) e.g colon cancer, diverticulitis (1 mark maximum for examples)</li> <li>Diets high in NSP possibly improve metabolism of glucose (1) It may help prevent diabetes (1)</li> <li>Diets high in NSP possibly reduce blood cholesterol (1)</li> <li>Too high intake could interfere with absorption of some micronutrients (1) (6 x1)</li> </ul>  | 6           |
|                        | <b>Total for question</b>  | <b>10</b>   |
| <b>Question Number</b> | <b>Answer</b>  | <b>Mark</b> |
| 6(a)(i)                | <p><i>Two of the following, stating ways in which the body uses energy, up to a maximum of two marks:</i></p> <ul style="list-style-type: none"> <li>basal metabolism /Bodily functions / named basal metabolic process (1)</li> <li>physical activity (1)</li> <li>thermogenesis (heat production) (1)</li> <li>chemical activity (1)</li> <li>electrical activity (1)</li> </ul> <p style="text-align: right;">(2x1)</p>   | 2           |
| 6(b)                   | <p><i>Maximum of 2 marks explaining the concept of negative energy balance</i></p> <ul style="list-style-type: none"> <li>energy intake is less (1) than the energy expenditure (1) /energy expenditure greater (1) than energy intake (1)</li> <li>will lead to weight loss (1)</li> </ul> <p style="text-align: right;">(2x1)</p>  | 2           |
| 6(c)                   | <p><i>Four points from the following to explain why the issue of obesity is a major focus for health professionals in the UK, up to a maximum of four marks.</i></p> <ul style="list-style-type: none"> <li>Sedentary lifestyles (1) therefore people becoming/are less active (1)</li> <li>Several conditions are associated with overweight and obesity which adversely affect people’s quality of life (1)</li> <li>Such conditions include: <ul style="list-style-type: none"> <li>(type 2) diabetes (1)</li> <li>hypertension (1)</li> <li>coronary heart disease (1)</li> <li>High cholesterol (1)</li> <li>stroke (1)</li> <li>osteoarthritis (1)</li> <li>cancer (1)</li> <li>gallstones (1)</li> <li>complications in pregnancy (1)</li> <li>complications in surgery (1)</li> <li>low self esteem / depression (1)</li> </ul> <p style="text-align: center;"><i>( Maximum of 2 marks for named conditions associated with obesity)</i></p> </li> <li>create increasing financial burden (1) social burden (1) burden on NHS (1)</li> <li>tackling childhood obesity (1) early intervention (1)</li> <li>educating parents (1) to promote healthy lifestyles and balanced diet (1)</li> </ul> | Max 4       |



(4x1)

6 (d)

*Maximum of four marks from one of the following new food materials used in the development of food products targeted at those who wish to go on a reduced calorie diet.*

**Modified starches (1)**

- are native starches that have been chemically modified (not GM) to produce a specific function in a food product (1)
- Modified starches can give a creamy mouthfeel (1) which would traditionally be produced by fat (1) to a product
- E.g. special maltodextrin, a carbohydrate that when dissolved in water gels with fat-like textural characteristics / named modified starch used to give characteristics of fat in a product (1)
- Modified starches function as stabilisers (1) and so act as thickeners in reduced calorie dressings (1) and low-fat desserts (1)
- ( Discussion point) Many consumers today look for 'clean labels' and especially dislike the use of added artificial ingredients. (1)

**Encapsulation (1)**

- Involves the coating of a fine particle of an active core with an outer shell into small capsules (1)
- Encapsulation is a barrier technology, preventing ingredients from reacting prematurely with their environment or degrading during processing or storage (1)
- In reduced calorie products, encapsulation can be used to enhance the flavour of food through the addition of encapsulated natural and artificial flavours (1) which might have been traditionally provided by fat (1)
- Encapsulated nutrients could be added to a food to promote a reduced calorie functional food (1)
- ( Discussion point) Many consumers today look for 'clean labels' and especially dislike the use of added artificial flavours (1) or foods which are not considered 'natural' (1)

**Meat analogues / novel protein (1)**

- use either naturally occurring ingredients (e.g. soya bean) or fermentation technology to manufacture a food which has been altered to perform a particular function, i.e. act as an alternative to meat (1)
- In recent years, manufacturers have used meat analogues which mimic the sensory properties of meat and can be used to replace or extend meat in traditional products (1) the texture and flavour can be disappointing for some consumers (1)
- e.g. textured vegetable protein (TVP)/ myco-protein (quorn)/ tofu (1)
- They are low fat products (1) and so can be used In calorie reduced products as they are a lower calorie **HBV** protein source than meat or poultry (1)
- Many of these analogues are also **fortified (1) with named** vitamins and minerals, e.g. vitamin B12 and iron (1)

|  |                           |           |
|--|---------------------------|-----------|
|  | (4x1)                     |           |
|  | <b>Total for question</b> | <b>12</b> |

| Question Number | Answer  | Mark      |
|-----------------|---|-----------|
| 7a)             | <p><i>The following to state the three main parts of a cereal grain.</i></p> <ul style="list-style-type: none"> <li>• Bran / husk (1)</li> <li>• Endosperm (1)</li> <li>• Germ / embryo (1)</li> </ul> <p>(3 x 1)</p>   | 3         |
| 7 b)            | <p><b>All products must be addressed for full marks. Up to a maximum of nine marks evaluating the different types of wheat used in the making of bread, biscuits and pasta.</b></p> <ul style="list-style-type: none"> <li>• Hard wheats (1) have a high gluten/protein content (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 producing well-risen / good bread (1)</li> <li>• Soft wheats (1) have a lower gluten/protein content (1) and produce a weak flour (1) better used where a finer, shorter texture (1) where a developed gluten network is undesirable (1)</li> <li>• Pasta is made from hard (1) durum (1) wheat which has a high gluten/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 dough can be stretched (1) and 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)</li> </ul> <p>(3x3)</p> | 9         |
|                 | <b>Total for question</b>   | <b>12</b> |