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**FOOD AND NUTRITION**

**0648/13**

Paper 1 Theory

**October/November 2017**

MARK SCHEME

Maximum Mark: 100

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**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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| Question | Answer  | Marks |
|----------|---|-------|
| 1        | <i>difference between malnutrition and under nutrition</i><br><br>malnutrition is unbalanced / <u>incorrect intake</u> of nutrients;<br>under nutrition is <u>not enough food</u> / insufficient amount of nutrients; | 2     |

| Question  | Answer  | Marks |
|-----------|---|-------|
| 2(a)(i)   | <i>children require higher levels of protein</i><br><br>rapid growth / growth spurt;<br>repair due to small children falling over;<br>energy for activities due to age; | 1     |
| 2(a)(ii)  | <i>athletes require higher levels of protein</i><br><br>energy for athletic pursuits;<br>repair to damaged muscle tissue / muscle growth;                               | 1     |
| 2(a)(iii) | <i>women who are breastfeeding require higher levels of protein</i><br><br>repair of body cells after birth;<br>energy for milk production;                             | 1     |
| 2(b)      | <i>sources of high biological value protein</i><br><br>cheese;<br>eggs;<br>fish;<br>meat;<br>milk;<br>soya;   | 2     |
| 2(c)      | <i>action of trypsin during the digestion of protein</i><br><br>converts protein to <u>peptones / peptides / polypeptides</u> ;   | 1     |

| Question | Answer   | Marks |
|----------|--|-------|
| 2(d)     | <i>deficiency disease caused by a lack of protein</i><br>marasmus;<br>kwashiorkor;                   | 1     |
| 2(e)(i)  | <i>denaturation</i><br>(permanent / irreversible) change to structure / shape when heated / by acid; | 1     |
| 2(e)(ii) | <i>coagulation</i><br>setting / hardening when <u>heated</u> ;                                       | 1     |

| Question | Answer  | Marks |
|----------|---|-------|
| 3(a)     | <i>difference between fats and oils</i><br>oils are liquid at room temperature, fats are solid at room temperature;<br>oils are generally from plant sources, fats generally from animal sources;   | 1     |
| 3(b)     | <i>functions of fat in the body</i><br>warmth/heat/insulation;<br>energy;<br>energy store;<br>protein sparing;<br>protection of internal organs;<br>solvent for fat-soluble vitamins / vitamins A, D, E, K;<br>formation of cell membranes;<br>increases calorific value of food without adding bulk;<br>high satiety value / gives a feeling of fullness;<br>provides essential fatty acids; | 4     |

| Question | Answer  |   |   |  | Marks   |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
|----------|---|---|---|--|---------|----------|------------|--------|---------|--|---|---|------|---|---------|--|--------|--|--|--|--------|---|--|--|---|
| 3(c)     | <i>action of lipase during the digestion of fat</i><br>converts fats to <u>glycerol</u> and <u>fatty acids</u> ;  |   |   |  | 1       |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| 3(d)     | <i>type of fat</i><br><u>saturated</u> ;  |   |   |  | 1       |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| 3(e)     | <i>why eating too much fat could cause heart disease</i><br>fat deposits lead to obesity which causes extra strain on heart;<br>cholesterol is found in saturated fat which is deposited on artery walls;<br>cholesterol narrows / blocks artery walls so flow of oxygen in blood reduced / stopped;  |   |   |  | 2       |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| 4        | <table border="1"> <thead> <tr> <th data-bbox="322 683 472 735">mineral</th> <th data-bbox="472 683 958 735">function</th> <th data-bbox="958 683 1332 735">deficiency</th> <th data-bbox="1332 683 1805 735">source</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 735 472 959">calcium</td> <td data-bbox="472 735 958 959"></td> <td data-bbox="958 735 1332 959">rickets;<br/>osteomalacia;<br/>tetany;<br/>osteoporosis;<br/>osteopenia (low bone density);</td> <td data-bbox="1332 735 1805 959">dairy food or named example;<br/>bones of <u>canned</u> fish e.g. salmon;<br/>bread; hard water; green veg (or named example); wholegrain cereals; nuts or named example;<br/>pulses or named example;</td> </tr> <tr> <td data-bbox="322 959 472 1107">iron</td> <td data-bbox="472 959 958 1107">formation of haemoglobin / red pigment in blood / red blood cells;<br/>transports oxygen to cells / in blood / cell respiration;</td> <td data-bbox="958 959 1332 1107">anaemia</td> <td data-bbox="1332 959 1805 1107"></td> </tr> <tr> <td data-bbox="322 1107 472 1225">iodide</td> <td data-bbox="472 1107 958 1225">makes hormone thyroxine;<br/>controls rate at which energy is used / controls rate of metabolism;</td> <td data-bbox="958 1107 1332 1225"></td> <td data-bbox="1332 1107 1805 1225">seafood; milk; dairy food;<br/>vegetables grown near the sea;<br/>iodised salt</td> </tr> <tr> <td data-bbox="322 1225 472 1449">sodium</td> <td data-bbox="472 1225 958 1449">controls the amount of water in the body;<br/>maintains normal pH of blood;<br/>transmits nerve signals;<br/>helps muscular contraction;<br/>regulation of fluids in blood;</td> <td data-bbox="958 1225 1332 1449">headache;<br/>nausea / vomiting;<br/>muscle cramps;<br/>fainting;<br/>fatigue;</td> <td data-bbox="1332 1225 1805 1449"></td> </tr> </tbody> </table> |   |   |  | mineral | function | deficiency | source | calcium |  | rickets;<br>osteomalacia;<br>tetany;<br>osteoporosis;<br>osteopenia (low bone density); | dairy food or named example;<br>bones of <u>canned</u> fish e.g. salmon;<br>bread; hard water; green veg (or named example); wholegrain cereals; nuts or named example;<br>pulses or named example; | iron | formation of haemoglobin / red pigment in blood / red blood cells;<br>transports oxygen to cells / in blood / cell respiration; | anaemia |  | iodide | makes hormone thyroxine;<br>controls rate at which energy is used / controls rate of metabolism; |  | seafood; milk; dairy food;<br>vegetables grown near the sea;<br>iodised salt | sodium | controls the amount of water in the body;<br>maintains normal pH of blood;<br>transmits nerve signals;<br>helps muscular contraction;<br>regulation of fluids in blood; | headache;<br>nausea / vomiting;<br>muscle cramps;<br>fainting;<br>fatigue; |  | 8 |
| mineral  | function  | deficiency  | source  |  |         |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| calcium  |   | rickets;<br>osteomalacia;<br>tetany;<br>osteoporosis;<br>osteopenia (low bone density); | dairy food or named example;<br>bones of <u>canned</u> fish e.g. salmon;<br>bread; hard water; green veg (or named example); wholegrain cereals; nuts or named example;<br>pulses or named example; |  |         |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| iron     | formation of haemoglobin / red pigment in blood / red blood cells;<br>transports oxygen to cells / in blood / cell respiration;   | anaemia   |   |  |         |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| iodide   | makes hormone thyroxine;<br>controls rate at which energy is used / controls rate of metabolism;  |   | seafood; milk; dairy food;<br>vegetables grown near the sea;<br>iodised salt  |  |         |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |
| sodium   | controls the amount of water in the body;<br>maintains normal pH of blood;<br>transmits nerve signals;<br>helps muscular contraction;<br>regulation of fluids in blood;   | headache;<br>nausea / vomiting;<br>muscle cramps;<br>fainting;<br>fatigue;              |   |  |         |          |            |        |         |  |   |   |      |   |         |  |        |  |  |  |        |   |  |  |   |

| Question | Answer   | Marks    |
|----------|--|----------|
| 5(a)     | <p><i>effect of <math>-18\text{ }^{\circ}\text{C}</math> on bacteria</i></p> <p>bacteria are dormant;<br/>no bacterial multiplication is possible;</p> | <b>1</b> |
| 5(b)     | <p><i>effect of <math>75\text{ }^{\circ}\text{C}</math> on bacteria</i></p> <p>bacteria are killed / destroyed at this temperature;</p>                | <b>1</b> |

| Question | Answer  | Marks    |
|----------|---|----------|
| 6(a)     | <p><i>symptoms of scurvy</i></p> <p>tiredness / weakness / fatigue;<br/>walls of blood vessels weaken / break and blood escapes / bruises appear under the skin;<br/>pain in muscles and joints;<br/>teeth loosen;<br/>swollen / bleeding gums;<br/>wounds slow to heal / scars reopen;<br/>poor absorption of iron / anaemia;<br/>bulging eyes / proptosis;<br/>scaly / cracking / dry / brownish skin;<br/>stunted bone growth in children;</p> | <b>4</b> |

| Question | Answer   | Marks |
|----------|--|-------|
| 6(b)     | <p><i>prepare and cook green cabbage to retain its vitamin C content</i></p> <p>wash before cutting so vitamin C does not leach from cut cells;<br/> tear instead of cutting as tear follows cell walls and does not damage;<br/> do not shred too thinly less cell damage / expose too much surface to oxygen;<br/> use a sharp knife to prevent bruising / damaging cells;<br/> prepare just before cooking as vitamin C destroyed by enzymes from cell walls and by oxidation;<br/> do not soak as vitamin C is water soluble;<br/> use small amount of water for cooking as vitamin C is water soluble;<br/> boil water first so less leaching of vitamin due to prolonged cooking;<br/> lid on pan to speed up cooking time;<br/> do not overcook as vitamin C is destroyed by heat;<br/> use cooking liquid in sauces as it contains dissolved vitamins;<br/> do not add bicarbonate of soda which is alkaline and destroys vitamin C;<br/> cook by stir frying / microwaving due to speed of method so less exposure to loss of vitamin;<br/> steam as less contact with water to dissolve vitamin;</p> | 6     |

| Question | Answer  | Marks |
|----------|---|-------|
| 7(a)     | <p><i>methods used to make biscuits</i></p> <p>all-in-one / one-stage;<br/> melting;<br/> rubbing-in;<br/> whisking;</p>  | 2     |
| 7(b)(i)  | <p><i>type of flour and reason</i></p> <p>low gluten as no rise is required;<br/> plain flour as no raising agent is needed;<br/> rice flour / cornflour can be mixed to give shortness;<br/> wholemeal flour to give a nutty flavour / provide NSP;<br/> winter wheat / weak flour / soft flour / 0000 gives fine, even texture;</p> | 2     |

| <b>Question</b> | <b>Answer</b>  | <b>Marks</b> |
|-----------------|--|--------------|
| 7(b)(ii)        | <p><i>type of fat and reason</i></p> <p>butter or hard / block margarine for flavour / colour / good for rubbing in;<br/>soft/polyunsaturated margarine for ease of creaming / lower saturated fat;</p>  | <b>2</b>     |
| 7(b)(iii)       | <p><i>type of sugar and reason</i></p> <p>caster for finer texture;<br/>granulated for crunchy texture;<br/>soft brown to give colour;</p>   | <b>2</b>     |
| 7(c)            | <p><i>ways to decorate the biscuits after baking</i></p> <p>butter icing;<br/>caster sugar;<br/>fondant icing;<br/>frosting;<br/>glacé icing;<br/>(sieved) icing sugar;<br/>melted chocolate;<br/>piped cream;</p>   | <b>3</b>     |
| 7(d)            | <p><i>advantages of using paper-board / card</i></p> <p>available in variety of colours;<br/>biodegradable;<br/>can be coated / laminated for strength;<br/>can be folded / flexible;<br/>can be made from recycled material;<br/>can be waxed for protection against moisture;<br/>cheap;<br/>easy to print on;<br/>lightweight;<br/>strong / sturdy structure / durable;<br/>recyclable;<br/>variety of thicknesses;</p> | <b>4</b>     |

| Question | Answer   | Marks |
|----------|--|-------|
| 7(e)     | <p><i>information on a food label</i></p> <p>additives / allergens identified;<br/> address / 'phone / website of manufacturer;<br/> brand;<br/> cooking instructions;<br/> date marking;<br/> description;<br/> halal symbol;<br/> name of manufacture;<br/> name of product;<br/> ingredients;<br/> picture of product;<br/> price;<br/> recycle symbol;<br/> serving suggestion;<br/> storage instruction;<br/> special claims such as reduced fat / no added sugar / added vitamin C;<br/> vegetarian society symbol / suitability for vegans;<br/> weight;<br/> wheat ear / gluten free symbol;</p> | 5     |
| 8(a)     | <p><i>label parts of egg</i></p> <p>A – yolk;<br/> B – shell;<br/> C – chalazae;<br/> D – air (sac / cell / space);<br/> E – white;</p>  | 5     |



| Question | Answer  | Marks |
|----------|---|-------|
| 8(b)     | <p><i>guidelines when storing eggs</i></p> <p>air sac / blunt / round end up / pointed end down;<br/> in box or egg tray / rack;<br/> 0–5 °C/in refrigerator / cool / room temperature;<br/> store away from strong smelling foods;<br/> store away from raw meat / fish;<br/> use stock rotation / check best before dates;<br/> do not store cracked eggs;<br/> keep dry;<br/> do not wash;<br/> not too dry a place;<br/> if freezing separate egg yolk and white;</p> | 4     |
| 8(c)     | <p><i>functions of eggs with examples</i></p> <p>binding / holds ingredients together e.g. rissoles / fish cakes / croquettes / marzipan;<br/> aeration / lightening / traps air e.g. mousse / soufflé / meringues / Swiss roll;<br/> glazing e.g. pastry dishes / bread;<br/> emulsifying e.g. mayonnaise / rich cakes;<br/> coating e.g. fish / Scotch egg;<br/> setting / coagulation / thickening e.g. quiche / baked egg custard / lemon curd / soup;</p>            | 6     |

| Question | Answer  | Marks    |
|----------|---|----------|
| 8(d)     | <p><i>groups who may be at risk from eggs</i></p> <p>babies;<br/>elderly;<br/>sick people;<br/>pregnant women;<br/>people with an allergy to eggs;</p> <p><i>reasons they may be at risk</i></p> <p>eggs are protein food ideal conditions for microorganism growth;<br/>eggs are moist ideal conditions for microorganism growth;<br/>eggs are easily contaminated due to porous shell;<br/>eggs may contain salmonella / eggs are dangerous if not cooked properly due to salmonella;<br/>inability to digest egg protein (lysine) / allergic reaction;</p> | <b>4</b> |

| Question | Answer   | Marks    |
|----------|--|----------|
| 9(a)     | <p><i>type of vegetarian that does not eat eggs</i></p> <p>vegan / lacto-vegetarian;</p> | <b>1</b> |

| Question | Answer  | Marks    |
|----------|---|----------|
| 9(b)     | <p><i>reasons why some people choose to follow a vegetarian diet</i></p> <p>religious beliefs e.g. Hinduism, Jainism, Rastafarians, Zoroastrianism;<br/> moral / ethical reasons e.g. object to slaughter / rearing conditions of animals;<br/> uneconomical use of land e.g. expensive to rear animals / more crops could be grown if land was used for cereals / more people could be fed from same area of land;<br/> dislike taste / texture / smell / appearance of animal flesh;<br/> believe vegetarian diet is more healthy e.g. animal fat is saturated / contains cholesterol / associated with CHD / lacks dietary fibre;<br/> animal products / meat more expensive than plant products / cereals / pulses;<br/> peer pressure / follow trends;<br/> family upbringing / tradition / custom;<br/> health scares e.g. bird 'flu / BSE / Salmonella from eggs / chickens;<br/> environmental issues e.g. methane from cows;</p> | <b>5</b> |

| Question | Answer   | Marks |
|----------|--|-------|
| 10(a)    | <p><i>Discuss and explain the specific nutritional needs of an elderly person. Suggest ways in which the elderly can save money when shopping for food</i></p> <p><i>nutritional requirements [max. 10 marks]</i><br/> fewer fat / carbohydrate foods as they tend to be less active so this prevents obesity and associated diseases;<br/> protein foods to maintain and repair body cells;<br/> iron to help prevent anaemia / dementia / bleeding haemorrhoids;<br/> vitamin C to absorb iron / production of connective tissue / antioxidant;<br/> calcium / phosphorus to maintain bones and teeth / blood clotting / muscle function / prevents osteoporosis / osteomalacia / brittle bones;<br/> vitamin D to absorb calcium / phosphorus especially elderly who are housebound as they may have limited exposure to sunlight;<br/> increased NSP / dietary fibre prevention of constipation / diverticular disease / hernias / haemorrhoids / cancer of the colon / removal of toxins;<br/> vitamin B<sub>1</sub> / thiamin to release energy from carbohydrates / to help memory and concentration;<br/> vitamin B<sub>3</sub> / niacin / nicotinic acid prevention of dementia;<br/> vitamin B<sub>12</sub> (cobalamin) to prevent pernicious/anaemia;<br/> folate to prevent tiredness;</p> <p><i>saving money [max. 6 marks]</i><br/> buy foods in season it is cheaper / better quality;<br/> only buy what is needed to prevent waste e.g. two apples not four;<br/> cheaper to buy in bulk if able to store correctly;<br/> use cheaper cuts of meat / fish;<br/> use cheaper protein sources such as eggs, milk, cheese, TVP;<br/> use pulses mix with other LBV protein to give HBV;<br/> have a shopping list to reduce impulse buys / only buy what is needed;<br/> look for special offers / reduced price / use 'money off' coupons;<br/> check 'sell by' dates to prevent wastage;<br/> do not have fixed meal plans look for bargains;<br/> buy supermarket's own brands as are often cheaper;<br/> compare prices between shops for 'best buy';<br/> compare prices per 100 g / unit to get best value;<br/> shop locally to save transport costs / shop online;<br/> use markets as they are often cheaper;</p> | 15    |

| Question | Answer   | Marks |
|----------|--|-------|
| 10(b)    | <p><i>Discuss and explain the following aspects of microwave ovens:</i><br/> <i>(i) how food is cooked in a microwave oven; (ii) disadvantages of cooking in a microwave oven; (iii) safety when using a microwave oven.</i></p> <p><i>how food is cooked in a microwave oven (5 marks)</i><br/> microwaves heat food by radiation / electromagnetic waves;<br/> inside the oven is a machine that converts one form of energy into another / generator called a magnetron;<br/> the magnetron converts electricity into microwaves;<br/> microwaves vibrate millions of times per second;<br/> the food sits on a slowly spinning turntable so the microwaves cook it evenly;<br/> the microwaves bounce around the oven off the reflective metal walls of the compartment;<br/> when in contact with the food the energy from the microwaves causes water molecules in the food to start moving around / become excited / agitated;<br/> the molecules vibrate more quickly so the food gets hot;<br/> the hotter parts of the food will pass heat by conduction to the cooler parts giving uniform cooking throughout;</p> <p><i>disadvantages (5 marks)</i><br/> not all foods can be cooked e.g. pastry / whole eggs;<br/> food does not brown / cannot easily judge when cooked ;<br/> food does not become crisp;<br/> flavours do not develop as food cooks quickly;<br/> not suitable for large pieces of food / joints of meat / chicken / as microwaves only penetrate 4 cm;<br/> no aluminium / metal dishes / metal decorations on china as causes arcing which can damage magnetron;<br/> depends on an appropriate electricity supply;<br/> easy to overcook due to speed of cooking;<br/> may need more attention than other methods of cooking;<br/> standing time required to allow cooking to continue so overcooking can occur;<br/> different thickness of food cook unevenly / food needs to be turned;<br/> liquids need to be stirred to allow even cooking or 'hot spots' occur;<br/> size of the oven cavity limits the quantity and size of the food to be cooked;<br/> some heat can be transferred to cooking dish by conduction;</p> | 15    |

| Question | Answer  | Marks |
|----------|---|-------|
| 10(b)    | <p><i>safety (5 marks)</i></p> <p>remove lid / cling film carefully to prevent scalding from steam;<br/> use oven gloves to remove containers from microwave as they may be heated from the food;<br/> avoid using containers made from soft pliable plastics / melamine / china with a metal rim / metal containers / aluminium foil and coloured paper products due to arcing;<br/> cover foods with cling film / paper towel / lid to prevent splashing / spitting;<br/> pierce holes in cling film / film lid / food such as potato to allow steam to escape;<br/> do not heat water or other liquids beyond the time recommended by the manufacturer / recipe;<br/> do not operate the microwave with wet hands;<br/> do not operate the microwave with a frayed flex / cracked plug;<br/> don't operate empty;<br/> check seal for leaks;<br/> unopened jars / air tight containers should not be heated in the microwave as they may explode;<br/> do not stir liquids when cooking time is finished as they may boil over due to being superheated;</p> |       |