Version 1.0: 0608

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Home Economics 5561/6561

HEC6

Mark Scheme

2008 examination - June series

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HEC6

1

(a) The Committee on Medical and Nutritional Policy (COMA) recommends that:
35% of food energy should come from fats which equates to about 76g fat per day for women and l00g for men. Since these recommendations were made, much progress has been made by the population in reducing their total fat intake.
11% of food energy from saturated fats. Currently people are getting 13% of food energy from sat. fats.
2% of food energy from trans fatty acids
6.5% from cis PUFA
0.2% (min.) from n-3 (omega 3 fatty acids) PUFA (Long chain - 1 .5g per week)
n-6(omega 6 fatty acids) PUFA - min, for individuals of 1% and max. 10%
MUFA - no specific recommendation, but around 13% is sufficient.
Ways in which total fat content and saturated fat content can be reduced in the diet are:

- use lower fat versions of dairy products, eg. semi-skimmed milk, skimmed milk or use less of the full fat products
- use meats low in fat, eg. chicken (without skin) and lean cuts of meat; remove visible fat and skin where possible
- use less fat in cooking and low fat spreads for bread
- grill and bake foods instead of frying and roasting
- to reduce the amounts of saturates, lower fat chosen; fats/oils richer in mono-saturates(eg. olive oil, rapeseed oil) or polyunsaturates (eg. sunflower oil, corn oil) should be used sparingly as substitutes.
- cut down on processed food.

(max 9 marks)

CRITERIA BANDS

Simple answer (1- 3): the candidate has a simplistic understanding of the current recommendations for dietary fat intake and will not differentiate between the different types of fatty acids. May give limited suggestion/s on how the recommendations can be achieved.

Intermediate answer (4-6): candidates in this category are expected to discuss recommendations in more accurate terms, eg. the % of fat intake which should represent energy intake or similar facts. Candidates at the top end of this band should have an appreciation of the recommendations for some of the different types of fatty acids. A number of suggestions for achieving these recommendations is expected.

Higher level answer (7-9): candidates should have an in depth knowledge and understanding of the dietary recommendations for fat.
They should quote accurately the percentages of at least 3 different types of fatty acid, eg. total fat35%, unsaturated 11%, 6.5% PUFAs, 2% trans etc. A wide range of suggestions for achieving these recommendations is required for candidates to be put in this mark band.

(b) (i) ESSENTIAL FATTY ACIDS can only be derived from fats/ the diet (1) They include omega 3 (linolenic) (I) and omega 6(linoleic) (1) fatty acids. Essential for production of cell membranes/nervous tissue (1)

(4 marks)

(ii) TRANS FATTY ACIDS occur during the processing/hydrogenation (1) of oils. Describes the way in which the hydrogen atoms (1) are arranged/on geometrically opposite sides of the double bond(1). Associated with adverse effects (I) on blood cholesterol (1)

(Any 4 marks)

(iii) OXIDATIVE RANCIDITY describes the reaction between an unsaturated fatty acid (1) and oxygen(1) Oxygen joins the double bond to create aldehydes/ketones (1)which produce a rancid taste(1)

(4 marks)

(iv) HYDROGENATION is the hardening (l) of oils/unsaturated fatty acids (1) by the addition of hydrogen. (1) The hydrogen is pumped into the oil and the atoms it attach themselves to the free spaces on the carbon atoms (1)where there is a weak double bond.

(4 marks)

2

(a) Having a balance and variety of foods is important for health.
Not necessary at every meal, but should aim for balance over the day **and certainly the week.**
Balance means **all of the nutrients in the right proportions and quantities** to **meet our needs.**
The nutrients include **protein, fat, carbohydrate (including nsp), vitamins, minerals and water.**
Dietary needs vary from person to person, depending on age, sex and level of activity and lifestyle
Balance of Good Health/Eatwell Plate (FSA) is a pictorial guide to a balanced diet.
It is produced by the FSA in consultation with the department of health.
It is divided into 5 food groups: bread, other cereals and potatoes;
fruit and vegetables; milk and dairy foods; meat, fish and alternatives;
foods containing fats; foods containing sugar.
The food from the first 3 groups should be eaten in larger quantities than the food from the last 2 groups.
The Balance of Good Health guide is consistent with the government's 8 guidelines for a eating well.
Starchy foods should be a major part of a balanced diet.
Should also aim to eat 5 portions of fruit and vegetables every day.
May mention COMA and reduced fat, saturated fat, sugar and sodium + increased fibre intake.

(10 marks)

Simple answer (1-3): candidates in this band will have a very simplistic understanding of the concept of a balanced diet and will not refer to any of the government documents to support their answer.

Intermediate answer (4-7): candidates will demonstrate a sound understanding of the concept of a balanced diet, appreciating that all the nutrients are required in the correct proportions. May name some/all of the nutrients. Candidates at the top end of the band should refer to foods either in terms of variety or food groups. They may also make specific reference to the Balance of Good Health/Pyramid of Health.

High level answer (7-10): a in depth knowledge and understanding of all aspects of a balanced diet is expected. To achieve 9/10 marks candidates are expected to refer to the Balance of Health model in detail to support their definition of a balanced diet. Knowledge and understanding of the difference in dietary needs may also be mentioned.

(b) Relationship between diet and

(i) **obesity** - having a higher intake of kcals/kjoules (1)than those expended (1) contributes significantly to being overweight, Over time this imbalance leads to obesity(1) Regular consumption of fatty/fried foods (I) with their high kcal content (1) 1 g 9kcals (1)Excessive intake of sugary foods (1) also contributes as does any food which has an energy content (1) such as proteins(1) in amounts above ones RNI (1). Alcoholic drinks(l) also contribute kcals(i) to the diet.

(Any 5 marks)

(ii) **high blood pressure** - eating a balanced diet (1) that is low in fat (1) particularly saturates(1) and sodium (salt) (1) and low alcohol intake (1) and maintaining a healthy body weight(1)are linked to healthy blood pressure. The latest recommendation for adults is no more than 6g of salt a day(I). Many ready meals, takeaway foods and processed foods in general have high sodium content (1)

(Any 5 marks)

(iii) **diverticular disease -** there is a direct link between this condition and low fibre(l) intake. 2 types of fibre - soluble (1) and insoluble(i). Insoluble fibre absorbs water(1) and increases in bulk(1). This helps the stools to become soft(1) and bulky(1) thus keeping the gut in good working order(1). 18-24gms per day recommended.

(Any 5 marks)

3

(a) **THREE METHODS OF MAKING FLOUR MIXTURES LIGHT:**

• using **yeast** (1) in warm, moist conditions(l) **to produce C02**(l)eg in bread making (1)
• using **baking powder**(1) in warm, moist conditions(1) **produces C02**(l)eg Victoria sandwich cake (or other relevant example) (1)cakes
• using **steam**(1) high volume of liquid(1) converted to steam (1) at high cooking ternps.(1)eg Yorkshire puddings
• using **air** (l) whisked into eggs(i) and sieved (1) into flour eg Swiss roll/Victoria sandwich (1)

(9 marks)

Any THREE methods acceptable
Flour mixtures include bread, pastries, cakes, scones and white sauces

(b) **Knowledge of chemical structure and behaviour of main ingredients in baked products linked to successful results.**

Discussion should cover the following:

Flour in terms of its gluten content with suitable examples. Should appreciate that gluten has elastic properties in presence of water and that it is a protein which undergoes changes on heating. Gives structure, bulk and thickens. Gelatinises. Dextrinises in dry heat.
Sugar is a humectant and a sweetener. It is soluble and caramelises on heating. Gives colour and flavour. It delays the coagulation of egg proteins and the pasting of starch in the flour resulting in a good volume.
Fat adds colour and flavour to baked products. Has different melting points and varying levels of plasticity. All of these qualities dictated by fatty acid content. Contributes to flakiness in pastries and crumb in cakes. Tenderises. Increases keeping quality of baked products. Combination of fat and sugar can entrap air. Shortening.
Eggs - extremely versatile both as a whole food or separated into yolk and white. Proteins in white can be unravelled and trap air. Proteins in yolk can thicken as in Roulade. Coagulation on heating. Emulsifying properties of lecithin in egg yolk essential in cake making. Adds colour.

(16 marks)

CRITERIA BANDS
Simple answer (1 -4 marks): basic information with evidence of very limited knowledge and understanding of the chemical structure and behaviour of the 4 ingredients listed. At lower end of this band candidates may only refer to some of the 4 ingredients.

Intermediate answer (5 - 8 marks): candidate shows knowledge and understanding of the chemical structure and behaviour of some of the ingredients. May deal with one or two in some depth and' run out of steam' with the others. Must refer to chemical structure of at least one of these ingredients to achieve marks at the top of this band. Some examples are expected.

Good answer (9 - 12): candidates demonstrate a confident knowledge and understanding of at least 3 of the ingredients. Technical language will be used and relevant examples given, e.g. high gluten flour used in bread making.

High level answer (13 - 16 marks): candidates demonstrate an in depth knowledge and understanding of the chemical structure and behaviour of each of the 4 ingredients. Technical terms will be used confidently and a range of examples will be given to support their answers.

4

(a) Monosaccharides(l) C6 H12 06(1) eg glucose, fructose, galactose(leg = 1 mark)
Disaccharides(I) Cl 2 H22 011(1)eg sucrose, maltose, lactose (leg= 1 mark)
(6 marks)

(b) **Function of sugar** in each of the following food products:

(i) Egg white foam - sugar has a mixed effect on egg white foam. It delays foaming and reduces maximum volume. However it **stabilises** the foam **when added after foam formation**; it **prevents drainage** and **collapse** of the foam during cooking.

(ii) Jam - sugar acts as a **preservative**/prolongs shelf life**.** The **high concentration** of sugar **takes up the spaces occupied by water molecules** / has a **dehydrating effect** and thus **prevents microbial growth**. When sugar is **heated with the acidic fruit it hydrolises/inverts i.e sucrose is broken down** into **glucose and fructose.**

(iii) Baked egg custard - when sugar is added it **raises the coagulation temperature** and thus **reduces the risk of curdling.** Also the custards are more **translucent** and have a **finer skin** than if no sugar were added. Sweetens.
(10 marks)

Simple answer (1-3): simplistic statements only, mainly referring to the sweetening properties of sugar.

Intermediate answer (4-7): candidates will demonstrate a sound knowledge and understanding of the role of sugar in at least 2 of the food products. Cursory reference may be made to the third product. Technical terms will be used accurately.

High level answer (7-10): candidates demonstrates a thorough knowledge and understanding of the role of sugar in each of the three products. Technical terms are used confidently.

(c) Relationship between diet and
(i) **dental decay** - diet plays an important role in dental health. Frequent consumption of **sugary** foods and drinks can promote dental caries, whilst consumption of **acidic** foods and drinks also promotes dental decay. In the case of sugary food, it is changed to acid by bacteria through fermentation(in dental plaque coating the surface of teeth). The acid corrodes the tooth enamel (demineralisation) This process usually takes place below a pH of about 5.5. Foods like milk and cheese protect against dental caries. **Fluoride** also protects against dental caries by coating the tooth enamel to strengthen it and protect from decay.
(9 marks)

Simple answer (1-3): simplistic description of tooth decay relating mainly to sugar.

Intermediate answer (4-6): candidate demonstrates a sound understanding of the process of tooth decay and can relate it to more than one aspect of the diet. At the top end of this band candidates will use technical terms to describe the process of dental decay. Must refer to at least 2 aspects of diet to achieve 6 marks.
High level answer (7-9): candidates demonstrate an in depth knowledge and understanding of the relationship between diet and dental caries making reference to sugar, acid and fluoride. Technical terms will be used to accurately describe the process of decay.