



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2012**

Home Economics

Assessment Unit AS 1

assessing

Nutrition for Optimal Health

[AN111]

MONDAY 28 MAY, AFTERNOON

**MARK
SCHEME**

Section A

AVAILABLE
MARKS

- 1** Identify **three** novel sources of protein in the diet. (AO1)
- Quorn
 - textured vegetable protein
 - tofu
- All other valid points will be given credit [3] 3
- 2** State **four** effects on health resulting from an excess intake of vitamin A. (AO1, AO2)
- liver damage
 - birth defects
 - skin disorders
 - bone damage
- All other valid points will be given credit [4] 4
- 3** Outline the role of **two** nutrients needed for brain function. (AO1, AO2)
- Omega 3; long chain fatty acids n-3 are normally components of brain and retinal membranes, crucial for normal brain development
 - iron; insufficient iron in infancy results in long-term reductions in cognitive development and behaviour in children
 - iodine; necessary for production of thyroid hormones which play a key role in early growth and development of the brain
- All other valid points will be given credit [4] 4
- 4** Consider the importance of combining foods to achieve an appropriate balance of indispensable amino acids. (AO1, AO2)
- lack of any one of the indispensable amino acids will limit the synthesis of protein in the body
 - plant sources of protein are said to be of low quality and are lacking in one or more of the indispensable amino acids, however, if they are eaten with a second protein that lacks a different indispensable amino acid, the mixture is of high biological value and will provide the correct proportions for the body's needs
 - provided a diet contains a mixture of different proteins it is unlikely to be deficient in any essential amino acid [5] 5

- 5 Outline the nutritional benefits of including complex carbohydrates in the diet. (AO1, AO2)
- foods such as potatoes, bread and other cereal products, provide not only complex carbohydrates in the form of starch, but may also contain non-starch polysaccharides and other nutrients, such as protein, iron and vitamins B and E
 - they are more favourable than high fat foods as they have a lower energy density and a higher satiety value, thus reducing the proportion of fat in the diet
 - some complex carbohydrates are more slowly absorbed and can even out blood glucose levels
- All other valid points will be given credit [5]

5

- 6 Examine the dietary factors affecting calcium absorption in the body. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of calcium absorption in the body
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to examine a range of dietary factors affecting calcium absorption in the body
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of calcium absorption in the body
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to examine a range of dietary factors affecting calcium absorption in the body
- quality of written communication is reasonable to good

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of calcium absorption in the body
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to examine a range of dietary factors affecting calcium absorption in the body
- quality of written communication is very good to highly competent

Examples of suitable points to be examined by the candidate:

Enhancing factors

- vitamin D; causes the synthesis of a calcium-binding protein in the intestinal cells that transports calcium into the plasma; the ability to synthesise this protein and the amount made is regulated by active vitamin D
- lactose; this milk sugar enhances calcium absorption by keeping it in a soluble form
- sugars and protein; also enhance calcium absorption

Inhibiting factors

- phytic acid; this is present in whole cereals and combines with calcium in the body, to form an insoluble compound called calcium phytate
- oxalates; these are present in a range of foodstuffs and form an insoluble salt called calcium oxalate
- non-starch polysaccharide (NSP); this may trap some calcium, thus preventing absorption in the small intestine

All other points will be given credit

[8]

8

- 7 Identify the current dietary guidelines for saturated and polyunsaturated fatty acids and discuss the rationale for these guidelines. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of the current dietary guidelines for saturated and polyunsaturated fatty acids
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to identify the current dietary guidelines for saturated and polyunsaturated fatty acids
- demonstrates a limited ability to discuss the rationale for these dietary guidelines
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the current dietary guidelines for saturated and polyunsaturated fatty acids
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to identify the current dietary guidelines for saturated and polyunsaturated fatty acids
- demonstrates a reasonable to good ability to discuss the rationale for these dietary guidelines
- quality of written communication is reasonable to good

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of saturated and polyunsaturated fatty acids
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to identify the current dietary guidelines for saturated and polyunsaturated fatty acids
- demonstrates a very good to highly competent ability to discuss the rationale for these dietary guidelines
- quality of written communication is very good to highly competent

Examples of suitable points to be discussed by the candidate:

- rationale; dietary fats influence the risk of death from heart disease mainly through their effect on blood cholesterol, a major cause of death in our society
- cholesterol type; the risk of death from heart disease increases with higher levels of total cholesterol, higher levels of LDL cholesterol and lower levels of HDL cholesterol; the levels of these are affected by the different types of dietary fat and fatty acids
- saturated fatty acids; the average contribution of saturated fatty acids to dietary energy should be reduced to 10% or less; evidence shows that saturated fat is the dietary component with the greatest negative influence on total blood cholesterol and LDL cholesterol levels
- polyunsaturated fats; the average contribution of n-3 series should be increased to about 0.2 g per day or 1.5 g per week as it reduces blood triglycerides levels and has a lower blood clotting potential
- polyunsaturated omega 6; have found to have LDL cholesterol lowering properties, which helps to protect against heart disease, however, large amounts have been found to reduce the good “HDL” cholesterol levels, thus it is advised to not increase levels of these fatty acids from the current level

All other points will be given credit

[8]

8

- 8 Propose and justify possible reasons for a deficiency in vitamin D. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of reasons why a deficiency in vitamin D might occur
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to propose and justify reasons why a deficiency might occur
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of reasons why a deficiency in vitamin D might occur
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to propose and justify reasons why a deficiency might occur
- quality of written communication is appropriate

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of reasons why a deficiency in vitamin D might occur
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to propose and justify reasons why a deficiency might occur
- quality of written communication is very effective

Examples of suitable points to be proposed and justified by the candidate:

- inadequate dietary intake; not consuming enough naturally, in the diet, e.g. fortified margarines, oily fish, milk; following a strict vegetarian diet and not seeking out alternatives to animal sources; low levels in infant’s formula milk or a limited weaning diet, when introducing infants to solid foods
- poor absorption; absorption may be hindered due to malabsorption conditions of the intestine; excretion could also be increased due to high alcohol consumption
- low levels of skin synthesis; not enough skin exposure outdoors due to being housebound, for example, the sick or elderly; having your skin covered or use of sun creams with sunblock, which reduces the natural synthesis under the skin; reduced exposure during winter months might increase risk for pregnant women; reduced synthesis under the skin due to the natural ageing process

All other points will be given credit

[8]

8

Section A

45

Section B

AVAILABLE
MARKS

- 9 (a) Discuss the importance of achieving a balanced intake of energy during adulthood. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of energy requirements during adulthood
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the importance of achieving a balanced intake of energy for this group
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of energy requirements during adulthood
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to discuss the importance of achieving a balanced intake of energy for this group
- quality of written communication is reasonable to good

Mark Band ([8]–[10])

Overall impression: very good to highly competent

- clear knowledge and understanding of energy requirements during adulthood
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to discuss the importance of achieving a balanced intake of energy for this age group
- quality of written communication is very good to highly competent

Examples of suitable points to be discussed by the candidate:

- energy decreases with age; as adults get older and have finished growing, they tend to need less food because the body uses up less energy. Throughout life needs will vary and they should adjust the amount they eat accordingly. If physically active during the day then energy requirements will be greater than those who lead a more sedentary lifestyle; adults are more likely to gain weight, if the food and drink taken in provides more energy than used
- weight gain; men in particular should avoid excess energy intake as they are more prone to carrying weight in the abdominal area (central obesity); carrying weight in this area increases the risk of heart disease, diabetes and certain cancers

- activity levels; energy needs for adults are determined by activity levels and therefore if adults are involved in extreme sport, there will be an additional need for energy and associated nutrients for increased metabolism

All other points will be given credit

[10]

(b) Explain the possible consequences to health for adults who have an insufficient intake of:

- antioxidant nutrients
- zinc
- calcium

(AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of antioxidant nutrients, zinc and calcium
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the possible consequences to health of adults who have insufficient intake of these nutrients
- demonstrates a limited ability to select relevant points in relation to the health of adults
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of antioxidant nutrients, zinc and calcium
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to explain the possible consequences to health of adults who have insufficient intake of these nutrients
- demonstrates a reasonable to good ability to select relevant points in relation to the health of adults
- quality of written communication is reasonable to good

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of antioxidant nutrients, zinc and calcium
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to explain the possible consequences to health of adults who have insufficient intake of these nutrients
- demonstrates a very good to highly competent ability to select relevant points in relation to the health of adults
- quality of written communication is very good to highly competent

Examples of suitable points to be explained by the candidate:

Antioxidants

- CVD; a lack of the antioxidant vitamins, beta carotene, C and E, may result in less protection against heart disease as they play a preventative role in the formation of fibrous plaques
- cancers; a lack of selenium mineral may increase the risk of certain cancers as evidence points to a positive inverse relationship between selenium status and cancer mortality, especially for prostate, colon and rectal cancers. Antioxidant nutrients such as vitamin E and beta carotene have been associated with a lower risk of lung cancer
- brain function; it is thought that an adequate diet, containing plenty of antioxidants, in early adulthood, may be protective against some of the degenerative changes in the brain in later life

Zinc

- mild deficiency; includes suppressed appetite, poor taste acuity, delayed wound healing, immunosuppression
- growth retardation; some research suggests that poor zinc status in pregnant women especially in the first trimester may be linked with poor foetal growth

Calcium

- osteoporosis; it is important to maintain the skeleton during adult life in order to maintain peak bone mass and reduce the risk of osteoporosis in later life
- blood clotting; calcium is essential for blood clotting, if calcium levels are insufficient, blood will not clot

All other points will be given credit

[15]

25

10 (a) Debate the issue of micronutrient supplementation during pregnancy.

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of micronutrient supplementation during pregnancy
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to debate the issue of taking relevant micronutrient supplements during pregnancy
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of micronutrient supplementation during pregnancy
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to debate the issue of taking relevant micronutrient supplements during pregnancy
- quality of written communication is appropriate

Mark Band ([8]–[10])

Overall impression: very good to highly competent

- clear knowledge and understanding of micronutrient supplementation during pregnancy
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to debate the issue of taking relevant micronutrient supplements during pregnancy
- quality of written communication is very effective

Examples of suitable points to be debated by the candidate:

Arguments for supplementation

- folic acid; supplementation of the diets of women of childbearing age could reduce the risk of the occurrence of neural tube defects (NTDs) in their offspring. Current advice recommends a 0.4mg daily supplement of folic acid in addition to their usual dietary intake. For women who have already had an NTD-affected pregnancy, the advice is that they should take 5mg folic acid per day
- iron; more iron is required during pregnancy to supply the growing foetus, the placenta and the increased number of maternal red blood cells. These extra demands are usually met without the need to increase consumption because menstrual losses cease and intestinal absorption is increased. However, additional iron may be required when stores are low at the start of pregnancy and during the last trimester when a large transfer of iron from mother to foetus occurs
- vitamin D; the mother provides a store of vitamin D to her foetus during pregnancy. It is recommended that all women should receive supplementary vitamin D to achieve 10 micrograms per day, particularly for women who receive little sunlight exposure and also for vegans who eat a limited range of foods containing vitamin D

Arguments against supplementation

- vitamin A; high intakes of vitamin A can be harmful to the unborn baby. The Department of Health advises that pregnant women should avoid consuming supplements that contain vitamin A
- health effects; high intakes of iron, zinc and selenium are toxic and an excess of vitamin C can cause stomach upsets. Excess intake of vitamin B6 can cause neurological symptoms and excess intake of folic acid can mask a deficiency in vitamin B12
- nutritional imbalances; supplements can also create nutritional imbalances. Vitamins, minerals and other nutrients work together within the body. Too much of one particular nutrient may interfere with the absorption of another micronutrient

All other points will be given credit

[10]

(b) Explain why pregnant women are advised to reduce their consumption of the following:

- alcohol
- caffeine
- cheese
- eggs
- fish

(AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of food safety advice during pregnancy
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain why pregnant women are advised to reduce their consumption of these foods
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of food safety advice during pregnancy
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to explain why pregnant women are advised to reduce their consumption of these foods
- quality of written communication is appropriate

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of food safety advice during pregnancy
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good to highly competent ability to explain why pregnant women are advised to reduce their consumption of these foods
- quality of written communication is very effective

Examples of suitable points to be explained by the candidate:

Alcohol

- foetal alcohol syndrome; can result in a number of features diagnosed after birth. It can affect the way the baby develops in the womb, the baby's health at birth, the baby's susceptibility to illness at a later stage and the child's ability to learn.
- micronutrient absorption; drinking heavily can adversely affect the absorption of folate during pregnancy

Caffeine

- limit intake; limit the amount of caffeine consumed each day, but it is not necessary to cut it out completely; caffeine occurs naturally in a range of foods
- excess caffeine; high levels of caffeine can result in babies having a low birth weight, which can increase the risk of health problems in later life; high levels of caffeine might also cause spontaneous miscarriage

Cheese

- cheese to avoid; avoid cheeses such as Camembert, Brie or Chevre (a type of goats' cheese), or others that have a similar rind. Also avoid soft blue cheeses; these cheeses are made with mould and they can contain Listeria, a type of bacteria that could cause miscarriage or serious illness in the baby
- cheese which is safe to eat; hard cheeses, e.g. Cheddar, Edam, Parmesan, Mascarpone, Feta cheese, do not need to be reduced and can all be eaten safely

Eggs

- Salmonella; raw or undercooked eggs could be a source of Salmonella food poisoning which is particularly undesirable during pregnancy, although it is not likely to have a direct adverse effect on the baby
- raw egg sources; avoid eating raw eggs or food that contains raw or partially cooked eggs, e.g. mayonnaise. Eggs should be cooked until the white and yolk are solid

Fish

- avoid certain types; shark, marlin and swordfish should be avoided, and limit the amount of tuna eaten (no more than two tuna steaks a week or no more than four medium cans of tuna), due to the potential high levels of mercury present in these species, which could affect the babies' developing nervous systems
- reduce consumption; oily fish, sea bream, sea bass, turbot, halibut and rock salmon should be reduced as they contain low levels of pollutants that can build up in the body over time including dioxins and PCBs
- vitamin A; oily fish contains valuable sources of vitamin A, however too much is toxic and can harm the unborn baby

All other valid points will be given credit [15]

Section B

Total

25

25

70