



Rewarding Learning

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

Home Economics

Assessment Unit AS 1

assessing

Nutrition for Optimal Health

[AN111]

TUESDAY 10 JANUARY, AFTERNOON

MARK SCHEME

Section A

AVAILABLE
MARKS

- 1 State **three** dietary sources of non-haem iron. (AO1)
- white bread
 - green vegetables
 - dried fruits
- All other valid points will be given credit [3] 3
- 2 Describe the effects on health of a prolonged deficiency of niacin in the diet. (AO1, AO2)
- dermatitis; particularly affects those parts of the body exposed to sunlight and may appear like sunburn
 - diarrhoea; the lining of the gastrointestinal tract may be inflamed, resulting in heartburn, indigestion, abdominal pain and diarrhoea
 - dementia; tends to occur in advanced pellagra and ranges from disturbed sleep, through to anxiety, hallucinations and confusion
- All other valid points will be given credit [4] 4
- 3 Explain the functions of vitamin K in the body. (AO1, AO2)
- blood clotting; vitamin K is required for the synthesis of several proteins required for normal blood clotting
 - bone metabolism; vitamin K acts as a co-enzyme in the production of important proteins found in bone which is needed for the normal binding of calcium in bone matrix
- All other valid points will be given credit [4] 4
- 4 Present the arguments for and against the intake of oily fish during pregnancy. (AO1, AO2)
- for; fish oils are a rich source of n-3 fatty acids which are important for foetal development of the brain, nervous system and retina and so an adequate supply is essential during pregnancy
 - for; don't give up eating oily fish because the health benefits outweigh the risks as long as the recommended maximums are not exceeded (2 × 140g oily fish per week)
 - against; fish oils can contain high concentrations of vitamins A and D, which may be toxic to the unborn baby and lead to birth defects if recommended dose is exceeded
 - against; tuna is to be restricted during pregnancy and swordfish to be avoided, due to the presence of mercury, which at high levels can harm a baby's developing nervous system
- All other valid points will be given credit [5] 5

5 Explain why there may be an increased requirement for zinc in adolescence.

- growth; an insufficient reserve of zinc in the body will not enable adolescents to cope with the demands of physical development during adolescence, which may subsequently lead to poor growth
- sexual development
- zinc is needed to prevent delayed sexual maturation and skeletal abnormalities
- boosts immunity; zinc supports the immune system and so is important to help heal wounds and combat infections, it is also used to help with treating acne

All other valid points will be given credit

[5]

5

6 Comment on the view that alcohol can be beneficial to the health of adults when consumed in small to moderate amounts. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of alcohol and the health of adults
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to comment on the view that alcohol can be beneficial to health when consumed in small to moderate amounts
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of alcohol and the health of adults
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to comment on the view that alcohol can be beneficial to health when consumed in small to moderate amounts
- quality of written communication is appropriate

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of alcohol and the health of adults
- 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 comment on the view that alcohol can be beneficial to health when consumed in small to moderate amounts
- quality of written communication is very effective

Examples of suitable points to be commented on by the candidate:

- mortality rates; research shows that abstainers and heavier drinkers have higher mortality rates than moderate drinkers
- cardiovascular health; moderate alcohol intake is associated with lower rates of CVD; alcohol may affect blood clotting; phenolic antioxidants in red wine may help prevent heart disease by reducing the oxidation of LDL cholesterol, thus reducing the risk of atherosclerosis
- potential benefits; some scientific studies have found that drinking alcohol in moderation may be associated with a reduction of breast cancer risk, however this may be outweighed by the risk of developing other illnesses associated with alcohol consumption, e.g. liver disease or cancer
- psychological health; moderate intake could help reduce stress and be a social tonic

All other valid points will be given credit

[8]

8

7 Explain **four** functions of protein in the body. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of the functions of protein
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the functions of protein 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 the functions of protein
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to explain the functions of protein in the body
- quality of written communication is appropriate

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of the functions of protein
- 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 functions of protein in the body
- quality of written communication is very effective

Examples of suitable points to be explained by the candidate:

- structure; each cell contains protein as part of the cell membrane and within its cytoplasm; protein is synthesised during growth, repair, maintenance and replacement during life; proteins also form part of the structural framework of bones
- formation of enzymes; almost all enzymes are proteins and thus proteins are instrumental in facilitating most of the chemical reactions that occur in the body, including digestion of nutrients, regulation of energy production in cells
- transport; many substances attach themselves to protein to facilitate transport in the body, e.g. haemoglobin is a transporting protein, to carry oxygen; transport proteins also carry substances across cell membranes, e.g. during absorption in the digestive tract
- homeostasis; the physiological mechanisms of the body aim to maintain a constant internal environment; this is achieved in many ways: hormones acting like messengers are carried in the circulation; proteins acting as buffers in the circulation to maintain an acid-base balance in the blood and bodily fluids

All other valid points will be given credit

[8]

8

- 8 Assess the role of sugars in the development of dental caries.
(AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of the role of sugars in the development of dental caries
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to assess the role of sugars in the development of dental caries
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the role of sugars in the development of dental caries
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to assess the role of sugars in the development of dental caries
- quality of written communication is appropriate

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of the role of sugars in the development of dental caries
- 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 assess the role of sugars in the development of dental caries
- quality of written communication is very effective

Examples of suitable points to be assessed by the candidate:

- sugar as a substrate for bacteria; teeth are covered in plaque made up of bacteria and sticky polysaccharides. The dietary sugars provide the substrate for the multiplication of oral bacteria and the subsequent production of acid
- types of sugars; extensive evidence suggests that the most cariogenic sugars are the non-milk extrinsic sugars which are present on the tooth surface without cell walls. Glucose and fructose are fermented at a similar rate to sucrose, but their overall impact on dental health is less as they are consumed less often and in smaller amounts
- frequency of consumption; if sugar consumption occurs at frequent intervals, the teeth are exposed for prolonged periods of time to the low pH, resulting in demineralisation and the development of caries. If sugars are confined to mealtimes, the production of more saliva can wash away sugar remnants and buffer the acid
- concentration of sugars; a low concentration that passes through the mouth very quickly will have much less effect than a concentrated source of sugar present in a sticky form that remains in the mouth for a long period of time

All other valid points will be given credit

[8]

8

Section A

45

Section B

AVAILABLE
MARKS

- 9 (a) Examine the arguments for supplementation in the diets of older people (65+). (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the use of supplementation in the diets of older people (65+)
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to examine relevant arguments for supplementation in relation to older people
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the use of supplementation in the diets of older people (65+)
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to examine relevant arguments for supplementation in relation to older people
- quality of written communication is appropriate

Mark Band ([8]–[10])

Overall impression: very good to highly competent

- clear knowledge and understanding of the use of supplementation in the diets of older people (65+)
- 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 relevant arguments for supplementation in relation to older people
- quality of written communication is very effective

Examples of suitable points to be discussed by the candidate:

- vulnerable group; many issues such as poor appetite, reduced income, illness or mobility issues make it difficult for some older people to achieve a healthy balanced diet
- drug interactions; the presence of disease and its treatment by drugs may affect nutritional needs, e.g. aspirin interferes with the absorption of vitamin C, thus resulting in a deficiency of this vitamin
- vitamin D; many older people have been found to be deficient in vitamin D due to being housebound and not getting enough natural sunlight. The acceleration in bone loss, post menopause, may also warrant taking vitamin D and calcium in supplement form
- B vitamins; vitamins B6, B12 and folate can help reduce the levels of homocysteine in the blood, which is linked to heart disease, alzheimers disease and memory loss. Supplements may help reduce the risk of heart disease or dementia

- poor dentition; if intakes of red meat are low due to poor dentition and perhaps low income, iron supplements may be recommended
- antioxidants; supplementation with several antioxidants, most notably vitamin E and C have been associated with a reduced risk of age associated chronic diseases and maintenance of cognitive function

All other points will be given credit

[10]

- (b) Discuss the specific nutritional requirements of older people (65+).
(AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of the specific nutritional requirements of older people (65+)
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to select and discuss relevant nutrients in relation to older people (65+)
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the specific nutritional requirements of older people (65+)
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to select and discuss relevant nutrients in relation to older people (65+)
- quality of written communication is appropriate

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of the specific nutritional requirements of older people (65+)
- 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 select and discuss relevant nutrients in relation to older people (65+)
- quality of written communication is very effective

Examples of suitable points to be discussed by the candidate:

- energy; needs decrease with age due to a reduction in physical activity levels and a decrease in basal metabolism, as a result of a decline in lean body mass
- protein; protein synthesis, turnover and breakdown all decrease as people get older. Homeostatic mechanisms regulate protein levels in the body and these can be less efficient in the elderly. The condition of health can also upset the equilibrium for protein in the body, thus requiring an increased intake
- calcium and vitamin D; adequate intakes of calcium can help to slow age related bone loss, which can result in osteoporosis and fractures. Vitamin D can also be deficient due to a lack of exposure to sunlight and reduced vitamin D synthesis
- iron; the need for this is reduced due to the cessation of menstruation, however due to malabsorption of nutrients at this lifestage, iron is still important to prevent iron deficiency anaemia and associated problems
- B vitamins; folate, B12 and others are important to prevent anaemia. Low folate status is quite common due to poor dietary intake or malabsorption. Folate and B6 may also help to lower homocysteine levels, thus reducing risk of CVD at this lifestage
- vitamin C; needed for healthy connective tissue and deficiency can result in poor wound healing and weakened immune system. Vitamin C also has antioxidant properties which plays a role in preventing degenerative diseases

All other valid points will be given credit

[15]

25

- 10 (a)** Explain the importance of achieving an adequate intake of iron and calcium for schoolchildren (4–11 years). (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of iron and calcium
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the importance of achieving an adequate intake of iron and calcium for schoolchildren
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of iron 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 importance of achieving an adequate intake of iron and calcium for schoolchildren
- quality of written communication is appropriate

Mark Band ([8]–[10])

Overall impression: very good to highly competent

- clear knowledge and understanding of iron 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 importance of achieving an adequate intake of iron and calcium for schoolchildren
- quality of written communication is very effective

Examples of suitable points to be explained by the candidate:

Iron

- growth and development; children are particularly susceptible to iron deficiency anaemia in view of their increased blood volume and muscle mass during growth periods, raising the need for iron to build up haemoglobin, the red pigment in blood which carries oxygen and for the related protein myoglobin, in muscle
- menstruation; elevated iron levels are needed during the onset of menstruation in young girls
- cognitive function; some research suggests children with a low iron intake or iron deficiency anaemia may have a lower cognitive achievement, compared to children with normal iron status

Calcium

- bones and teeth; the majority of calcium is present in the bone where it plays an essential part in hardening the skeleton and teeth
- skeleton; this accounts for at least 99% of the body stores of calcium and the gain in skeletal weight is most rapid during growth spurts. About 45% of the skeletal mass is formed during early adolescence (10+ years). All the calcium for the growth of the skeleton must be derived from the diet
- calcium retention; the accumulation of calcium during childhood is greatest. The efficiency of calcium absorption is only around 30% so it is important that the diet supplies an adequate calcium intake to help build the densest bones possible. The achievement of peak bone mass during this life stage is crucial to reduce the risk of osteoporosis in later years

All other valid points will be given credit

[10]

- (b) Explore some of the reasons why parents often find it difficult to achieve good nutrition in children aged 4–11 years. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of difficulties in achieving good nutrition in children aged 4–11 years
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explore some of the reasons why parents often find it difficult to achieve good nutrition in this age group
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of difficulties in achieving good nutrition in children aged 4–11 years
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to explore some of the reasons why parents often find it difficult to achieve good nutrition in this age group
- quality of written communication is appropriate

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of difficulties in achieving good nutrition in children aged 4–11 years
- 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 explore some of the reasons why parents often find it difficult to achieve good nutrition in this age group
- quality of written communication is very effective

Examples of suitable points to be explored by the candidate:

- peer pressure; can have negative effects on the eating patterns of children which may conflict with parents wishes, for example, there may be an unhealthy desire to be thin amongst peer groups, which leads to undereating
- price premium on healthy foods; often less wholesome foods are much cheaper and more regularly on special offer, which makes it difficult to justify making the more expensive healthier choices
- highly visible value marketing; the snack market is huge and the majority of food adverts feature high fat sugar and salty snacks (HFSS), which makes it difficult for parents to resist pester power which results from these marketing practices
- role model; children learn from example, so parents need to make an effort to be seen making the healthier choices themselves

- busy lifestyles; modern parents are often busy and perceive healthy eating to be time consuming, which increases the likelihood of them opting for more convenient, ready prepared foods, which may not always be the best nutritional choices for the whole family
 - autonomy; as children get older, parents have less control over their children's food intake, particularly in relation to snacks; this can greatly impact on food choice and nutritional status of children
- All other valid points will be given credit [15]

Section B

Total

AVAILABLE MARKS	
	25
Section B	25
Total	70