



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2016**

Home Economics

Assessment Unit AS 1

assessing

Nutrition for Optimal Health

[AN111]

MONDAY 23 MAY, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

Section A

**AVAILABLE
MARKS**

<p>1 State three micronutrients with antioxidant properties. (AO1)</p> <ul style="list-style-type: none">• vitamin C• beta carotene• selenium <p>All other valid points will be given credit</p>	[3]	3
<p>2 Describe the effects on health of a prolonged deficiency of niacin. (AO1, AO2)</p> <ul style="list-style-type: none">• dermatitis; particularly affects those parts of the body exposed to sunlight and appears 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 <p>All other valid points will be given credit</p>	[4]	4
<p>3 Explain the term nitrogen balance in relation to protein requirements. (AO1, AO2)</p> <ul style="list-style-type: none">• indicator of protein metabolism; it is the overall indicator of protein metabolism in the body, which is the difference between intake and losses of nitrogen• positive nitrogen balance; this indicates protein is being retained in the body, indicating protein synthesis, i.e. growth or major tissue repair• negative nitrogen balance; this occurs when losses exceed intake, indicative of protein being depleted, which could be caused by starvation, injury or illness <p>All other valid points will be given credit</p>	[4]	4
<p>4 Differentiate between intrinsic and extrinsic sugars in the diet and provide examples to support your answer. (AO1, AO2)</p> <ul style="list-style-type: none">• intrinsic sugars are naturally present and built into the cellular structure of food whereas extrinsic sugars are not incorporated in cell structure• intrinsic sugars, e.g. glucose and fructose are found in the cells of fruit and vegetables whereas extrinsic sugars may be from natural, unprocessed foods such as lactose in milk or more frequently from refined or processed foods such as table sugar, fruit juices and manufactured foods with added sugar, referred to as non-milk extrinsic sugars (NMES)• a high intake of extrinsic sugars apart from lactose, that is NMES, is associated with dental caries whereas, when intrinsic sugars are eaten as part of the cellular structure of food, as with fruit, there is no adverse effect on health <p>All other valid points will be given credit</p>	[5]	5

5 Present some of the possible health benefits of consuming alcohol in small to moderate amounts. (AO1, AO2)

- small to moderate alcohol intake is associated with lower rates of CVD; alcohol may affect blood clotting, by causing blood to clot less avidly and by enhancing the ability of blood to break up clots, when they form. Phenolic antioxidants in red wine may help prevent heart disease by reducing the oxidation of LDL cholesterol, thus reducing the risk of atherosclerosis
- small to moderate consumption has also been linked with beneficial changes to insulin sensitivity thus helping in the management of diabetes
- small to moderate intake could help reduce stress and be a social tonic, thus contributing to good mental health and well-being

All other valid points will be given credit

[5]

AVAILABLE
MARKS

5

6 Explain the role of essential fatty acids in the diet. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of essential fatty acids in the diet
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the role of essential fatty acids in the diet
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of essential fatty acids in the diet
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to explain the role of essential fatty acids in the diet
- quality of written communication is reasonable to good

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of essential fatty acids in the diet
- demonstrates a very good to highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a very good ability to explain the role of essential fatty acids in the diet
- quality of written communication is very good to highly competent

Examples of suitable points to be explained by the candidate:

- cell membranes; essential for the stability and integrity of these cell membranes
- other substances; they make hormone-like substances such as prostaglandins and other eicosanoids which are involved in a number of functions in the body such as the clotting of blood and regulation of cholesterol
- neurological development; omega 3 fatty acids are particularly important in the membranes of the nervous system, brain and retina
- reduces inflammation; can help treat stiffness and joint pain
- CVD; there is evidence that eating EFA reduces the risk of death from heart attacks by decreasing the tendency of the blood to clot

All other valid points will be given credit

[8]

8

- 7 Consider the benefits of breastfeeding in relation to the health of the baby.
(AO1, AO2, AO3)

AVAILABLE
MARKS

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of the benefits of breastfeeding
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to consider a range of benefits in relation to the health of the baby
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the benefits of breastfeeding
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to consider a range of benefits in relation to the health of the baby
- quality of written communication is reasonable to good

Mark Band ([6]–[8])

Overall impression: very good to highly competent

- clear knowledge and understanding of the benefits of breastfeeding
- 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 consider a range of benefits in relation to the health of the baby
- quality of written communication is very good to highly competent

Examples of suitable points to be considered by the candidate:

- correct balance of nutrients; breast milk provides the ideal combination of energy nutrients and fluids to meet the baby's needs in the first six months of life and its composition automatically changes as the baby grows and develops
- protective factors; protection is passed on to baby against illness as the mother's body contains pathogens and whenever a virus enters her body the pathogens create antibodies which fight against the virus – these antibodies are passed on to baby
- boosts immunity; colostrum contains immunoglobulin A which guards the baby from invading germs by forming a protective layer on the mucous membranes in baby's intestines, nose and throat
- reduces infection; exclusive breastfeeding for at least 3 months is associated with a lower incidence and severity of gastroenteritis, ear infection and respiratory infection in the infant
- future health; there is increasing evidence that breastfeeding is associated with a lower risk of an infant developing obesity and cardiovascular risk factors, such as hypertension and insulin resistance, in later life. It is also likely that breastfeeding protects against some immune-related diseases such as diabetes, coeliac disease, inflammatory bowel disease and possibly cancer

All other valid points will be given credit

[8]

8

8 Explain the functions of carbohydrate as a nutrient in the body. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of carbohydrate as a nutrient in the body
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the functions of carbohydrate as a nutrient 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 carbohydrate as a nutrient 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 explain the functions of carbohydrate as a nutrient 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 carbohydrate as a nutrient 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 explain the functions of carbohydrate as a nutrient in the body
- quality of written communication is very good to highly competent

Examples of suitable points to be explained by the candidate:

- energy; glucose is oxidised in the cells and broken down in a series of reactions and energy is released providing 17 kJ of energy per gram
- storage; glycogen is formed and stored in the liver and muscles as a readily available source of energy; glucose in excess of energy requirements can be converted into fat and stored all over the body in the fatty cells of the adipose tissue
- protein sparing; a moderate carbohydrate intake ensures that most of the dietary protein can be used for growth purposes
- non-starch polysaccharides (NSP); give bulk to the faeces and prevent disorders of the colon

All other valid points will be given credit

[8]

Section A

**AVAILABLE
MARKS**

8

45

Section B

**AVAILABLE
MARKS**

9 (a) Explain the nutritional significance of achieving an adequate intake of the following during pregnancy:

- energy;
- protein; and
- iron. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of energy, protein and iron during pregnancy
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the nutritional significance of achieving an adequate intake of energy, protein and iron during pregnancy
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of energy, protein and iron 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 the nutritional significance of achieving an adequate intake of energy, protein and iron during pregnancy
- 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, protein and iron 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 the nutritional significance of achieving an adequate intake of energy, protein and iron during pregnancy
- quality of written communication is very good to highly competent

Examples of suitable points to be explained by the candidate:

Energy

- weight; important to achieve an adequate intake of energy as extreme weight gain and loss can cause complications during pregnancy
- third trimester; additional energy is needed in third trimester for the formation of new tissue (foetus, placenta, amniotic fluid) and maternal tissues, e.g. breast and uterus; increased oxygen consumption by maternal organs.

Protein

- foetal growth; as the foetus enters a rapid growth phase, the protein becomes available from the mother's tissues. In this way, the needs can be met without a major increase being necessary
- maternal tissue; growth of maternal tissue, e.g. breast and uterus and milk production in the third trimester

Iron

- red blood cells; iron should be adequate in a woman's diet in preparation for pregnancy, to supply the growing foetus, the placenta and to meet the need of increased maternal red blood cells. There is an increased volume of blood plasma and the mass of red blood cells to increase the amount of oxygen going to the foetus
- intestinal absorption; can increase from 10% to over 50% in the last trimester. The iron needs of the foetus are met at the expense of maternal iron stores and women with already low iron stores in early pregnancy may need additional iron in the form of a supplement

All other valid points will be given credit

[10]

- (b) Debate the issue of micronutrient supplementation in pregnancy.
(AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

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

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of supplementation in 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 micronutrient supplementation in pregnancy
- quality of written communication is reasonable to good

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of supplementation in 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 micronutrient supplementation in pregnancy
- quality of written communication is very good to highly competent

Examples of suitable points to be debated by the candidate:**Arguments for**

- iron; a mother may be advised to take an iron supplement if she has had close successive pregnancies, her diet is poor, she is a teenager or is naturally low in iron
- folic acid; provides most protection against neural tube defects
- vitamin B₁₂; Department of Health recommends a supplement of vitamin B₁₂ for vegans
- calcium; supplementation with calcium has been used effectively to reduce blood pressure in women at risk of hypertension and may also be useful for those with an inadequate intake of calcium or a family history of osteoporosis

Arguments against

- iron; too much iron can lead to gastro-intestinal problems; low iron levels could merely be a marker for a generally inadequate diet, low in a range of nutrients, therefore better to improve the whole diet rather than just one nutrient
- excess vitamin A; could be toxic and could lead to birth defects
- excess folic acid; could mask a vitamin B₁₂ deficiency and lead to a late diagnosis which could result in spinal and neurological problems caused by B₁₂ deficiency

All other valid points will be given credit

[15]

AVAILABLE
MARKS

25

- 10 (a) Identify and explain some of the difficulties in achieving good nutrition in schoolchildren and adolescents. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the difficulties in achieving good nutrition in school children and adolescents
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to identify and explain these difficulties in school children and adolescents
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of the difficulties in achieving good nutrition in school children and adolescents
- demonstrates a reasonable to good ability to apply appropriate knowledge and understanding to the question
- demonstrates a reasonable to good ability to identify and explain these difficulties in school children and adolescents
- quality of written communication is reasonable to good

Mark Band ([8]–[10])

Overall impression: very good to highly competent

- clear knowledge and understanding of the difficulties in achieving good nutrition in school children and adolescents
- 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 and explain these difficulties in school children and adolescents
- quality of written communication is very good to highly competent

Examples of suitable points to be identified and explained by the candidate:

- peer pressure; can have negative effects on schoolchildren and adolescents' eating patterns which may conflict with parents' wishes, for example, they may be teased for eating 'uncool' healthy foods or there may be an unhealthy desire to be thin amongst peer groups, which leads to the other extreme of under-eating
- price premium on healthy foods; often unhealthy foods are much cheaper and more regularly on special offer, which makes it difficult to justify making the more expensive healthier choices, if following a tight budget
- highly visible value marketing; the snack market is huge and the majority of food adverts feature high fat, sugar and salty snacks (HFSS),

making it difficult for parents to resist pester power resulting from these marketing practices

- consistent messages; it is crucially important that the messages conveyed at home and at school are the same. Schoolchildren and adolescents 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, increasing 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 schoolchildren and adolescents get older, parents have less control over their food intake, particularly in relation to snacks; this can greatly impact on food choice and nutritional status

All other valid points will be given credit [10]

- (b) Discuss the specific nutritional requirements for schoolchildren (4–11 years). (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of specific nutritional requirements for schoolchildren (4–11 years)
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss these requirements for schoolchildren (4–11 years)
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: reasonable to good

- reasonable to good knowledge and understanding of specific nutritional requirements for schoolchildren (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 discuss these requirements for schoolchildren (4–11 years)
- quality of written communication is reasonable to good

Mark Band ([11]–[15])

Overall impression: very good to highly competent

- clear knowledge and understanding of specific nutritional requirements for schoolchildren (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 discuss these requirements for schoolchildren (4–11 years)
- quality of written communication is very good to highly competent

Examples of suitable points to be discussed by the candidate:

- energy; starchy carbohydrates are preferable rather than sugary carbohydrates (NMES) which can lead to dental caries; young children have a high requirement for dietary energy (calories) relative to their size
- fat; provides the child with energy and fat soluble vitamins. The BMR is still quite high and children are usually quite active. Fats need to be eaten in moderation in order to prevent children from becoming overweight (no more than 35% of total dietary energy per day)

- protein; as growth of children is rapid, excess protein can be converted to glucose and used as a store of energy; ten indispensable amino acids are required to meet the additional demands of children's growth and development
- calcium; the majority of calcium is present in bone where it plays an essential part in hardening the skeleton and teeth. The accumulation of calcium during childhood is greatest and accounts for at least 99% of the body stores of calcium, the gain in skeletal weight is most rapid during growth spurts
- iron; 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
- vitamin C; helps form collagen which fulfils the structural role in most organs, helps keep children's gums healthy and strengthens their blood vessels, helps cuts and wounds heal, boosts the immune system, keeps infections at bay and also helps the body absorb iron from non haem food sources which is essential during periods of rapid growth and development during childhood
- vitamin D; prevents the risk of rickets and assists the absorption of calcium which helps to prevent weak bones later in life. Important for those who are of Asian origin or who spend little time outdoors. Also if parents cover children in sunblock they may not receive adequate vitamin D

All other valid points will be given credit

[15]

**AVAILABLE
MARKS**

25

Section B

25

Total

70