Rewarding Learning

ADVANCED
General Certificate of Education
2017

Health and Social Care

Assessment Unit A2 15

assessing

Unit 15: Human Nutrition and Dietetics

[A6H71]

WEDNESDAY 7 JUNE, MORNING

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.

AVAILABLE MARKS

1 **(a)** Discuss how physical activity levels (PALs) affect an individual's energy requirements. (AO1, AO2)

Answers may address the following:
- the higher the level of physical activity, the greater the energy requirements of an individual
- the lower the level of physical activity, the less the energy requirements of an individual

[1] For key phrase(s), [2] for adequate discussion [3] for fuller discussion.
(1 × [3]) [3]

(b) Complete the table below to include one function and one rich source of each of the following nutrients in an adult's diet. (AO1, AO2)

Answers may include one of the following:

Vitamin A:
Function:
- Night vision, reduces night blindness, helping vision in dim light
- Healthy skin and tissue
- Helps immune system to work properly

Rich Sources:
- liver
- oily fish
- whole milk
- butter
- margarine, fortified low-fat spreads
- cheese
- eggs
- carrots
- green vegetables
- orange and red fruit and vegetables

Vitamin B6:
Function:
- needed for the metabolism of protein
- allows body to store energy from protein and carbohydrate in food
- helps in the formation of red cells and correct functioning of the nervous system
- produces haemoglobin to carry oxygen around the body
- converts food into energy

Rich Sources:
- liver
- whole cereals
- meat [including poultry]
- peanuts
- walnuts
- bananas
- salmon, seafood
- avocado
- fortified breakfast cereals/bread

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- dark green leafy vegetables
- pistachio nuts
- sunflower seeds
- soya beans
- dried fruit (prunes)

Fats:
Function:
- concentrated source of energy
- needed for the structure of all body cells
- source of Vitamins A and D
- body fat stored under the skin and helps keep the body warm
- provides essential fatty acids
- protects major organs from damage

Rich Sources:
- meat
- meat products
- processed foods
- milk
- dairy products
- vegetable oils
- oily fish
- avocado

All other valid points will be given credit.
(6 × [1]) [6]

(c) Discuss the importance of Vitamin D in the diet. (AO1, AO2, AO3)

Answers may address the following:
- necessary for teeth and bone growth and development
- maintains plasma levels of calcium and phosphorous concentrations at a level appropriate for the formation of bone
- supports cellular processes and functioning of nerves and muscles
- aids the absorption of calcium which also contributes to bone mass
- a lack of Vitamin D is the most common cause of rickets in children and osteomalacia in adults

All other valid points will be given credit.
[1] For key phrase(s), [2] for adequate discussion, [3] for fuller discussion.
(1 × [3]) [3]

(d) Analyse the functions, dietary sources and deficiency diseases of protein. (AO1, AO2, AO3, AO4)

Answers may address some of the following:
Functions:
- facilitates most of the chemical reactions which occur in the body as all enzymes are proteins. This includes digestion, regulation of energy production in cells and the synthesis of all chemical substances in the body
- homeostasis
- transport
- blood clotting
- promotes growth

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- replaces and repairs body cells and tissues key to building and maintaining all types of body tissue, including muscle
- can serve as a source of energy when insufficient carbohydrate and fat are available to meet body's needs

Dietary sources:
- animal foods: meat, fish, poultry, eggs, milk, milk products. [HBV]
- soya beans
- tofu
- other plant foods: peas, beans, lentils, cereals such as rice and wheat, flour, pasta, nuts and seeds. [LBV]

Deficiency diseases:
- marasmus: some features include:
  - severe wasting
  - stunted growth
  - peeling and pigmented skin
  - lack of energy
  - slow wound healing
- kwashiorkor: some features include:
  - oedema or excess tissue fluid
  - liver swollen with fat
  - depigmented and peeling skin
  - fatigue
  - loss of muscle mass

All other valid points will be given credit.

[0] is awarded for a response not worthy of credit.

Level 1 ([1]–[3])
Overall impression: basic
- Displays limited knowledge of the functions, sources and deficiency diseases of protein
- There is limited analysis
- May list points relating to protein's functions, dietary sources and the diseases which result from a deficiency of protein in the diet or only analyse one area
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([4]–[6])
Overall impression: adequate
- Displays adequate knowledge of the functions, sources and deficiency diseases of protein
- There is adequate analysis
- Analysis of protein in at least two areas should be addressed to achieve at this level quality of analysis may vary where one area is more adequately addressed than the other
- Quality of written communication is adequate. The candidate makes a reasonable selection and use of an appropriate form and style of writing.

AVAILABLE MARKS

Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([7]–[9])
Overall impression: competent

- Displays competent knowledge of the functions, sources and deficiency diseases of protein
- There is competent analysis
- Analysis of protein in all three areas must be addressed to achieve at this level and there is competent analysis of all three at the top of this level
- Quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear. [9]

(e) Discuss how the following food groups can meet the nutritional needs of primary school children. (AO1, AO2, AO3)

Bread, rice, pasta, potatoes and other starchy foods

- starchy foods should make up a third of what we eat to meet energy requirements
- starchy foods also contain fibre to aid digestion and prevent constipation
- starchy foods contain calcium important for bones and teeth, muscle contraction, blood clotting and enzyme secretion
- starchy foods contain iron which forms part of the red blood cell protein, haemoglobin which carries oxygen around the body
- starchy foods contain B vitamins, e.g. B1 and B2 to help release energy to cells and in the body's use of carbohydrates

[1] For key phrase [2] for adequate discussion, [3] for fuller discussion.
(1 × [3]) [3]

Milk and dairy products

- calcium sources for children to provide some of the needs for bone growth and optimum bone health in later years
- phosphorus and magnesium to give strength and harden bones, avoids osteoporosis in later life
- vitamin D – to assist with the absorption of calcium
- contain fat which provides the body with energy
- protein – growth and development

[1] For key phrase(s), [2] for adequate discussion, [3] for fuller discussion.
(1 × [3]) [3]

Fruit and vegetables

- riboflavin – needed for healthy skin. Helps release energy to cells in the body's use of carbohydrates
- niacin – assists in the nervous system and healthy skin. Involved in the energy producing reactions in the body cells
- vitamin A – good for night vision and healthy skin and tissue
- vitamin C – essential factor for the synthesis of collagen that forms part of the structural framework for bones, therefore maintaining the body's connective tissue. Important for wound healing. Helps iron absorption and has antioxidant properties which helps to reduce the risk of heart disease and cancer, boosts immune system

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- iron – important in making red blood cells, which carry oxygen around the body
- magnesium maintains normal muscle and nerve system
- potassium – this helps control the balance of fluids in the body and also is essential for muscle and liver function which are important for children
- vitamin E – healthy immune system
- fibre to aid digestion and prevent constipation

[1] For key phrase(s), [2] for adequate discussion, [3] for fuller discussion. (1 × [3]) [3]

(f) Analyse the current dietary advice to reduce obesity levels in the population. (AO1, AO2, AO3, AO4)

- Reduce total calorie consumption from food
- Reduce alcohol consumption
- Reduce intake of sugar
- Reduce fat consumption e.g. trim off fat etc.
- Eat more fruit and vegetables
- Review portion size and reduce if necessary
- Choose lower calorie options, e.g. reduced sugar drinks or leaner meats
- Breastfeed babies
- Follow government guidelines, e.g. the Eatwell plate
- Make healthy packed lunches, avoiding processed meats
- Encourage children to take healthy school meals
- Using healthy cooking methods, e.g. grilling instead of frying
- Reduce intake of processed foods/takeaway meals
- Eat more brown bread, rice, pasta – low GI rating, fibre, high satiety value – fuller longer
- Read labels – traffic light system

All other valid responses will be given credit.

[0] is awarded for a response not worthy of credit.

Level 1 ([1]–[4])
Overall impression: basic

- Displays limited knowledge of of the current dietary advice to reduce obesity levels in the population
- There is limited analysis
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([5]–[8])
Overall impression: adequate

- Displays adequate knowledge of the current dietary advice to reduce obesity levels in the population
- There is adequate analysis
- Quality of written communication is adequate. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([9]–[12])
Overall impression: competent

- Displays competent knowledge of the current dietary advice to reduce obesity levels in the population
- There is competent analysis
- Quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear.

Level 4 ([13]–[15])
Overall impression: highly competent

- Displays very good to excellent knowledge of the current dietary advice to reduce obesity levels in the population
- There is highly competent analysis
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is extremely well organised with a highest degree of clarity and coherence. There is extensive use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of the highest standard and ensure that meaning is absolutely clear. [15]

AVAILABLE MARKS

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2 **(a)** List three signs or symptoms of food poisoning. (AO1)

Answers may address three of the following:
- flu like symptoms
- abdominal pain
- diarrhoea
- vomiting
- nausea
- fever
- blurred vision
- headache
- raised heart rate

All other valid points will be given credit.
(3 × [1]) [3]

(b) Explain how the following factors affect the growth of food poisoning bacteria. (AO1, AO2)

Temperature
Answers may address the following points:
- bacteria grow most rapidly at temperatures between 8 °C and 63 °C/ danger zone
- growth of bacteria slows down at low temperatures and is destroyed at very high temperatures

[1] for key phrase/s [2]for explanation.
(1 × [2]) [2]

Time
Answers may address the following points:
- the process of binary fission by which bacteria grow rapidly by dividing themselves in two
- one bacterium becomes two bacteria and then two become four etc.
- it usually takes between 10 and 20 minutes

[1] for key phrase/s [2] for explanation.
(1 × [2]) [2]

(c) Discuss how other physiological factors may influence the choice of food offered to patients on a hospital ward. (AO1, AO2 AO3)

Answers may address some of the following points:
- Patients with CHD are offered choices including fruit and vegetables, grains, unsaturated fats, e.g. oily fish and limit sugar intake and salt intake (to less than 6g)
- Patients with diabetes are offered choices including starchy carbohydrates and low GI foods, fibre rich foods fruit and vegetables limit fat intake, lean meat and fish twice a week
- Post stroke patients or those with difficulty chewing or swallowing are offered shaped pureed meals, soft meals proceeding to extra tender meals
- Patients with kidney disease are offered low salt options and limited fluids
- Patients with food intolerance/allergies
- Coma – fed through gastric tubes or intravenous lines calculated on basis of weight of patient and blood investigations

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All other valid responses will be given credit.

[0] is awarded for a response not worthy of credit.

Level 1 ([1]–[2])
Overall impression: basic
- Displays limited knowledge of how physiological factors may influence the choice of food offered to patients on a hospital ward.

Level 2 ([3]–[4])
Overall impression: adequate
- Displays adequate knowledge of how physiological factors may influence the choice of food offered to patients on a hospital ward.

Level 3 ([5]–[6])
Overall impression: competent
- Displays competent knowledge of how physiological factors may influence the choice of food offered to patients on a hospital ward. [6]

(d) Analyse how the Hazard Analysis Critical Control Point system [HACCP] aims to protect food from contamination, using the following headings. (AO1, AO2, AO3, AO4)

Answers may address the following points:
Hazard analysis: Identify any hazards that must be avoided, removed or reduced. Identifying the critical control points [CCP] in the food handling process with regards to food safety from purchasing and delivery through to storage and preparation and finally to cooking and serving. By writing down hazards and identifying how to deal with them protects residents and reduces the likelihood of food poisoning. Defrosting is a critical point as if it is not carried out correctly bacteria will be allowed to multiply and render meat harmful to the residents.

Controls: Specifying control procedures putting in place controls to prevent microbiological, chemical and physical hazards contaminating food. These might include specifying acceptable delivery temperatures, the proper use of date stamps and using reputable suppliers. Rotate stock on a "first in first out" basis. In the event of pest infestation use a professional pest control contractor. Store < 8°C; holding > 63°C ⩽ 2 hrs; cooking ⩾ 75°C

Monitoring control procedures: checking controls monitoring these points to make sure that contamination does not occur. These include record keeping, checking the temperature of refrigerated goods on delivery, monitoring fridge and freezer temperatures, use of temperature probes during cooking of meat and visual checks. Cooking food to the correct temperature. Holding hot food at 63 °C and cold foods at or below 8 °C. Use by dates will be closely monitored and recorded. Recording cleanliness and hygiene standards of equipment food preparation area and personal hygiene of handlers and their work procedures.

All other valid responses will be given credit.

[0] is awarded for a response not worthy of credit.

AVAILABLE MARKS

Level 1 ([1]–[3])
Overall impression: basic

- Displays limited knowledge of how the Hazard Analysis Critical Control Point system [HACCP] aims to protect food from contamination
- There is limited analysis
- Answers which address only one aspect cannot achieve beyond this level.
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that the intended meaning is not clear.

Level 2 ([4]–[6])
Overall impression: adequate

- Displays adequate knowledge of how the Hazard Analysis Critical Control Point system [HACCP] aims to protect food from contamination
- There is adequate analysis
- Candidates who address only two aspects cannot achieve beyond this level
- Quality of written communication is adequate. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([7]–[9])
Overall impression: competent

- Displays competent knowledge of how the Hazard Analysis Critical Control Point system [HACCP] aims to protect food from contamination
- There is competent analysis
- There may be some variation in the quality of analysis across the three aspects
- Quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary.
- Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear.

Level 4 ([10]–[12])
Overall impression: highly competent

- Displays very good to excellent knowledge of how the Hazard Analysis Critical Control Point system [HACCP] aims to protect food from contamination
- There is highly competent analysis
- Candidates must demonstrate highly competent analysis of the three aspects
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is extremely well organised with a highest degree of clarity and coherence. There is extensive use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of the highest standard and ensure that meaning is absolutely clear. [12]

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3 (a) (i) Explain what is meant by coeliac disease. (AO1)

Answers may address the following points:
- this is a condition which means individuals are intolerant to gluten
- they become ill with stomach pains and nausea if they eat products containing wheat causing damage to the lining of the small intestine
- it is an auto-immune disease

All other valid points will be given credit.
[1] for key phrase/s [2] for explanation

(1 × [2]) [2]

(ii) List four foods that Peter should avoid. (AO1)

Answers may include only four of the following:
- pasta
- cakes
- biscuits
- pizza
- wheat bread
- cereals – rye, wheat, barley
- some brands of crisps
- processed meat/pies
- soup containing barley
- battered/breaded foods
- gravy and sauces

All other valid points will be given credit.

(4 × [1]) [4]

(b) Discuss the functions of water in the body. (AO1, AO2, AO3)

Answers may address the following points:
- transportation of nutrients and other substances throughout the body
- digestion – helps breakdown, absorption and excretion
- lubrication – helps to lubricate joints, mucus membranes, the respiratory system
- temperature control – helps regulate body temperature, e.g. through sweating
- keeps the body hydrated
- helps the efficient functioning of the renal and urinary systems

All other valid points will be given credit.

[0] is awarded for a response not worthy of credit.

Level 1 ([1]–[2])
Overall impression: basic
- Displays limited knowledge of the functions of water in the body.

Level 2 ([3]–[4])
Overall impression: adequate
- Displays adequate knowledge of the functions of water in the body.

Level 3 ([5]–[6])
Overall impression: competent
- Displays competent knowledge of the functions of water in the body. [6]

AVAILABLE MARKS

(c) Explain three dietary factors associated with poor oral health. (AO1, AO2)

Answers may address three of the following:

High sugar intake:
- sugar sweetened beverages have high levels of sugar and drinking these can significantly contribute to tooth decay
- regular and 'diet' soft drinks, sports drinks, energy drinks, fruit juices, fruit drinks and cordials also have high acid levels that can cause tooth erosion
- high consumption of sticky sweets leads to the demineralisation of teeth
- processed foods high in sugar

Lack of calcium in the diet:
- if individuals do not have the recommended levels of calcium in the diet, e.g. through milk, cheese and other dairy products, teeth will not develop properly in children

Lack of vitamin D in the diet:
- vitamin D is needed to absorb calcium, so products like cereals fortified with vitamin D or foods high in vitamin D like oily fish are recommended to strengthen teeth

Snacking between meals:
- eating between meals increases the time that teeth are exposed to food
- if the foods contain sugar or natural sugars there will be a greater risk for tooth decay
- the longer the sugar is on the teeth the greater the risk for decay

All other valid points will be given credit.

[1] For key phrase(s), [2] for explanation.
(3 × [2]) [6]

(d) Analyse Rachel's nutritional needs during pregnancy. (AO1, AO2, AO3, AO4)

Answers may address the following points:
- Energy: 200Kcal energy intake increase
- Protein – 6g protein increase
- Folic acid – pregnant women are advised to take a supplement each day for the first 12 weeks of pregnancy
- Iron – women need extra iron when pregnant to make new blood cells for the developing baby
- Calcium – women need extra calcium in their diet during pregnancy. This is to allow the developing baby's bones to grow and develop, while looking after the mother's own bones too
- Vitamin D – women are advised to take supplements containing 10 micrograms of vitamin D each day.
- Omega-3 and omega-6 fatty acids are important for the developing baby's brain and eyes
- Vitamin C to assist in the absorption of iron
- Water to help prevent constipation which is common in pregnancy

	AVAILABLE MARKS
• NSP may also help reduce the risk of developing conditions such as high blood pressure and preeclampsia • Vitamin A – important for the body's embryonic growth including the development of healthy eyes, heart, lungs etc as well as circulatory, respiratory and CNS All other valid points will be given credit. [0] is awarded for a response not worthy of credit. **Level 1 ([1]–[4])** Overall impression: basic • Displays limited knowledge of Rachel's nutritional needs during pregnancy • There is limited analysis • May list nutritional needs • Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear. **Level 2 ([5]–[8])** Overall impression: adequate • Displays adequate knowledge of Rachel's nutritional needs during pregnancy • There is adequate analysis • Quality of written communication is adequate. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident. **Level 3 ([9]–[12])** Overall impression: competent • Displays competent knowledge of Rachel's nutritional needs during pregnancy • There is competent analysis • There may be some variation in the quality of analysis of Rachel's different nutritional needs during pregnancy • Quality of written communication is competent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard to make meaning clear. [12]	30
Total	**100**