

## FOOD AND NUTRITION (FDN315118)

### SECTION A - NUTRITION

**CRITERION 4** Demonstrate knowledge and understanding of the relationship between nutrition, food and health.

The following are the type of responses required for Section A. Marks may have been allocated for variations depending on examples used by students to demonstrate understanding. Students were expected to provide clear responses. In some cases the exam report provides **extra** information to inform acceptable responses. Answers must be supported by science based nutrition research to be accepted as valid e.g. NHMRC, AIHW.

### PART I

#### QUESTION I

(5 marks)

(i) Explain TWO functions of fibre and identify TWO foods high in fibre

- Fibre attracts water to our intestines and moves food through the intestines faster
- Fibre helps to keep bowel movements soft in form and reduces problems related to constipation by supporting regular bowel movements
- Adds bulk to waste in the digestive system to prevent constipation
- Delays gastric emptying which in turn helps a person feel fuller for longer
- Lowers blood cholesterol by binding to bile acids and excreting them which reduces the risk of heart disease
- Slow rate of glucose absorption – weight management benefits
- Provides bulk to a meal and feelings of fullness / satiety
- Foods high in fibre: fruits and vegetables (especially the skins or peels), whole grains, oats, legumes, seeds, bran cereals, nuts.

*Well answered (2 marks)*

(ii) Discuss why it is important to increase water intake if increasing fibre consumption in your diet?

- Because soluble fibre absorbs water (acts like a sponge), therefore it is important to consume adequate water to prevent constipation from faeces becoming dry in the intestine.

*Needed to state that fibre absorbs water and so dries out faeces. (1 mark)*

*Half marks were allocated for 'prevents constipation'.*

*Incorrect responses stated that 'water is needed to absorb fibre'.*

(iii) Name TWO conditions that adequate fibre intake aims to reduce the risk of.

- Fibre may reduce constipation, decrease high cholesterol, decrease high blood glucose levels, heart disease, type 2 diabetes, diverticulosis, colorectal cancer, haemorrhoids, and irritable bowel syndrome.

*Well answered (1 mark)*

*Bowel was commonly misspelt as 'bowl'*

(iv) What is the AI of fibre per day for an adult male and adult female?

- The AI for an adult male is 30g and an adult female is 25g

*Well answered (1 mark)*

## QUESTION 2

(5 marks)

(i) State TWO functions of fats.

- Energy source – the most concentrated energy source at 37kJ/g
- Supplies essential fatty acids and transports fat soluble vitamins A, D, E, and K
- Protects internal organs from shock and injury
- Insulates the body, preventing heat loss
- Maintenance of the structure and health of all cells

- Promotes healthy skin and hair
- Satisfies hunger and helps you feel full longer
- Adds flavour in food

*Well answered (1 mark)*

**(ii) Explain the role of cholesterol, including HDL and LDL cholesterol.**

- Cholesterol is essential for many body processes. Cholesterol produces hormones and bile acids, is part of cell membranes and allows the body to convert sunshine to vitamin D. It is found in animal tissues, but is never present in plants.
- Cholesterol is carried through the body via lipoproteins. The body has High Density Lipoprotein-(HDL) cholesterol and Low Density Lipoprotein-(LDL). HDL cholesterol is considered “good” cholesterol because it transports excess cholesterol found in the blood stream back to the liver for removal. LDL’s take cholesterol from the liver to wherever it is needed in the body. LDL cholesterol is considered “bad” as at high levels it will deposit plaques in the artery walls and increase the chance of heart disease or stroke.

*Many responses did not state the role of cholesterol but overall HDL&LDL were clearly explained. (2 marks). It is important to note that LDL is only considered ‘bad’ when at high levels. LDL has an important and necessary function in the body. HDL and LDL are cholesterol transport systems. Whilst cholesterol can be consumed through animal products, HDL and LDL are not contained in food.*

**(iii) (iii) What are the TWO categories of polyunsaturated fatty acids? Give ONE good food source of each type of fat.**

- Omega 3- oily fish (salmon, mackerel, sardines), walnuts, canola oil, flaxseed, green leafy vegetables
- Omega 6 – sunflower, safflower and corn oils, nuts

*Well answered (2 marks)*

QUESTION 3

(5 marks)

(i) State TWO functions of folate.

- Folate helps prevent neural tube birth disorders, such as spina bifida. (Neural tube damage occurs during the first weeks of pregnancy before a woman may realize she is pregnant. Meeting the folate requirement before becoming pregnant is essential for prevention).
- Formation of enzymes and red blood cells- Folate assists with the prevention of megaloblastic anaemia.
- Metabolism of DNA
- Amino acid metabolism

*Well answered (1 mark)*

(ii) Identify THREE good food sources of folate.

Dark green vegetables like broccoli, spinach and kale, legumes such as chickpeas, beans and lentils, chicken liver, yeast extracts such as vegemite, wholegrain breads and cereals, nuts and seeds, fruit and vegetables.

*Well answered (1 ½ marks)*

(iii) What is the difference between a fat soluble and water soluble vitamin? Make reference to which group folate belongs to.

- Vitamins are classified into two groups: water-soluble and fat-soluble. Water-soluble vitamins, which include B group and C vitamins, are easily absorbed into the body. If you consume more of a water-soluble vitamin than you need, the excess will be excreted in the urine. This means the risk of excess consumption is low, but you have to constantly replenish your stock. Water soluble vitamins are easily destroyed by heat during cooking.
- Fat-soluble vitamins include vitamins A, D, E and K. They are stored in the body, meaning a deficiency takes a longer time to develop. Excessive amounts can be toxic as they accumulate. They are not easily damaged by cooking.

- Folate (folic acid) is one of the B Vitamins, therefore it is a water soluble vitamin.

*Needed to answer all parts of the question for full marks. Poor answers just said the difference was fat-soluble dissolved in fat and water-soluble vitamins dissolved in water. Correct answers stated a number of clear differences in relation to their storage, types and stability. (2 ½ marks)*

#### QUESTION 4

(5 marks)

(i) Identify TWO good food sources of potassium and TWO good food sources of sodium.

- Potassium: bananas, potato, sweet potato, yoghurt, watermelon, nuts, dried fruit, instant coffee, vegemite, bran, meat and fish.
- Sodium: cheese, ham, canned soup, bread, butter, meat, table salt, beets and celery.

*The wording of 'good' source of sodium may have misled some students who said foods such as meat and fish... as they are 'healthiest sources of sodium to choose' = 'good', rather than 'rich source of sodium such as soy sauce and packet soup (2 marks)*

(ii) Explain the inter-relationship of potassium and sodium in maintaining fluid balance.

- Sodium is mostly located in the blood and fluids surrounding the cells, whilst potassium is located inside the cells. Both minerals attract water, thus when at correct levels, they evenly maintain water inside and outside of the cells, ensuring the cells can function correctly. This is referred to as maintaining osmotic pressure or the sodium-potassium pump.

(iii) Provide an explanation on why a deficiency in either or both of the minerals, sodium and potassium, may affect health?

- Because sodium and potassium work together to maintain fluid balance, a deficiency in either one causes the cells to become either dehydrated or flooded, affecting cell function and blood pressure. It also causes the relative concentration of the other mineral to be higher.
- Potassium deficiency (hypokalaemia) can cause muscle cramping and weakness, dehydration, cardiac arrhythmias and high blood pressure. Potassium also blunts the effects of excess sodium on blood pressure, so this will not be achieved if deficient.

- Sodium deficiency (hyponatraemia) is rare, but symptoms can include changes to a person's mental state, headache, nausea and vomiting, tiredness, muscle spasms and seizures and low blood pressure.
- A deficiency in both sodium and potassium can occur through dehydration, illness and diarrhoea when these important electrolytes are lost rapidly. This will affect nerve, heart and muscle function.

*A difficult question. Students needed to EXPLAIN why the deficiencies could lead to problems, referring to water either being removed from or drawn into the cells in uneven amounts. (2 marks)*

## PART 2

### QUESTION 5

Under-consumption and over-consumption of macronutrients and micronutrients in the body contribute to the overall burden of disease. Improving the nutritional status of Australians can play an important role in addressing many diet-related health conditions.

Choose one diet-related health condition from the following and provide the requested information:

#### Diet-Related Health Condition 1: Overweight and Obesity

##### (i) Definition of the condition

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. It can be measured by BMI (body mass index) which is a measure of weight for height. A BMI of 25-30 is classified as overweight. A BMI over 30 is classified as obese. This should also be combined with waist measurements as abdominal obesity is associated with increased health risk. It results from a sustained energy imbalance—when energy intake from eating and drinking is greater than energy expended through physical activity. Overweight and obesity are complex, multidimensional health issues influenced by a person's biological and genetic characteristics, and by lifestyle factors.

*Overall well answered (2 marks)*

##### (ii) Recent Australian statistics to highlight prevalence

- 63% of Australian adults are overweight or obese – almost 2 in 3 people
- 1 in 4 Australian children are overweight or obese
- The prevalence of overweight and obesity has steadily increased, up from 57% in 1995—which has largely been driven by a rise in obesity
- 28% of adults were obese in 2014-15, an increase from 19% in 1995
- In 2014–15, 71% of men were overweight or obese, compared with 56% of women. A greater proportion of men (42%) than women (29%) were overweight, while a similar proportion of men (28%) and women (27%) were obese

- Compared with non-Indigenous Australians, Indigenous adults are more likely to be overweight or obese. Those who live outside of major cities, or who are in the lower socioeconomic groups are more likely to be overweight or obese than others
- Overweight and obesity was responsible for 7% of the total health burden in Australia in 2011
- The costs of overweight and obesity were \$8.6 billion in 2011–12

*Overall well answered but some students used statistics that were not related to prevalence of the disease (2 marks)*

**(iii) Dietary factors that increase the risk**

- Sustained energy imbalance: when energy intake from eating and drinking is greater than energy expended through physical activity and BMR, causing weight gain.
- Diet high in energy-dense, nutrient-poor foods/ discretionary foods: lack adequate nutrients but are high in kilojoules and do not leave a person feeling satiated (full) for long, causing overeating.
- Excessive intake of high GI foods: promotes carbohydrate as the only energy source, leading to increased fat storage
- Diet high in fats: fat is very energy dense (37kJ/g) and this increases the presence of adipose tissue if stored fat is not used as energy
- Excess refined sugar consumption: soft drinks, cakes, biscuits and confectionary are all very high in kilojoules but provide little satiety and often contribute to excess energy intake
- Low fibre, water, fruit and vegetable intake – these are all low in kilojoules, provide satiety and reduce excess consumption of kilojoules

*Many students gave non-dietary risk factors (eg. smoking, genetics), which did not score any marks.*

*The most successful answers described how the dietary factor actually increased risk, for example, why a high fat diet contributed to obesity i.e. it is very energy dense. These answers were consistent with the amount of detail required for a level 3 course.*



*Less successful answers simply stated 'excess salt, saturated fat and sugar'.*

*It is important to note that all fats have the same energy density, thus it is not trans or saturated fats in particular which cause obesity.*

*The correlation between sodium and obesity is that excess sodium is associated with thirst and increased soft drink consumption and is also often present in many discretionary foods. Sodium itself provides no kilojoules. (3 marks)*

(iv) Discuss ONE prevention strategy.

**Dietary strategies:**

- Meet the individual EER (Estimated Energy Requirement) of daily kilojoules: this will help in maintaining a healthy weight range by balancing energy intake with energy expenditure
- Reduce portion sizes: this reduces the number of kilojoules consumed, which is effective in maintaining a healthy weight
- Choose nutritious Low-GI foods: these take longer to release glucose into the bloodstream, allowing the body to use fat as an energy source
- Increase fibre intake: fibre-rich foods leave the body feeling full for longer after meals, helping to reduce total amount eaten. They also tend to be nutritious and low in fat
- Eat a wide range of nutritious foods and avoid over-consumption of energy-dense, nutrient-poor foods
- Following the Australian Dietary Guidelines

**Behavioural Strategies:**

- Be physically active - at least 30 minutes exercise each day will assist in balancing energy intake with energy expenditure and increases BMR to burn more kilojoules and maintain muscle mass. Numerous health benefits including weight management, increased glucose uptake, lower cholesterol, lower blood pressure, reduced stress hormones (often associated with overconsumption of energy-dense foods) and improved sleep

### Government/Community Strategies:

- Changing city planning to include venues for safe, accessible and affordable physical activities and improving opportunities for physical activity in schools and workplaces: assists in maintaining energy balance
- Improving the nutritional value of processed foods: reducing risk nutrients assists in a reduction of kilojoules in commonly consumed foods
- Reducing unhealthy food marketing to children: reduces the consumption of discretionary foods and makes it less desirable to consume these products
- Reducing the price of healthy foods, such as fruits, vegetables and wholegrain products: encourages greater consumption of nutritious, low kilojoule options
- Improving the nutrition and variety of food available at school canteens and in workplaces
- Increasing education for health professionals on how to recognise and manage weight problems in people
- Investing in community education programs on weight management and helping families to understand how to provide a healthy environment for themselves and their children, including decisions about physical activity and healthy eating habits

### Campaigns:

Live lighter campaign is an education platform encouraging people to make simple changes aiming to reduce the risk of obesity. It provides people with resources such as meal plans, tips for reducing excess energy, recipes and information on exercise. They also advocate for healthier environments including less promotion of junk food, improving access to healthy food, better food labelling and infrastructure and policies to encourage people to be more active. This empowers people to prevent diet-related diseases and creates healthier communities to better enable healthy choices.

*This question, in the main, was not successfully answered. Many students did not really describe their strategy in any detail and some responses mentioned several strategies rather than just one. Students needed to identify a strategy and discuss how this assisted in the prevention of the disease. Strategies needed to be preventative (stopping the disease from occurring in the first place) rather than treatment/management once a person has developed the disease. Prevention strategies could have included any appropriate individual or community strategies such as dietary factors, exercise, community/government initiatives and programs. (3 marks)*

## QUESTION 6

### Diet-related health condition 2: Type 2 Diabetes

#### (i) Definition of the condition

Insulin is a hormone made by the pancreas, which enables glucose from foods to enter the body cells to be used for energy. Type 2 diabetes is a condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas. Glucose then builds up in the blood- a dangerous condition which damages blood vessels and organs.

#### (ii) Recent Australian statistics to highlight prevalence

- 280 Australians develop diabetes every day - that's one person every five minutes
- Around 1 million Australians (5%) have diagnosed type 2 diabetes
- Up to 500,000 Australians are estimated to have silent, undiagnosed type 2 diabetes
- More than 100,000 Australians have developed diabetes in the past year
- Type 2 diabetes represents 85-90% of all diabetes cases
- The prevalence of diabetes (based on self-reported data) has tripled in the past 25 years
- Based on self-reported and measured results, Indigenous Australian adults were almost 4 times as likely to have diabetes as their non-Indigenous counterparts

**(iii) Dietary factors that increase the risk**

- Frequent and over-consumption of high GI foods: cause a rapid spike in blood glucose levels, placing a high demand on the pancreas for insulin production and causing higher day-long insulin levels which can lead to insulin resistance over time
- Over-consumption of kilojoules: can lead to being overweight and obesity; a major risk factor for type 2 diabetes. Abdominal obesity is particularly associated with an increased risk as visceral fat surrounding the cells makes them less responsive to insulin
- Diet high in trans fats: increases LDL cholesterol and decreases HDL cholesterol which is a precursors to type 2 diabetes and associated with decreased glucose tolerance

*Any of the dietary factors increasing risk for overweight/obesity could also be applied if indicated that overweight/obesity are major risk factors for Type 2 diabetes.*

**(iv) Discuss ONE prevention strategy.**

- Nutritious Low GI carbohydrate foods: release glucose slowly into the bloodstream, helping to moderate insulin release and maintaining feelings of fullness for longer e.g. oats, sweet potato, wholegrain bread
- Increase fibre intake: soluble fibres delay blood glucose absorption from the small intestine, lowering insulin production and release. Also reduces LDL cholesterol, which is linked to regulation of insulin release
- Also see suggested responses question 5 (iv)

**Diet-related health condition 2: Heart Disease**

**(i) Definition of the condition**

Heart disease occurs when there is a gradual accumulation of fatty deposits (plaque) on the inside of the artery walls, narrowing and hardening the arteries and restricting blood flow. This process is called atherosclerosis. When arteries to the heart become blocked this commonly results in angina and heart attack.

Cardiovascular disease refers to all diseases and conditions of the heart and blood vessels and also includes stroke.

**(ii) Recent Australian statistics to highlight prevalence**

- Coronary heart disease is the leading cause of death and burden of disease (ill health and life lost to premature death) in Australia
- 1 in 5 Australian adults (22%) in 2014 had cardiovascular disease (CVD), based on self-reported data.
- Heart disease was responsible for 13 percent of deaths in Australian men, and 10 percent of deaths in Australian women
- 1 person dies every 28 minutes from heart disease
- Heart disease was a factor in nearly 1 in 4 deaths in 2017
- 1.1 million hospitalisations were associated with CVD (principal and/or additional diagnosis) in 2014–15, that is 11% of all hospitalisations in Australia
- Prevalence of CHD is higher amongst the lowest socioeconomic group and Aboriginal and Torres Strait Islander people

**(iii) Dietary factors that increase the risk**

- Excess sodium: increases blood pressure, placing strain on the heart and damaging blood vessels. e.g. salted chips, packet soups, sauces
- Diet high in trans fats: increases LDL cholesterol and decreases HDL cholesterol, a major factor in the development of atherosclerosis e.g. commercial pies and pastries
- Diet high in excess saturated fats: increases LDL cholesterol which is strongly associated with heart disease
- Low-fibre intake: prevents removal of excess cholesterol
- Over-consumption of kilojoules: can lead to overweight and obesity; a risk factor for CVD
- Diet high in excess sugar: strongly associated with decreased HDL cholesterol and increased blood triglyceride levels
- Insufficient essential fatty acid intake – Omega 3 and 6 help to lower LDL cholesterol and reduce blood pressure, improve blood vessel elasticity, maintain regular heart rhythm and clotting which are all important factors in reducing heart disease risk

(iv) Discuss ONE prevention strategy.

- Consume AMDR of omega-3 and omega-6 essential fatty acids (6-10% daily energy intake): these decrease triglyceride levels, increase HDL levels, maintain elasticity of blood vessels, stabilise heart rhythm, decrease the risk of clots in blood vessels and can reduce blood pressure
- Increase soluble fibre intake: lowers cholesterol levels by removing bile acids (containing cholesterol) from the body e.g. legumes, oats and fruits
- Eat a wide range of fruits and vegetables to increase fibre and phytonutrients which protect against CVD and are also a good source of potassium which counteracts the effects of sodium on blood pressure
- Reduce sodium intake (SDT max = 2000mg) to avoid hypertension, which then decreases the risk of heart attack and stroke e.g. using herbs for flavour rather than salt
- Limit saturated fat (no more than 10% of energy) to reduce LDL cholesterol levels. Choose reduced-fat, natural dairy products and avoid trans fats
- Also see suggested responses question 5 (iv)

## QUESTION 7

Using the diet-related conditions discussed in Question 5 and 6 explain any links between the conditions and any similarities in food intake that may lead to the conditions.

### Obesity and Heart Disease / Type 2 Diabetes

- Being overweight or obese is a primary risk factor for both type 2 diabetes and heart disease.
- The risk factors for all of these conditions are similar: family history/genetics, low physical activity levels, smoking, increasing age and gender (males more likely to develop each condition).
- If your body stores fat primarily in your abdomen (visceral fat), your risk of type 2 diabetes and heart disease is greater than if your body stores fat elsewhere, such as your hips and thighs. The more fatty tissue you have, the more resistant your cells become to insulin and the higher the risk of atherosclerosis.

- Similarities in diet include
  - Energy imbalance (leads to overweight/obesity)
  - Low fibre: (high fibre helps to slow glucose absorption, increases satiety to prevent overeating and reduces cholesterol levels)
  - High fat (energy dense so can lead to overweight/obesity)
  - Excess alcohol consumption (energy dense and interferes with metabolic processes)
- Therefore the intake of similar foods may lead to these conditions e.g.
  - Processed, energy dense foods – McDonalds, KFC, Pizza Hut, sausages etc.
  - High fat – croissants, hot chips, battered food etc.
  - Lack of fruit, vegetables and wholegrains

#### Heart Disease and Type 2 Diabetes:

- The build-up of glucose in the bloodstream from Type 2 diabetes results in damage to the arteries and blood vessels, leading to an increased risk of heart attack or stroke.
- People with diabetes have twice the risk of developing CVD as the general population. The prevalence rate of stroke can be up to five times greater, and prevalence of heart attack up to ten times greater, for people with diabetes than for those without diabetes.
- Over two-thirds of people with diabetes also have CVD.
- Low intake of soluble fibre is strong risk factor in both conditions as soluble fibre helps to slow glucose absorption and regulate insulin production and for heart disease it helps reduce cholesterol levels by binding to bile acids and excreting them.

*Whilst some links between the conditions were detailed clearly, very few students were able to answer this question well. With similarities in food intake contributing to the conditions there was some confusion: students lumped salt in with obesity and diabetes and again stated that saturated and trans fats cause obesity. (5 marks)*

## SECTION B – DIET ANALYSIS

CRITERION 5 Analyse diets using Nutrient Reference Values and recognised food selection tools.

### PART I

#### QUESTION 8

a.i) Using the data, how many kilojoules on a typical day is Billy consuming in comparison to what his EER suggests he should have for energy balance?

- Billy's EER is 10547kj. He consumed 23,906 kj which is more than double the amount recommended (well above the recommended).

*If students only state the EER and amount of kj Billy was consuming and didn't make the comparison they only scored half marks.*

a.ii) Discuss the concept of energy balance in relation to the data. Why is it important for Billy to work towards an energy balance?

- Energy balance is when energy intake (through eating and drinking) is equal to energy output (Kj's burned through activity and metabolic activity). If Billy's balance is unequal he will either gain or lose weight. There is a great risk of diet related disease if a person is under or over weight.

*Most students could say input = output or could explain energy balance in some way. Quite a few students only answered one part of the question or said that Billy needed to work towards an energy balance so that he would not become overweight when he was already clearly overweight.*

a.iii) How do Billy's energy intake ratios differ from the Acceptable Macronutrient Distribution Ranges (AMDR)?

Fat – Recommended energy ratio is 20-35%. Billy's is 46% which is above the recommendation.  
Food sources: sausages, salami.

Carbohydrates – Recommended energy ratio is 45-65%. Billy's is 35% which is 10% below the lower end. Food sources: biscuits, fruit drink.



Protein – Recommended energy ratio is 15-25%. Billy's is 18% which is within the range. Food sources: processed meat and cheese.

*Most students could state the correct AMDR's and Billy's intake ratio. ½ marks were given if they did not mention how they differ (higher, lower etc.).*

**a.iv) Explain why the AMDR are not a true reflection of Billy's dietary needs.**

According to the AMDR, Billy is exceeding the recommendation for fat, below the recommendation for carbohydrate and within the range for protein. However, as Billy is consuming almost 2.5 times his EER he is overconsuming in all 3 macronutrients and therefore the AMDR are not a true reflection of his dietary needs.

*Overall, a poorly answered question. Most students could not explain that the AMDR is merely a ration of where energy is sourced, and that Billy was significantly overeating so was overconsuming all macronutrients. Many gave vague answers. For any marks to be awarded they needed to include terms such as overconsuming, overeating, exceeding EER.*

**b) Identify TWO macronutrients which Billy is consuming in excess. Describe ONE possible consequence of excessive consumption of each macronutrient.**

Protein – Billy has consumed 252g of protein. This is well above the RDI of 65g. Excessive protein means that the kidneys have to work harder to remove ammonia (a by-product of protein metabolism). It also typically means the diet contains higher levels of saturated fat and low levels of fibre.

Fat – Billy consumed nearly half of his energy from fat. This would contribute to weight gain as it is the most energy dense nutrient. As 44% of these fats came from saturated sources, it also increases the risk of heart disease.

Carbohydrate – One consequence of consuming too much carbohydrate is increasing blood sugar levels and reducing insulin production, which could lead to type 2 diabetes.

*Better answers could name 2 suitable macronutrients and some consequences. Very few student gained full marks for this question, as they did not use data to support their statements. Some included their own comments about the question, asking whether it was correct as they thought there was only 1 macronutrient in excess (fat). A few listed saturated fat and trans fat as the 2 macronutrients. Only 1 of these was accepted.*

- c) **One of the micronutrients Billy is consuming in excess is sodium. Explain ONE short-term and ONE long-term consequence of a sodium intake as high as Billy's.**

Billy consumed 12,732mg of sodium. This is well above the UL of 2300mg. When excessive sodium is consumed, water is drawn out of the cells and this increases blood volume and thirst. Initially kidneys balance this and excess fluid is excreted as urine. Overtime, if intake levels remain high, the kidneys gradually allow blood volume to increase which leads to an increase in blood pressure (hypertension).

*Better answers explained a short-term consequence (thirst, due to fluid imbalance) and a long-term consequence (hypertension, due to greater blood volume).*

- d) **Explain how Billy's fat intake ratios differ from the nutritional recommendations.**

The recommended fat intake ratios are 33% saturated, 33% monounsaturated and 33% polyunsaturated. Billy is consuming 44% saturated fat (well above the recommendation), 46% monounsaturated fat (above the recommendation) and 10% **polyunsaturated** (well below the recommendation).

*This question was well answered.*

PART 2

QUESTION 9

a) According to the Australian Dietary Guidelines, Australian adults get nearly 36% and children get nearly 41% of their daily kilojoules from discretionary food.

(i) **Billy consumes too many discretionary foods. Explain why discretionary food is not an essential component of the dietary patterns recommended by the Australian Government.**

Discretionary foods are called that as they are not essential or a necessary part of the diet. These foods are high in added sugars, added salt, saturated fat or alcohol and low in fibre. They are often high in kilojoules and low in essential nutrients. They are associated with a higher risk of obesity, heart disease, stroke, type 2 diabetes and some forms of cancer.

*A fairly well answered question. Some students could not give 3 reasons why they should be limited.*

(ii) **Choose THREE discretionary food items from Billy's typical dietary intake.**

- Recommend an appropriate modification for EACH discretionary food item.
- Justify why EACH modification is a better choice for Billy.

**Food item 1:** Sausages – for breakfast, Billy could replace this with wholegrain bread, avocado and a poached egg. The bread would increase his fibre intake, while the poached egg would reduce the saturated fat. Avocado is a good source of monounsaturated fat.

**Food item 2:** Banana Split – instead of consuming this for a snack, Billy could eat a handful of walnuts. Walnuts are high in omega 3

**Food item 3:** Salami and bacon – both are high in added salt which can increase the risk of high blood pressure. Instead for dinner, Billy could make a wholemeal pizza topped with roasted pumpkin, capsicum and zucchini. These are good sources of fibre and antioxidants.

*Better answers gave a reasonable swap that fitted into the time of day/ meal and was accompanied by a nutritional reason for the swap e.g. banana split swapped with fruit salad (blueberries, banana and strawberries). This is a better choice as it eliminates some fat and sugar from Billy's diet and introduces some antioxidants. Some students missed the justification or suggested inappropriate swaps e.g. swap shaved ham for sliced ham, banana split for a large serve of fish, swap the sausage roll with pastry (there was no sausage roll). Justifications such as 'because it is healthier' were not awarded marks. Swaps to yoghurt were not awarded full marks unless low fat options were mentioned.*

- b) The Australian Guide to Healthy Eating (AGHE) suggests that individuals should 'Enjoy a side variety of nutritious foods from the five different groups.'

One of the groups is 'lean meats, poultry, fish eggs, tofu, nuts and seeds, legumes and beans.'

- (i) How many serves of 'lean meats, poultry, fish eggs, tofu, nuts and seeds, legumes and beans' should Billy be consuming daily?

3 serves

*Half marks were awarded for 2.5-3 or 3 – 3.5*

- (ii) Discuss THREE ways Billy could introduce or swap healthier alternatives to improve his daily intake for this food group to comply with the number of serves recommended by the AGHE.

- Instead of fried sausage for breakfast, Billy could have poached eggs.
- As snacks instead of chocolate custard or tiny teddy biscuits, Billy could have a small serving of nuts and seeds
- Billy could have grilled chicken on a homemade pizza for dinner
- Billy could have homemade chicken soup for dinner with lentils, beans and split peas

*Better answers swapped out a high fat meat for leaner meat. This question was misinterpreted by quite a few students who answered in very general terms about swaps that Billy could make to comply with the correct number of serves for any food group. Those who answered about the 'lean meats.' food group answered well. A small number interpreted 'ways' to mean a) see a dietician b) reward self for improvements c) educate himself d) start a paleo diet e) start a gym program.*

**(iii) Discuss TWO effects that substituting food items from this food group will have on Billy's health.**

- Grilled chicken will reduce the consumption of saturated fat and sodium and therefore help to decrease his risk of Cardiovascular Disease and high blood pressure.
- Consuming lentils, beans or split peas will help to increase his fibre intake and therefore decrease the risk of high cholesterol, Cardiovascular Disease and obesity.

*More successful answers included statements such as "Due to less saturated fat there was less chance of health issues such as heart disease, stroke, obesity, atherosclerosis, hypertension, bowel cancer." Discussion was usually brief due to the room allowed. Those who just mentioned the nutritional effects and not the actual health issues did not score as well. Not well answered by a number of students.*

**(iv) If Billy was to become a vegan, list THREE ways he could still meet the recommended serves per day of this food group.**

- Chickpea burgers – in a wholemeal roll
- Lentil curry served with cauliflower
- Tofu (complete protein) in a stir-fry with cashew nuts and vegetables
- Combine two incomplete protein foods e.g. rice and lentils, baked beans on toast

*Some students did not have a good understanding of a vegan diet and commented that Billy could have eggs for breakfast, fish oil tablets or dairy products. Although full marks were awarded, it is noted that the terminology in the course document refers to incomplete and complete proteins, rather than complementary.*

c) Billy's daily dietary intake appears high in calcium.

(i) Recommend FOUR good food sources of calcium that he may substitute into his eating patterns.

Justify why EACH substitution is a better choice for Billy.

- Low fat milk – this reduces his intake of saturated fat, although it still contains the same level of calcium.
- Low fat cheese – use a small amount of this on top of homemade pizza not both cheddar and mozzarella (good source of calcium but less saturated fat and kilojoules).
- Consume broccoli – a good source of calcium, vitamins, minerals, fibre and is naturally low in kJ.

*Better answers listed 4 calcium foods which were low in fat and provided a valid justification e.g. Billy can substitute regular fat milk in his coffee for low fat/no fat milk, this will reduce saturated fat content in his diet. Those who mentioned introducing extra products into Billy's diet (he is already eating too much) or included milk and yoghurt products without mentioning low fat varieties, did not score as well.*

(ii) Provide TWO reasons why it is important for Billy to meet the daily AI for calcium.

- Calcium contributes to the strength of bones and teeth and reduces the risk of developing osteoporosis.
- Calcium also assist with muscle contraction and nerve functioning.

*Well answered question.*

d) Billy's dietary intake appears low in fibre. Suggest TWO high fibre snacks that he could include.

- An apple
- Carrot sticks with hummus dip
- Bean mix
- Wholegrain toast

*Some missed the 'snack' word and suggested a bowl of oats for breakfast, just oats, steak, beans and legumes or steamed vegetables.*

e) Billy's regular dinner meal is pizza from his local pizza shop (see daily eating pattern).

Suggest THREE modifications Billy could make to create a more healthy pizza at home himself, in accordance with the ADGs.

- Make the base from scratch using wholemeal flour and reducing the amount of salt in the dough
- Use low fat cheese in the topping
- Roast pumpkin, capsicum and zucchini and use this to create topping
- Make the tomato topping (paste) himself using herbs for flavouring rather than salt

*Better answers included a valid modification of the pizza with an explanation of how the modification linked to the ADG's e.g. (ADG 3, limit salt intake).*

## SECTION C – FOOD ISSUES

CRITERION 2 Communicate ideas and information in a variety of forms

CRITERION 8 Identify and analyse food related issues

### GENERAL COMMENTS

Students made good attempts. Essay structures were there for most, introduction, paragraphs and conclusion. Most ideas were organised in a logical manner. Students generally showed a good understanding of the topics and were able to use key terms accurately.

Sentences must have a capital letter, a full stop, use commas appropriately and be of reasonable length.

Students need to take care with spelling words correctly, especially if they are basic to the unit e.g. security, sustainable, fossil fuels, agriculture.

Several students wrote the word 'and' as an abbreviation, whereas it needs to be written in full.

If acceptable abbreviations are used, they need to be written in full first.

Some students used emotional/colloquial language e.g. massive, huge, big time. This should be avoided in academic writing. Some made value judgements and generalisations which are not appropriate e.g. "...this group of people in Australia are all low income, these people cannot afford healthy foods."

Some students could take more care with handwriting.

Students need to ensure that they address all parts of the question and support their work with specific examples and accurate statistics.

Strategies need to include detail on how they can improve either food security or ecological sustainability and include both advantages and disadvantages.



## QUESTION 10

When explaining the term 'food security' a number of students didn't include the pillars. Better answers were also able to integrate the pillars into their response and not just list them at the start.

Most students were able to explain barriers to food security but could have improved their responses by including current global and Australian statistics. Some students just listed barriers and didn't discuss one in more depth.

Some students just listed groups most at risk of food insecurity or just wrote about people living in a particular country e.g. Cambodia. Specific groups needed to be identified such as Indigenous Australians or small farm holders in developing countries. Students then needed to give reasons why these groups are more at risk of food insecurity and support their discussion with accurate examples and data.

Better answers identified appropriate strategies to reduce food insecurity and were able to explain how they can improve food security (advantages) and possible disadvantages. For strategies to be sustainable, they should include more than just aid.

## QUESTION 11

A number of students didn't explain sustainable food systems (including food production, processing and consumer practices). Many just went straight into writing about barriers to sustainable food systems.

More successful answers supported their work with specific examples and accurate statistics.

Some students needed more detail on how their strategies help to improve ecological sustainability and possible disadvantages of strategies.

Some students only wrote about one strategy.

A number of students used GMO's as a strategy. Some students listed a wide range of fruits and vegetables as being grown in Australia as GMO's, which is incorrect.

## SECTION D – FOOD SOCIOLOGY

### CRITERION 6 – Analyse factors affecting food choice

#### GENERAL COMMENTS

- Students must write in pen. Pencil is difficult to read.
- The spelling of the factors was poor. Students need to ensure they use the correct spelling of 'physiological' and 'psychological'.
- Students should be able to use the terminology of food sociology throughout their responses (factors and sub-factors).
- The lack of food examples was apparent in many papers. The description of many food examples was very basic, so it is required they be more expansive.

#### PART I

#### GENERAL COMMENTS

*This was generally well answered.*

#### QUESTION 12

**The connection between food selection and emotion can be very strong.**

**Provide THREE different examples to support this statement.**

*Students needed to identify three different emotions, give a brief explanation and a food example.*

Examples might include:

- During periods of exams, a student may feel stressed and eat energy dense foods for comfort and as an energy boost e.g. Mars Bar.
- Food choice may affect a person's emotions. Eating energy dense foods may make a person feel disgusted in their behaviour e.g. eating a tub of ice-cream. A person may feel contempt for their behaviour.
- An elderly person may not be able to make or consume their partner's favourite meal once they pass away as the food may remind them of past experiences where times were happier, e.g. roast beef

- An individual reads an article about the live shipment of animals, so may feel guilty and decide to become a vegetarian as a sign of respect to animals e.g. vegetable pasta rather than spaghetti bolognese.
- Eating homemade chicken soup may remind a university student living away from home of a time when they ate soup as a family meal. This may make them feel less home sick and bring a sense of comfort.
- If a teenage girl is feeling unworthy and have a poor self-concept due to unrealistic body expectations she sees on social media, she may choose to eat less in an attempt to lose weight and look like the models she envies.

### QUESTION 13

Explain how advertising can influence food choice, and either positively or negatively affect self-concept. Provide ONE example of an advertisement and how it may influence food choice and self-concept.

*Students needed to give an explanation of how advertising impacts food choice. They also needed identify a specific example of an advertisement and link this to the impact this has on self-concept. Many students did not explain how the advertisement affects self-concept.*

Examples of answers might include:

- Advertising is ubiquitous; it can be on television, the internet or on billboards. The use of advertising to promote products is effective as it uses an individual's self-doubts and vulnerabilities to convince them that they should purchase a certain product. Females featuring in magazine advertising for slimming shakes may set unrealistic expectations of a healthy body weight. This can have a negative influence on self-concept by making a person feel unattractive or inferior. In response, a person may buy the product in a quest to change their body shape and then feel negatively towards their body if they are unable to achieve the same look.

#### QUESTION 14

Food plays many role in shaping and expressing both individual identify and connectedness to families, peer groups and communities. Outline ONE lifestyle and work pattern influence, and ONE cultural and traditional influence on food choice. Provide an example of each.

*Students needed to explain the factor/sub factor and provide an example of how this factor influences food choice. Many of the answers lacked depth.*

#### OTHER POINTS

- *Many students confused the beliefs of a religion with culture. They stated that a Hindu does not eat beef. If this example was used in a response, there needed to be an explanation of the link between religion and culture e.g. 'Culture and tradition can be impacted by beliefs. A Hindu does not eat beef as the cow is sacred to their religion. This may mean they eat chicken instead'.*
- *Students also confused the term tradition and habit. It is a habit to sit in front of the television to eat dinner. This is not a tradition.*

#### EXAMPLES OF ANSWERS MIGHT INCLUDE

##### Lifestyle and work pattern influence

- The physical demands of a person's job may influence their food choices. A person who works in a physically demanding job (e.g. builder) will require a higher energy intake than a person who works at a desk all day (e.g. call centre). Builder = 2 salad rolls, Call Centre worker = 1 salad roll.
- The pressure to meet deadlines may also lead to workers consuming lunch at their desk and rely on stimulants such as caffeine to keep them alert e.g. coffee and an apple rather than a balanced meal.

##### Cultural and traditional influence

- Culture relates to lifestyle, upbringing and ways of doing things. When a family moves from one country to another, they may bring their cultural habits to the new country, e.g. celebrating Chinese New Year and eating steamed dumplings.

- Traditions are customs that are repeated at specific times by members of a group or society within a culture. In Australia, we celebrate Christmas by eating a variety of foods such as turkey and Christmas pudding, despite the fact it is summer and lighter foods might be more appropriate.

### QUESTION 15

Describe TWO strategies in relation to food choice that fast-food outlets may use to encourage individuals or families to purchase discretionary food.

*Students that identified two strategies and explained how this influences food choices were able to score full marks. Some students did not read the question correctly and instead talked about marketing in supermarkets or the marketing of discretionary foods.*

### EXAMPLES OF ANSWERS MIGHT INCLUDE

1. Advertising of fast food is multi-layered. It is part of television advertising, but also includes banners at sporting fixtures, emblems on clothing and giving away memorabilia e.g. KFC Big Bash – buckets on heads. This serves as a reminder that stimulates people's appetite.
2. Availability of fast food establishments on main roads with extended opening times and easy access that make the purchasing of food a sedentary activity. They also bundle family feast/boxes together to reduce the cost and decisions that need to be made e.g. McDonalds Burger Box

### QUESTION 16

Define and explain the difference between hunger, appetite and satiety in relation to food choice. Provide an example of each.

*Most students only defined the factors and did not explain the difference between the factors. Many students did not give a specific example to explain the term.*

### AN EXAMPLE OF A GOOD ANSWER MIGHT INCLUDE

'Hunger is the feeling of emptiness, weakness and pain caused by a lack of food. It becomes more intense as time passes. For example, the feeling of light-headedness after completing the 40-hour famine. Appetite is the desire for food even if the body is not hungry. It can be triggered by sight, aroma and smell, e.g. fresh bread cooking. Unlike hunger, appetite will eventually go away if not satisfied. Satiety is the feeling of fullness that comes from eating adequate amounts of food and is usually felt after a nutritious meal, e.g. roast chicken, baked vegetables and peas. Eating 'on the run' often does not allow us to consciously feel satiety, so confuses appetite with hunger.'

### QUESTION 17

#### Scenario

#### OVERALL COMMENTS

- *There was a wide variety of styles used to set out the case study. Each style was valid.*
- *To gain maximum points - students needed to identify a factor/sub-factor, give an explanation and then give a food example.*
- *Students needed to use a wider variety of sub-factors and ensure that they used examples of likely food choices. Many students did not score well due to a lack of food examples.*
- *Some students reworded the scenario instead of explaining the factors that affected each of the family members. These answers did not score well.*
- *Some students gave dietary modification advice. These answers were not relevant to this section and did not score well. The question did not ask for a meal plan.*
- *Some students included too much nutrition information. Students can mention this, but this is not a nutrition question. This is an example that was well written:*
- *'Physiological – Nutritional Requirements – Age: As Steven is only 5 years old it is important for him to include calcium in his diet to grow strong bones and teeth. He may choose to eat cheese, milk, small bones of fish or broccoli.'*
- *Inappropriate repetition – especially 'nutrient requirements' was mentioned for each character.*
- *Incorrectly using the term 'ecological' rather than 'economic'.*
- *Many students did not identify the inter-relationship between the factors.*

SOME EXAMPLES OF ANSWERS THAT IDENTIFIED A FACTOR AND SUB-FACTOR FOR EACH OF THE CHARACTERS MIGHT INCLUDE

**Anna**

- **Physiological – Nutritional Requirements:** Due to her training schedule she would have different nutritional requirements when compared to females of the same age with a sedentary lifestyle e.g. energy, iron. This may mean she eats iron rich foods like spinach.
- **Social – Lifestyle and Work Pattern:** Anna seems to have a busy schedule with training and family and lacks time for meal preparation. Due to her complex household structure and roles, this may mean that she is unable to prepare all foods from scratch. As she has an interest in health, she may read labels on food packets and choose foods e.g. taco kits with reduced sodium (food regulation)

**Chris**

*(Please note: many students confused hunger with appetite when they discussed Chris)*

- **Physiological – Appetite/Hunger:** Chris may not understand that his appetite is being stimulated by the smell and flavour of fast food, which confuses appetite with hunger e.g. the smell of Chinese food as he walks past.
- **Economic – Food Availability:** The food venues available (marketplace) after the football would be places that welcome sporting people. This might include a local pub rather than a fine dining venue. Salty snacks might be offered at the bar to encourage customers to drink more beer in order to increase profits.

**Steven**

- **Physiological - Food Sensitivities:** This means that Steven is allergic to nuts. A food allergy is an immune response and occurs when the body overreacts to a specific part of a food. This would restrict the food that the family would be able to have in the house e.g. peanut butter. This would mean that the family may have to eat vegemite on toast instead.

- **Social – Advertising:** Children are targets for television marketing. As Stephen is a child, he would be unable to understand the health implications (education) of consuming these foods e.g. McDonalds Happy Meals. He may be more likely to persuade his father than his mother to purchase this food due to his mother's beliefs about health.

### Michelle

- **Physiological - Sensory reactions:** This refers to the taste, texture, turgor, shape and colour of food. Michelle is sensitive to the smell of foods e.g. bananas. This may mean that she is unable to eat other foods with strong flavours, such as sardines and blue cheese, as she does not enjoy the taste.
- **Social – Social and Community Interactions:** Peers have a major influence on Michelle. While her friend may have chosen to become a vegetarian due to her belief that animals have the right to live, Michelle has chosen to become a vegetarian after overhearing a conversation. She may eat zucchini slice without bacon.

### Paulo

- **Psychological – Past Experiences:** Paulo's food choices are influenced by the customs and traditions from his country of birth. He enjoys eating this food (e.g. Baked Burrito) due to his past experiences and the feeling of comfort that he can get from this food, given he lived in a foreign country where the geography and climate may have been very different.
- **Economic – Food Availability:** Due to the location of the university, the supermarket marketplace may be difficult to get to (available resources - car), which means that his host family would need to do the shopping for him. This may mean that they choose Mexican ingredients that are less traditional e.g. flavoured corn chips



## EXAMPLES OF ANSWERS THAT DEMONSTRATED INTERRELATIONSHIPS MIGHT INCLUDE

- Being very tall would affect Chris' metabolic rate, as his body would have more metabolising tissue. This would increase his energy requirements so he needs to consume quick snack foods e.g. takeaway pizza that could be purchased near his workplace (lifestyle and work pattern).
- A 'past experience', when Michelle accidentally ate the skin of a kiwi fruit, may be the reason why she doesn't eat kiwi fruit today. The texture may have felt coarse and unpleasant in her mouth and shaped her attitude to eating kiwi fruit today. She may only eat kiwi fruit when it is peeled.
- Children often have a heightened sense of taste. As there are two children in the family, Paulo may have to adjust the amount of chilli that he uses to flavour the Mexican food he cooks when compared to what he might prepare if the children are not home (household structure and roles).
- Paulo's food choices are influenced by the customs and traditions in his country of birth. He enjoys eating this food (e.g. Baked Burrito) due to these past experiences and the feeling of comfort that he can get from this food, having lived in a foreign country where the geography and climate may be very different.