Food & Nutrition marking guide and response

External assessment 2023

Combination response (73 marks)

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

1. recognise and describe facts and principles related to the food system, food formulation and nutrition consumer markets
2. explain ideas and problems related to current and emerging nutrition consumer markets
3. analyse problems, information and data related to current and emerging nutrition consumer markets
4. determine solution requirements and criteria for nutrition consumer market problems
5. synthesise information and data for solutions related to nutrition consumer market problems
7. evaluate and refine ideas and solutions to make justified recommendations for enhancement.

Note: Unit objectives 6 and 8 are not assessed in this instrument.

Purpose

This document consists of a marking guide and a sample response.

The marking guide:

- provides a tool for calibrating external assessment markers to ensure reliability of results
- indicates the correlation, for each question, between mark allocation and qualities at each level of the mark range
- informs schools and students about how marks are matched to qualities in student responses.

The sample response:

- demonstrates the qualities of a high-level response
- has been annotated using the marking guide.

Mark allocation

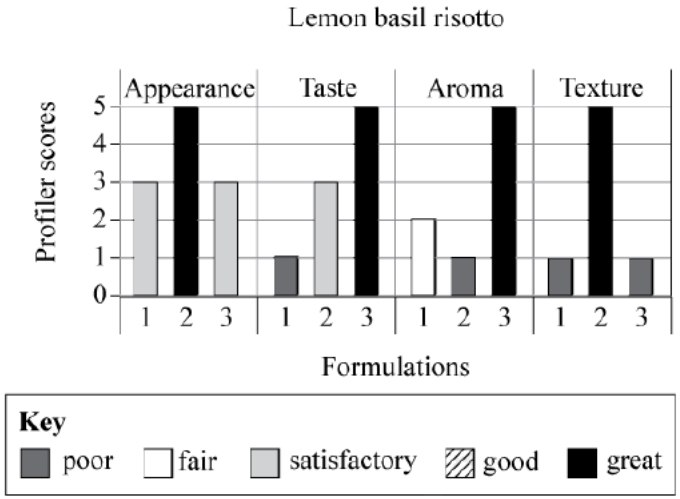
Where a response does not meet any of the descriptors for a question or a criterion, a mark of ‘0’ will be recorded.

Where no response to a question has been made, a mark of ‘N’ will be recorded.

Marking guide

Short response

Q	Sample response	The response:
1	The health claim of 'a good source of fibre' is not reasonable as the product does not meet the needs of the NPSC. A category 2 food must score less than 4 to make a health claim. This product scored 10.	• identifies that the health claim is not reasonable **[1 mark]** • justifies by stating that a category 2 food must score less than 4 in the NSPC, but this product scored 10 **[1 mark]**

Q	Sample response	The response:
2a)		• synthesises the sensory profiling data into a comparison graph representing – appearance **[1 mark]** – taste **[1 mark]** – aroma **[1 mark]** – texture **[1 mark]**
2b)	Based on the sensory profiling data, Formulation 3 (F3) has the best taste and aroma, with both rated at 5. This would be the result of the food components used. The food components of F3 should be used. F3's texture is poor and appearance only satisfactory, which is due to the procedure. When looking at the other formulation's sensory profiling, it is evident that Formulation 2 (F2) has the best ratings for appearance and texture (both rated at 5). The procedure for F2 allows for more absorption and time to cook the rice, therefore giving better texture and appearance. To reformulate the risotto, the food components of F3 and the procedure for F2 would achieve the best possible lemon basil risotto with high sensory profiling scores.	• identifies formulation 3 as the best rated in taste and aroma **[1 mark]** • identifies relationships between food components and sensory profiling data **[1 mark]** • specifies modifications to improve sensory ratings **[1 mark]** • identifies formulation 2 as the best rated in texture and appearance **[1 mark]** • identifies this rating being due to better procedure, based on sensory profiling data **[1 mark]** • specifies modifications to improve sensory ratings **[1 mark]**

Q	Sample response	The response:
3a)	• Nutritional benefits of Hawaiian pizza scrolls are poor, despite providing a large serve of energy at 1230 kJ to maintain satiety and prevent overeating. • The formulation food components of spinach and pineapple benefit the consumer as they add fibre to the formulation. • Nutritional risks are high, as scrolls provide twice the kilojoules at 1230 kJ as the maximum required snack size of 600 kJ. This is one eighth of RDI for adults, which could cause weight gain. • The product is high in sodium at 794 mg/100 g. The RDI states an adult should only consume 2000 mg of salt per day. This product provides nearly half the RDI for adults and could increase hypertension and exacerbate CHD.	• determines the nutritional benefits of formulation 1 as poor/few and the nutritional risks as high **[1 mark]** • justifies nutritional benefits and risks using – the formulation **[1 mark]** – the RDI panel **[1 mark]** – the definition of a snack **[1 mark]**
3b)	Formulation 3: Coconut strawberry muffins is better for the consumer from Question 3a). The nutritional benefits of coconut strawberry muffins are better than the raspberry smoothie balls, having the least energy (784 kJ/100 g) for a bigger serve (85 g), however it is larger than the recommended snack size of 400–600 kJ. 100 g of the muffins provides 784 kJ, while 100 g of the raspberry smoothie balls provide more than double at 1802 kJ, so raspberry smoothie balls would provide too much energy for a healthy snack per 100 g. Fat content also contributes to the satisfactory rating, as the muffins have the least total fat at 9.1 g/100 g, almost a tenth of the RDI for men (88 g), and only 6.8 g /100 g of saturated fat. Low fat is beneficial for a CHD consumer. The raspberry smoothie balls provide 26 g/100 g of saturated fat, considerably more than the muffins. Nutritional risks are minimal, however total fat is 9.8 g/100 g with saturated fat at 6.8 g/100 g, which could be lowered by using a monosaturated oil like olive oil. The muffins are low in fibre; fibre can assist in lessening cholesterol, which is beneficial for those suffering CHD. However, fibre can be increased by substituting wholemeal flour for coconut flour and adding more rolled oats.	• correctly states the better formulation for the CHD consumer is formulation 3 **[1 mark]** • correctly determines the nutritional benefits and risks of the formulation **[1 mark]** • justifies nutritional benefits and risks using – the RDI panel **[1 mark]** – formulation 2 **[1 mark]** – formulation 3 **[1 mark]**

<table>
<tr><th>Q</th><th>Sample response</th><th>The response:</th></tr>
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The best formulation to modify is Formulation 1: Zucchini and bacon slice.
<table>
<tr><th>Original food component</th><th>Substituted food component</th></tr>
<tr><td>150 g rindless smoked bacon</td><td>Sweet potato</td></tr>
<tr><td>1 brown onion</td><td>Spring onions</td></tr>
<tr><td>750 g self-raising flour</td><td>Wholemeal self-raising flour</td></tr>
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Justification for substitutions:

Sweet potato can replace bacon because both have a strong flavour.
Spring onions can replace brown onion as they have similar texture and taste.
Wholemeal self-raising flour can replace the white self-raising flour.as they have the same functional properties. The quantities may need to be altered to maintain the structure of the product.
All substitutions used are low GI, which maintains blood sugar levels, and increases satiety, avoiding weight gain. They are fat free with higher fibre and contain macronutrients, e.g. sweet potato contains Vitamin A. These factors would be important to the health-conscious nutrition consumer market.

Sensory profiling could be altered in appearance, taste, texture and aroma. Texture would be changed by using sweet potato as it is an entirely different texture to bacon and may contain more moisture. The wholemeal flour may make it drier, but this could counteract the moisture of sweet potato.
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states that Formulation 1 is the best formulation [1 mark]
provide one valid substitution [1 mark]
provide another valid substitution [1 mark]
provides third valid substitution [1 mark]
justifies substitution/s by linking to one NCM need [1 mark]
justifies substitution/s by linking to another NCM need [1 mark]
justifies by referencing possible sensory profiling [1 mark]

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Q	Sample response	The response:

Original food component	Substituted food component
450 g self-rising flour	wholemeal self-rising flour
10 g mixed spice	cocoa powder
240 g carrots coarsely grated	fresh beetroot

- **Justification for use of substituted food components with regards to health- conscious consumer**
  - The wholemeal self-raising flour can replace white sr flour. It has the same chemical and physical properties as white flour in the baking process.
  - The cocoa powder can be substituted for mixed spice as it will provide flavour be it a different taste
  - The grated beetroot can replace carrot being a fibrous vegetable similar to carrots should contribute to the process in the same way as carrot.

Sensory profiling could be altered in appearance, taste, texture and aroma. Texture would be changed by using beetroot as it is an entirely different taste to carrot and may contain more moisture. The wholemeal flour may make it drier, but this could counteract the moisture of beetroot. The cocoa powder is purely for taste value.

Extended response — Question 5

Criterion: Analyse the problem to determine the solution requirements for each stakeholder

The response:	The response:
• provides viable solution requirements for the company that – extend its range by choosing one of the formulations with refinements **[1 mark]** – select a product suitable for pregnant consumers who are vegan **[1 mark]** – represent all three current food trends **[1 mark]** – make the product convenient for the consumer **[1 mark]**	• provides viable solution requirements for pregnant consumers who are vegan that – contain appropriate foods to deliver correct kilojoule intake to maintain a healthy weight **[1 mark]** – consider intake of iron, calcium, salt and protein **[1 mark]** – follow safety guidelines for healthy eating during pregnancy **[1 mark]** – meet NCM's requirement for sensory profiling **[1 mark]**

Criterion: Analyse how prototype formulations meet the solution requirements of the NCM

The response, for Prototype 1:	The response, for Prototype 2:	The response, for Prototype 3:
• provides a critical analysis using the needs of the NCM, which includes that – it is highest in kJ at 2380 kJ/100 g; however this prototype is half the serving size of the other formulations at 105 g **[1 mark]** – it is highest in iron at 35.7 mg/100 g, which helps develop haemoglobin to carry oxygen to the mother and baby **[1 mark]** – all food components and processing meet safety guidelines for NCM **[1 mark]**	• provides a critical analysis using the needs of the NCM, which includes that – it is lowest in kJ per 100 g at 1440 kJ/100 g **[1 mark]** – it is similar in protein at 13.3 g/100 g to the other prototypes, which is good as pregnant women need higher protein, and is highest in calcium at 570 mg/100 g, which assists in growing strong bones **[1 mark]** – processing meets safety guidelines for NCM **[1 mark]**	• provides a critical analysis using the needs of the NCM, which includes that – it is similar in kJ to Prototype 2 at 1500 kJ/100 g, which is lower than Prototype 1 but provides a larger serve **[1 mark]** – it is lowest in fat (4.8 g/100g) and saturated fat (0.8 g/100g), which will help maintain a healthy weight **[1 mark]** – processing meets safety guidelines for NCM **[1 mark]**

Criterion: Analyse how prototype formulations reflect the pregnant consumer trends

The response, for Prototype 1:	The response, for Prototype 2:	The response, for Prototype 3:
• analyses whether Prototype 1 follows Trend 1 **[1 mark]** • analyses whether Prototype 1 follows Trend 2 **[1 mark]** • analyses whether Prototype 1 follows Trend 3 **[1 mark]**	• analyses whether Prototype 2 follows Trend 1 **[1 mark]** • analyses whether Prototype 2 follows Trend 2 **[1 mark]** • analyses whether Prototype 2 follows Trend 3 **[1 mark]**	• analyses whether Prototype 3 follows Trend 1 **[1 mark]** • analyses whether Prototype 3 follows Trend 2 **[1 mark]** • analyses whether Prototype 3 follows Trend 3 **[1 mark]**

Criterion: Analyse prototype formulations for sensory profiling

The response, for Prototype 1:	The response, for Prototype 2:	The response, for Prototype 3:
• provides a critical analysis of the four sensory properties of Prototype 1, including that it is – best for appearance: was rated at satisfactory or above by 50 profilers and great by 35 profilers **[1 mark]** – rated satisfactory or below for taste by 41 profilers **[1 mark]** – best for aroma: was rated satisfactory or above by 50 profilers and great by 30 profilers **[1 mark]** – best for texture: was rated at satisfactory or above by 43 profilers **[1 mark]**	• provides a critical analysis of the four sensory properties of Prototype 2, including that it is – rated at satisfactory or above for appearance by 46 profilers and great by 15 profilers **[1 mark]** – rated as satisfactory or below for taste by 45 profilers **[1 mark]** – rated at satisfactory or above for aroma by 42 profilers **[1 mark]** – rated at satisfactory or below for texture by 50 profilers **[1 mark]**	• provides a critical analysis of the four sensory properties of Prototype 3, including that it is – rated at satisfactory or above for appearance by 47 profilers and great by 25 profilers **[1 mark]** – best for taste: was rated at satisfactory or above by 44 profilers and great by 19 profilers **[1 mark]** – rated satisfactory or above for aroma by 49 profilers **[1 mark]** – rated satisfactory or below for texture by 47 profilers **[1 mark]**

Criterion: Evaluate and refine ideas and solutions to make justified recommendations for enhancement

The response:	The response:
• identifies Prototype 3 as the best solution and provides detailed justification, including – appropriateness of the formulation for the NCM **[1 mark]** – evaluation of trends **[1 mark]** – sensory profiling data **[1 mark]**	• makes an effective recommendation for the enhancement of a prototype **[1 mark]** • justifies this recommendation with detailed and accurate data from the stimulus **[1 mark]** • makes another effective recommendation for the enhancement of a prototype **[1 mark]** • justifies this recommendation with detailed and accurate data from the stimulus **[1 mark]**