

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY  
FIRST SEMESTER SUPPLEMENTARY EXAMINATIONS – 2021  
FOOD TECHNOLOGY – SECOND YEAR DEGREE

FT 214 NUTRITION I

FRIDAY 16<sup>TH</sup> JULY, 2021 – 8:20 AM

**TIME ALLOWED: 3 HOURS**

**INFORMATION FOR CANDIDATES:**

1. You have 10 minutes to read the paper. You must not begin writing in the answer book during this time.
2. **ANSWER ALL QUESTIONS.**
3. All answers must be written in the answer books provided.
4. Write your name and number clearly on the front page. Do it now.
5. Calculators are permitted in the examination room. Notes and textbooks are not allowed.
6. Show all workings and calculations in the answer book.

**MARKING SCHEME**

Question 1	[10 marks]
Question 2	[18 marks]
Question 3	[13 marks]
Question 4	[21 marks]
Question 5	[26 marks]
Question 6	[12 marks]

**ANSWER ALL QUESTIONS**

1. Write True or False for each of the following statements: [½ mark each]
- (a) Monosaccharides, amino acids, positive ions and vitamins C and B vitamins are absorbed by passive diffusion.
  - (b) Coeliac disease is an example of food intolerance.
  - (c) Segmentation is the wavelike rhythmic muscular contractions of the GI tract that propels contents down the tract whilst peristalsis is the periodic muscle contractions at intervals along the GI tract.
  - (d) Very low density lipoproteins are made in the adipose tissue.
  - (e) Beriberi (wet & dry) are consequences of prolonged vitamin B6 deficiency.
  - (f) Hepatic portal vein conveys nutrients from the stomach to the capillaries and into the cells.
  - (g) Secretin is secreted by duodenal wall cells in response to acidic chyme. It opposes action of gastrin & stimulates pancreas to release bicarbonate to neutralize acidic chyme.
  - (h) To calculate glycemic load of food; amount in grams of carbohydrate in a serving of the food is multiplied by the glycemic index of that food and then divided by 100.
  - (i) Vitamin K is the most important lipid soluble antioxidant.
  - (j) Rickets and osteomalacia are signs of calcium deficiency.
  - (k) Only vitamin B12 is a concern in a vegan diet.
  - (l) Type 2 diabetes is due to insulin resistance whilst Type 1 diabetes is due to lack of insulin production by the beta cells of the pancreas.
  - (m) The two main factors which influence protein quality are essential amino acids and digestibility.

- (n) Trans-fatty acids are made when liquid oils are hydrogenated. Trans-fatty acids raise the high density lipoprotein levels whilst decreasing the low density lipoprotein levels.
- (o) Amino acid asparagine is required for the formation of acrylamide.
- (p) Gall bladder makes the bile, concentrates and stores it, presence of fat in the small intestine triggers its release to facilitate fat digestion.
- (q) If you have large fat stores in adipose tissue, your survival time may be extended during starvation.
- (r) Glycolysis or splitting of glucose is an anaerobic pathway.
- (s) Glycogenolysis is the buildup of glycogen in the liver and the muscles.
- (t) Glycerol and fatty acids can be used to make glucose when there is limited glucose available.

[10 marks]

(Total = 10 marks)

- 2.
- (a) Give a definition for functional foods and explain their importance. [2½ marks]
  - (b) Some functional foods are categorized according to their mechanism of action. Explain what that means and explain the significance of such a group. [2½ marks]
  - (c) Define what glycemic index is? And state ANY TWO factors that affect it. [3 marks]
  - (d) Explain the importance of fortifying commonly consumed foods with nutrients. Also include the names of the two foods that are fortified in PNG along with the nutrients used. [3 marks]
  - (e) Explain gluconeogenesis. [2 marks]
  - (f) Fully state the areas of energy use in the body. [3 marks]
  - (g) Why store excess glucose as glycogen when you can store more as triacylglycerol? [2 marks]

(Total = 18 marks)

3. (a) Explain what happens during the 'fight and flight' situation, include in your explanation, the hormones involved and what they do. [3 marks]
- (b) Explain the importance of maintaining a good amino acid pool for good health. [2 marks]
- (c) Explain the reasons for referring to LDL as bad cholesterol. [2 marks]
- (d) Define and explain lipogenesis. [2 marks]
- (e) Explain what food composition databases are and why it is important to have a national database. [2 marks]
- (f) Why is it important to include adequate carbohydrates in the diet? [2 marks]
- (Total = 13 marks)
4. (a) Blood glucose must be maintained within limits that allow cells to nourish themselves. Describe how this glucose homeostasis is maintained and the importance of maintaining homeostasis. [4 marks]
- (b) Write short notes describing the mechanisms that exist in the body which helps facilitate the digestion and absorption of lipids. [4 marks]
- (c) Name the two families of essential fatty acids and describe their importance to health. [3 marks]
- (d) If someone is going through a prolonged period of fast, describe the changes that occur and explain why these changes occur. Explain in terms of fuel usage and relevant adjustments made during the periods of fed and fast to sustain life. [4 marks]
- (e) We say fatty acid catabolism provides energy fuel for the body. Describe how that is possible. [3 marks]
- (f) Discuss the importance of dietary fibre to good health. [3 marks]

(Total = 21 marks)

5. (a) Select any TWO named micronutrients and write notes describing their functions, deficiency diseases and common food sources. [7 marks]
- (b) Describe ketogenesis; what it is, where it occurs, the process and its importance. [4 marks]
- (c) Food allergies are an important consideration in food manufacturing. Define and describe what food allergy is highlighting some examples of its symptoms. Also include in your answer, description of what people can do to prevent food allergies and one method of diagnosis of food allergies and intolerances. [4 marks]
- (d) Name ANY ONE example of toxins under the following categories and describe what it is and how it affects human health:
- (i) Environmental contaminants. [2½ marks]
- (ii) Substances formed as a result of food processing. [2½ marks]
- (e) Write short notes discussing the effects of the following dietary factors on cancer risk; salt intake, red and processed meats and fibre on cancer risk. [6 marks]

(Total = 26 marks)

6. (a) Choose either triacylglycerol, cholesterol or phospholipids and write short notes describing what they are, and their important functions. [4 marks]
- (b) Chemical energy needed by the cells for cellular metabolism is held in the bonds of energy yielding nutrients. However, these are not usable for cells so has to be converted to the usable form which is ATP. Give an overview of how this happens. [3 marks]
- (c) It is important that children have adequate protein and calories in their diets, when this does not happen children suffer from protein energy malnutrition (PEM). Kwashiorkor is an important form of PEM. Describe kwashiorkor and explain the causes of its two key features; oedema and enlarged liver. [5 marks]

(Total = 12 marks)