



UNIVERSITY OF RUHUNA
FACULTY OF AGRICULTURE

Second Examination in BSc Agricultural Resource Management and Technology (Part I)

May 2023

Food and Nutrition - Theory (Compulsory)



INSTRUCTIONS

Answer Four (04) questions including the question number one.

Only non-programmable calculators are permitted.

Mobile phones are NOT permitted.

Attach the question paper to the **end** of the answer script

TIME: 2 (two) Hours

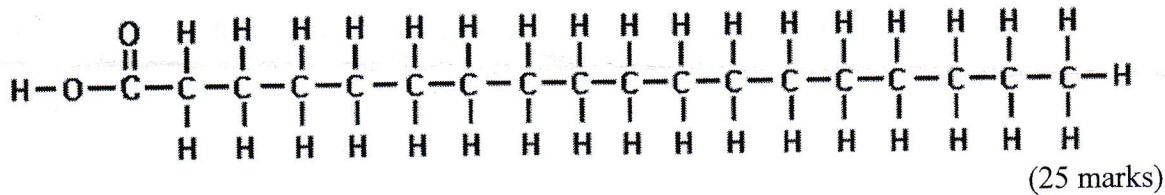
INDEX NUMBER

1.
 - a) Briefly describe the entry of carbohydrates other than glucose to the glycolysis. (25 marks)
 - b) "Amino acids are classified as Glucogenic and Ketogenic, or both, based on the intermediates produced during their catabolism". Elaborate this statement by giving examples. (25 marks)
 - c) Briefly explain whether the fatty acid shown below can be synthesized in human body
$$\text{CH}_3 - (\text{CH}_2 - \text{CH} = \text{CH})_3 - (\text{CH}_2)_7 - \text{COOH}$$
(25 marks)
 - d) Briefly explain how blood Calcium level is regulated in the body. (25 marks)

2.
 - a) Illustrate the Citric Acid Cycle and its regulation in human metabolism. (25 marks)
 - b) Briefly describe the metabolic fate of Pyruvate under aerobic and anaerobic conditions. (25 marks)
 - c) Illustrate the pentose phosphate pathway and list down its importance in carbohydrate metabolism. (25 marks)
 - d) Compare the utilization of glycogen and fat as energy sources in our body. (25 marks)

3.
 - a) Briefly discuss the importance of Nitrogen balance in human beings while explaining it with the body's physiological status. (20 marks)
 - b)
 - i) What is meant by "**Protein Turnover**"? Briefly explain it with the possible reasons for Protein turnover in the human body. (10 marks)
 - ii) List down **Five** major factors influencing the body protein turn over in the human body. (10 marks)
 - c)
 - i) In protein metabolism, some Essential amino acids are required in synthesizing some Non-essential amino acids. List down appropriate examples to support this statement. (15 marks)
 - ii) Illustrate the **Urea cycle**, and briefly explain the significance of it in the Protein metabolism. (20 marks)
 - d)
 - i) What is the condition of **Hyperammonemia**? (10 marks)
 - ii) **Phenylketonuria** is an inherited metabolic disorder caused by the absence of one of the enzymes in the Phenylalanine metabolism pathway. Briefly discuss symptoms and preventive measures/treatments of this disease. (15 marks)

- 4.
- List five (05) examples to prove the interrelation between carbohydrate and fatty acid metabolism. (25 marks)
 - Briefly explain the reaction catalyzed by Acetyl CoA carboxylase enzyme and importance of this reaction on fat metabolism. (25 marks)
 - Briefly explain the role of carnitine and citrate in lipid metabolism. (25 marks)
 - Calculate the energy yield (in ATPs) at **complete oxidation** of the given fatty acid in metabolism



- 5.
- Briefly explain the six major steps in digestion of food in gastrointestinal system of human (25 marks)
 - Briefly explain how HCL and pepsinogen are released by the cells in the stomach. (15 marks)
 - Mention the importance of HCl in food digestion in human. (10 marks)
 - Write a short account on Adrenal gland hormones. (25 marks)
 - Briefly explain how blood Glucose level is regulated in the body. (25 marks)