

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR SEMESTER TWO EXAMINATION FOR THE DEGREE  
OF BACHELORS OF SCIENCE (FOOD SCIENCE AND TECHNOLOGY)

BIOC 313: NUTRITIONAL BIOCHEMISTRY

STREAMS: BIOC

TIME: 2 HOURS

DAY/DATE: MONDAY 15/4/2019

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS

- Answer question **ONE (COMPULSORY)** and any other **TWO** questions.
- Sketch diagrams may be used whenever they may help to illustrate your answer.
- Do not write anything on the question paper.

QUESTION ONE (COMPULSORY) 30 MARKS

- With use of a well labeled diagram, give a detailed account of the integrated metabolism of carbohydrates, fats and proteins (8 marks)
- Discuss some of the metabolic changes associated with obesity (8 marks)
- Explain the meaning of coefficient of digestibility in and step wise fashion. Discuss the procedure employed when determining the coefficient of digestibility (6 marks)
- Briefly discuss the types of hormones of adipose tissue and their role in obesity (8 marks)

QUESTION TWO (20 MARKS)

- With use of a clear diagram, demonstrate the process of  $\beta$  – oxidation of free fatty acids (8 marks)
- Discuss the cause, clinical symptoms, biochemical changes and management of marasmus and kwashiorkor (5 marks)
- Explain the meaning of the term glycaemic index as applied in nutritional biochemistry (2 marks)
- Discuss the major classes of obesity affecting majority of the population (5 marks)

**QUESTION THREE (20 MARKS)**

- a. Describe the digestion and mechanism of absorption of carbohydrates in the gastrointestinal tract (8 marks)
- b. Discuss and illustrate the metabolism of alcohol in human body (6 marks)
- c. Briefly explain the meaning of the biological value as applied in nutritional biochemistry (2 marks)
- d. (i) Explain the meaning of the term nitrogen balance.  
(ii) What is the different between negative and positive nitrogen balance (2 marks)
- e. Briefly explain the meaning of malnutrition (2 marks)

**QUESTION FOUR (20 MARKS)**

- a. During the process of protein metabolism, ammonia is formed. Illustrate with the use of a suitable diagram the urea cycle in the process of protein metabolism (8 marks)
- b. Discuss in detail, some of the factors that can influence the rate of absorption of carbohydrate in the gastrointestinal tract (8 marks)
- c. Explain why the body stores glucose as glycogen and not as glucose itself (4 marks)

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