



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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University Examinations 2024/2025

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE BACHELOR OF
SCIENCE IN BIOCHEMISTRY

SHC 3202: BASIC METABOLISM I

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

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|---|-----------|
| a) Illustrate the structure of ATP synthase | (3 marks) |
| b) Explain how cytochrome c oxidase minimizes the formation of ROS | (3 marks) |
| c) Illustrate the sorbitol as an intermediate of the polyol pathway | (2 marks) |
| d) Explain the fate of pyruvate metabolism | (2 marks) |
| e) Describe the elongation and desaturation of fatty acids | (2 marks) |
| f) Illustrate the glyoxylate cycle | (3 marks) |
| g) Explain the interaction of gluconeogenesis with other pathways | (2 marks) |
| h) Describe the cori cycles | (2 marks) |
| i) Explain the lysosomal glycogen disposal | (2 marks) |
| j) Explain how fatty acid synthase slowly inhibited tumor growth | (2 marks) |
| k) Explain the regulation of pyruvate kinase | (2 marks) |
| l) Illustrate how nitric oxide synthase requires NADPH | (3 marks) |
| m) Explain the mechanism of transketolase and transaldolase enzyme | (2 marks) |

QUESTION TWO (20 MARKS)

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a) Describe the reactions in the sugar shuttle stage in HMP (10 marks)

b) Describe the β -oxidation of fatty acids (10 marks)

QUESTION THREE (20 MARKS)

a) Outline the TCA cycles (12 marks)

b) Describe the molecule in ETC (8 marks)

QUESTION FOUR (20 MARKS)

a) Outline the glycolysis pathways (12 marks)

b) Explain the regulation of glycogen metabolism (8 marks)