



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF BIOCHEMISTRY

### SHC 3252: PROTEIN BIOCHEMISTRY

DATE: APRIL 2024

TIME: 2 HOURS

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

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#### QUESTION ONE (30 MARKS)

- a) Explain numbering of amino acids in proteins (3 marks)
- b) Describe briefly proteomics (3 marks)
- c) Outline the characteristics of a peptide bond (3 marks)
- d) Distinguish between a competitive inhibitor and a non-competitive inhibitor (2 marks)
- e) Illustrate interchain and intrachain disulphide bridges (3 marks)
- f) Describe the roles of protein disulfide isomerase and peptidylprolyl cis-trans isomerase in protein folding (3 marks)
- g) Explain briefly determination of protein primary structure using Sanger's reaction (3 marks)
- h) Describe hydrophobic interaction chromatography (4 marks)
- i) Explain three optimal conditions required for enzymatic activity (3 marks)
- j) Describe UV-spectroscopy in protein analysis (3 marks)

**QUESTION TWO (20 MARKS)**

- a) Discuss the forces that stabilize the different protein structures (10 marks)
- b) Describe salting out of proteins (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Describe the following 3-D protein structure determination techniques
  - i. NMR (5 marks)
  - ii. X-ray crystallography (5 marks)
- b) Discuss neurological diseases resulting from altered protein conformations (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss quantitative estimation techniques for proteins (10 marks)
- b) Describe briefly two protein purity assessment techniques (10 marks)