



**MERU UNIVERSITY COLLEGE
OF SCIENCE & TECHNOLOGY**

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University Examinations 2011/2012

SECOND YEAR, FIRST SEMESTER EXAMINATIONS FOR DIPLOMA IN AGRICULTURE

BIO 0210: AGRICULTURAL BIOCHEMISTRY

DATE: AUGUST 2011

TIME: 1½ HOURS

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

QUESTION ONE – (30 MARKS)

- (a) Explain why human beings are evolutionally more closely related to yeast than to bacteria. (2 Marks)
- (b) Explain why water is referred to as a polar molecule. (2 Marks)
- (c) Explain why water has a higher melting point when compared to other solvents with a simple molecular structure. (2 Marks)
- (d) Draw the basic structure of an amino acid molecule. (2 Marks)
- (e) Describe the tertiary structure of protein and explain its significance in biochemistry. (4 Marks)
- (f) Arrange the following bonds in ascending order of strength: electrostatic, covalent, hydrogen. (1 Mark)
- (g) What is meant by denaturation of proteins? (2 Marks)
- (h) Draw the ring structures of B-D-Glucose and alpha-D-Glucose. (4 Marks)
- (i) Give five important functions of lipids in plants and animals. (5 Marks)
- (j) State two types of nucleic acids and describe their functions. (4 Marks)
- (k) Name the main components of cell membranes. (2 Marks)

QUESTION TWO – (15 MARKS)

- (a) Citing relevant examples define the three Main Branches of modern biochemistry. (6 Marks)
- (b) State the most common monosaccharides encountered in human diet. (3 Marks)
- (c) What is the significance of cis-unsaturated fatty acids in membrane lipids? (3 Marks)

(d) Which are the building blocks of a nucleotide? (3 Marks)

QUESTION THREE – (15 MARKS)

(a) Outline four types of protein, their functions and give relevant examples of each. (12 Marks)

(b) Give three functions of cholesterol that make it an important compound in human beings. (3 Marks)

QUESTION FOUR – (15 MARKS)

(a) Outline six functions of cell membranes. (6 Marks)

(b) Outline the two types of polymers that make up plant starch and explain how they differ. (4 Marks)

(c) Explain the differences that exist in between DNA and RNA. (3 Marks)

(d) State one industrial application of phospholipids and give an example. (2 Marks)

QUESTION FIVE – (15 MARKS)

(a) What is meant by facilitated diffusion through a membrane? Give an example. (4 Marks)

(b) Describe the structure of cellulose and explain why its configuration suits its functions. (4 Marks)

(c) Explain why human beings cannot digest cellulose. (2 Marks)

(d) What is a gated ion channel? Give an example. (5 Marks)