



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN APPLIED CHEMISTRY (ANALYTICAL OPTION)

BTAC 12S /BTAC 13S2

ABT 4201: STRUCTURE OF BIOMOLECULES

SEMESTER EXAMINATION

DECEMBER 2013 SERIES

2 HOURS

Instructions to candidates:

This paper consists of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

QUESTION ONE

- In the equation, $\text{CH}_3\text{CO}_2\text{H} \rightarrow \text{CH}_3\text{CO}_2^- + \text{H}^+$ if a one molar solution of acetic acid ($\text{CH}_3\text{CO}_2\text{H}$) dissociates 0.4% in solution, what is the dissociation constant, K_a , for acetic acid. **(4marks)**
- State the biological importance of water. **(5marks)**
- List any **FIVE** functions of lipids **(5marks)**
- Draw the structures of any **THREE** aromatic amino acids **(3marks)**
- Draw the structure of a phosphatidic acid. **(2marks)**
- Illustrate **FOUR** examples of saturated fatty acids. **(2marks)**
- Illustrate the reaction of an amino acid with 1,fluro-2,4-dintrobenzene (FDNB). **(4marks)**
- Distinguish between ribonucleic acid (RNA) and deoxyribonucleic acid (DNA). **(5marks)**

QUESTION TWO

a) Explain the titration curve of arginine.

($pK^1 = 2.1$, $pK^2 = 9.0$; $pK^3 = 12.5$, $PI = 10.8$)

(10marks)

b) Discuss the importance of nucleotides.

(10marks)

QUESTION THREE

a) Discuss the bacterial transformation experiment by Frederick Griffith.

(10marks)

b) Describe the DNA structure

(10marks)

QUESTION FOUR

a) Discuss the properties of phosphoglycerides.

(15marks)

b) Explain the chemical properties of neutral acids triglycerides.

(5marks)

QUESTION FIVE

Calculate the $[OH^-]$ and pOH of an aqueous solution of 0.5m acetic acid (CH_3COOH).

$K_a = 1.8 \times 10^{-5}$ at $25^\circ C$

(20marks)