JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOLOGICAL AND HEALTH SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF SCIENCE IN PUBLIC & COMMUNITY HEALTH
1ST YEAR 2ND SEMESTER 2018/2019 ACADEMIC YEAR
KISII COMPUS

COURSE CODE: HCD 3124

COURSE TITLE: BASIC BIOCHEMISTRY

EXAM VENUE: **STREAM: BSc. CH &D/PH**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

Instructions:

1. **Answer question ONE (COMPULSARY) and any other TWO questions in section B.**
2. **Candidates are advised not to write on the question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE

1. a) Differentiate between the following processes and compounds as used in biochemistry. (8mks)

i. transamination and deamination
ii. Glycolysis and glycogenolysis
iii. Zymogens and isozymes
iv. Gluconeogenesis and glycogenesis

b) i. What is meant by the term translation? (1mk)
ii. State and explain the three steps involved in the RNA aided protein synthesis. (6mks)

c) i. What is oxidative phosphorylation? (1mk)
ii. Explain how oxidative phosphorylation enhances damage of cells and contributing to disease and ageing (senescence) (1mk)

d) i. State and explain two main types of enzyme inhibitors. (4mks)

ii. What is the significance of enzyme cofactors in enzymes catalytic activity.
(1mk)

e) State the four main classes of biomolecules and give their corresponding monomers. (8mks)

QUESTION TWO

a) i. What is an enzyme inhibitor? (1mk)

ii. Explain how enzyme inhibitors influence the effectiveness of enzymes activity. (3mks)

iii. Explain how the knowledge of enzyme on enzyme inhibitors helps in the formulation of drugs. (2mks)

b) Distinguish between the following enzyme cofactors: (4mks)
i. coenzymes
ii. Prosthetic groups

c) Enzymes are generally specific in their catalytic activities. State and explain the four main different types of enzyme specificity. (8mks)

d) State one advantage of the existence of isoenzymes in biochemical reactions. (2mk)

QUESTION THREE

3. a) State the role of the following types of RNA in the synthesis of proteins. (3mks)

i. Transfer RNA (tRNA)
ii. Ribosomal RNA (rRNA)
iii. Messenger RNA (mRNA)

b) i. State the difference between a nucleoside and a nucleotide? (2mks)
ii. State any four differences between DNA and RNA. (8mks)

c) State the two classes of nucleotides. (2mks)

d) i. How does enzyme's active site influence the substrate acted upon? (1mk)
ii. Distinguish and give an example of the following classes of enzymes: transferases and isomerases. (4mks)

QUESTION FOUR

4. a) What is Pentose Phosphate Pathway (PPP)? Which body organ does Pentose phosphate pathway take place? (2mks)

b) Pentose phosphate pathway takes place in two distinct phases. With the aid of equations, state and explain these two phases through which pentose phosphate pathway occur. (4mks)

c) State the fate of the following three primary results of the pentose phosphate pathway. (3mks)
i. Reduced nicotinamide adenosine dinucleotide (NADH)
ii. Ribose-5-Phosphate sugar (R5P)
iii. Erythrose-4-Phosphate

d) i. State the regions where citric acid cycle takes place in the eukaryotic cells and prokaryotic cells (2mks)
ii. Explain how citric acid cycle and oxidative phosphorylation are interrelated. (2mks)
iii. State any three regulatory signals that controls citric acid cycle. (3mks)

e) . Hypoglycemia is a condition of very low blood sugar characterized by rapid heart palpitation, anxiety, hunger pangs, blurred vision etc. state and explain any two processes that helps to maintain blood sugar levels. (4mks)

QUESTION FIVE

5. a) i. Distinguish between biochemistry and molecular biology? (2mks)

b) Outline the role of biochemistry in the following fields: (3mks)
i. Agriculture
ii. Medicine

iii. Nutrition

c) i. What is amino acids degradation? (1mk)

ii. All amino acids have separate catabolic pathways, yet they converge into only five intermediates which enter into the citric acid cycle. State the five intermediates into which amino acids are broken into. (5mks)

iii. Amino acids may be classified as glucogenic or ketogenic. Distinguish between glucogenic and ketogenic acids and give one example of each category. (3mks)

d) Most living organisms share elemental needs though there are some differences between plants and animals. Outline any three differences in the elemental needs between plants and animals. (6mks).