



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

**UNIVERSITY EXAMINATION FOR THE DEGREE OF SCIENCE
PUBLIC HEALTH**

**1ST YEAR 2ND SEMESTER 2018/2019 ACADEMIC YEAR
KISII COMPUS – PART TIME**

COURSE CODE: HCD 3124

COURSE TITLE: BASIC BIOCHEMISTRY

EXAM VENUE:

DATE:

TIME: 2 HOURS

STREAM: BSc. Public Health

EXAM SESSION:

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**

SECTION A

QUESTION ONE-COMPULSARY (30 MARKS)

1. a) i. What is dehydration synthesis? (1mk)
ii. Differentiate between glycoside bond and peptide bond. (2mks)
iii. State and explain the three steps involved in the RNA aided protein synthesis. (6mks)
- b) i. Most living organisms share elemental needs, though there are some differences between plants and animals. State any two differences in elemental needs between plants and animals. (2mks)
ii. State the six major basic elements of life amongst all living organisms. (3mks)
- c) i. What is the function of acetyl CoA in citric acid cycle? (1mk)
ii. What chemical transformations are carried out by transaminases? (1mk)
iii. Explain the mechanism of transamination (3mks)
iv. Explain the role of urea cycle and give the site organ it takes place. (2mks)
- d) Differentiate between the following conditions and processes as used in biochemistry. (6mks)
i. Hypoglycemia and hyperglycemia
ii. Metabolism and dehydration synthesis
iii. Gluconeogenesis and glycolysis
- e) State one advantage of the existence of isoenzymes in biochemical reactions. (1mk)
f) State the role of the following fat-soluble vitamins: vitamin K and vitamin A. (2mks)

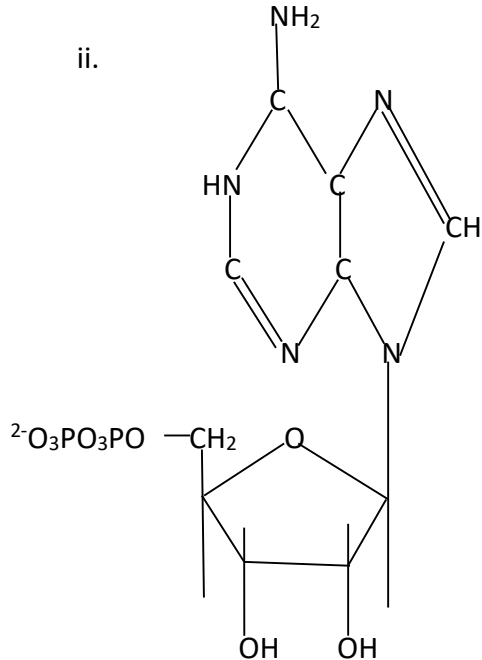
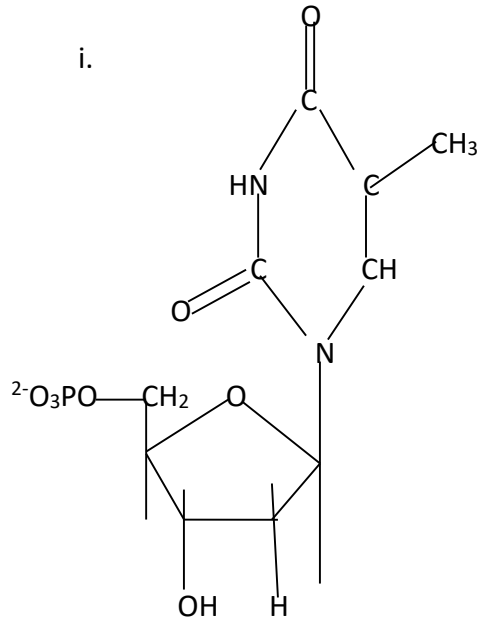
SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40 MARKS)

QUESTION TWO (20 MARKS)

2. a) State and explain three different classes of RNA which aid in protein synthesis. (6mks)
- b) Give three differences between DNA and RNA. (3mks)
- c) A nucleotide may have any of the five different nitrogenous bases, classified as either purines or pyrimidines. State the nitrogenous bases which are classified as purines and pyrimidines. (5mks)
i. Purines
ii. Pyrimidines

d) Draw the structure of a purine ring and indicate the nitrogen that is bonded to sugars in nucleotides (2mks)

e) Identify the nitrogenous bases in the following nucleotides hence give their systematic names. (4mks)



QUESTION THREE (20 MARKS)

3. a) Outline the fate of glucose-6-phosphate monomer produce during glycogenolysis. (3mks)
- b) Give the general biochemical reaction equation that takes place during glycogenolysis process. (3mks)
- c) i. State and explain two primary and two secondary signals that aid in the regulation of gluconeogenesis process in the liver. (8mks)
- ii. Hypoglycemia is a condition of very low blood sugar characterized by rapid heart palpitation, anxiety, hunger pangs and blurred vision etc. State any two metabolic processes that helps to maintain blood glucose level. (2mks)
- d) i. What is beta oxidation? (2mk)
- ii. Once fatty acids are in the mitochondrial matrix, beta oxidation begins. Outline the two steps in which beta oxidation proceeds in the mitochondria. (2mks)

QUESTION FOUR (20 MARKS)

4. a) i. What is enzyme specificity? (1mk)
ii. Enzymes are said to be specific in nature relative to the type of reaction they catalyse. State and explain the four main different types of enzyme specificity. (8mks)
- b) Why are enzymes that are used for clinical assays in hospitals stored in refrigerators? (1mk)
- c) Explain how the following mechanisms help in the regulation of enzymes activity (8mks)
- i. Allosteric enzymes
 - ii. Feedback mechanism
 - iii. Proenzymes
 - iv. Protein modification
- d) Distinguish between competitive enzyme inhibitors and irreversible enzyme inhibitors. (2mks)

QUESTION FIVE (20MARKS)

5. a) i. What is biochemistry? (1mk)
- 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)
- d) Giving specific enzymes, explain how threonine amino acid undergoes degradation to produce pyruvate which enters the citric acid cycle. (5mks)
- e) i. What is Pentose Phosphate Pathway, PPP.? (1mk)
ii. Pentose Phosphate Pathway takes place in two phases. State and give the product of each of these phases. (4mks)