EMBU UNIVERSITY COLLEGE

(A Constituent College of the University of Nairobi)

2015/2016 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (MICROBIOLOGY AND BIOTECHNOLOGY) BACHELOR OF EDUCATION SCIENCE, BACHELOR OF SCIENCE (BIOLOGY) BACHELOR OF SCIENCE (ENVIRONMENTAL CONSERVATION AND NATURAL RESOURCES MANAGEMENT)

SBT 102: INTRODUCTION TO BIOCHEMISTRY AND GENETICS II

DATE: APRIL 13, 2016 **TIME: 11:00-1:00**

INSTRUCTIONS: Answer **ALL** Questions from **SECTIONS A** and **B**, and **ONE** Question selected from **Section C**.

SECTION A: Multiple Choice Questions (15 Minutes, 1 Mark each).

Please tick in the box opposite the correct answer.

1. Eukaryotic cells usually contain

☐ A nucleus

☐ Mitochondria

☐ Microtubules

☐ All of the above

2. Unlike eukaryotes, prokaryotes lack

☐ A plasma membrane

☐ DNA

☐ Nuclei

☐ A nuclear membrane

3. When a DNA strand with the sequence 3' GACTAACGATGC 5' is used as a template the daughter strand has the following sequence

☐ 3' CTGATTGCTACG 5'

☐ 5'GCATCGTTAGTC 3'

☐ 5'CTGATTGCTACG 3'

☐ 3' CGTAGCAATCAG 5'

4. Which of the following codons are termination codons?

☐ UUC

☐ UUA

☐ UAG

☐ UAC

5. Which of the following is not a characteristic of monosaccharides?

☐ They are sweet and soluble in water.

☐ They can be crystallized.

☐ They can be hydrolyzed into simple units.

☐ They can reduce copper (II) to copper (I) in Benedicts solutions leading to formation of a reddish brown precipitate.

6. Which one of these factors cannot lead to genetic variation?

☐ Formation of chiasma among homologous chromosomes

☐ Fusion of male and female gametes

☐ Independent assortment of chromosomes during metaphase and anaphase

☐ A mutation in the DNA sequence during replication which is later corrected

7. In humans, haemophilia is a sex linked trait. The chance that a couple will produce a haemophilic son if the mother is normal and the father is haemophilic is

- ☐ 0%.
- ☐ 25%.
- ☐ 50%.
- ☐ 100%.

8. Which one of the following is not a property of colloids?

- ☐ Tyndall effect
- ☐ Soluble
- ☐ Brownian movement
- ☐ Viscosity

9. D-Ribose is_____sugar.

- ☐ A hexose
- ☐ A pentose
- ☐ A ketose
- ☐ A deoxy sugar

10. _____ join the nucleotides to form a single strand of DNA.

- ☐ Peptide bonds
- ☐ Hydrogen bonds
- ☐ Phosphodiester links
- ☐ Van der Waals bonds

11. When two curly winged fruit flies are mated, F1 consists of 341 curly and 162 normal. This ratio could be as a result of ?

- ☐ Linked genes
- ☐ Lethal genes
- ☐ Codominant genes
- ☐ Dominant genes

12. _____is not a class of ribonucleic acid.
    - ☐ Ribosomal RNA (rRNA)
    - ☐ Messenger RNA (mRNA)
    - ☐ Enzyme RNA (eRNA)
    - ☐ Transfer RNA (tRNA)

13. Glucose is classified as
    - ☐ Aldopendose
    - ☐ Ketohexose
    - ☐ Aldohexose
    - ☐ Ketopendose

14. _____is a carbohydrate consisting of glucose monomers attached by α (1→4) linkage.
    - ☐ Maltose
    - ☐ Cellulose
    - ☐ Amylose
    - ☐ Sucrose

15. When a gram molecular weight of a solute is dissolved in 1000g of water, the solution formed is known as
    - ☐ Parts per million
    - ☐ Molar solution
    - ☐ Molal solution
    - ☐ Normal solution

SECTION B: SHORT ANSWER QUESTIONS (5 MARKS EACH)

Your answers should be brief and to the point (Use the examination answer book provided)

16. Outline the importance of mitosis and meiosis in living organisms.
17. Compare and contrast the structure of DNA and RNA.
18. Outline the factors that influence enzyme action.
19. Explain the meaning of the terms
    a) Primary structure
    b) Secondary structure
    c) Tertiary structure and
    d) Quaternary structure of a protein
20. Distinguish between saturated and unsaturated fatty acids.
21. Discuss the structure and functions of waxes.

SECTION C: ESSAY QUESTIONS (25 MARKS EACH)

Write an essay on any ONE of the following topics (Use the examination answer book provided)

22. Discuss the functional classification of proteins.
23. With examples discuss the uses of enzymes.
24. Discuss the evidence that DNA is the genetic material.