



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION
BACHELOR OF EDUCATION (SPECIAL NEEDS EDUCATION)
BACHELOR OF SCIENCE IN BIOLOGY
BACHELOR OF EDUCATION (SCIENCE)**

SBT300 – CELL BIOLOGY AND GENETICS

DATE: 11/8/2016

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

- (a) Answer **ALL** the Questions in Section A
- (b) Answer **ANY TWO** Questions in Section B
- (c) Illustrate your answers with well labeled diagrams where appropriate

SECTION A (30 MARKS)

1. a) List the functions of the following cell organelles
 - i) Lysosomes (1 mark)
 - ii) Smooth endoplasmic reticulum (1 mark)
- b) Differentiate between an exon and intron (2 marks)
- c) Explain three structural differences between DNA and RNA (3 marks)
- d) Explain why DNA replication is semi-conservative (3 marks)
- e) Discuss three differences between eukaryotic and prokaryotic cells (3 marks)
- f) Briefly discuss conjugation in bacterial genetics (3 marks)

- g) Explain the phrase 'Genetic code is redundant.' (3 marks)
- h) Briefly discuss three forms of sex determination systems found in living organisms (3 marks)
- i) State and explain the Mendel's laws of inheritance (3 marks)
- j) Draw a well labeled diagram of a eukaryotic cell at metaphase stage of mitosis (5 marks)

SECTION B (40 Marks)

- 2. Describe the process of replication in eukaryotes. (20 marks)
- 3. Discuss the various sex determination systems exhibited by living organisms. (20 marks)
- 4. a) Using a well labeled diagram of a human cheek cell, describe five organelles that can be observed under a light microscope (15 marks)
- b) Briefly discuss five differences between plant and animal cells (5 marks)
- 5. Describe in detail the primary, secondary, tertiary and quaternary structure of a protein. (20 marks)