



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

DECEMBER SESSION EXAMINATION FOR

BACHELOR OF EDUCATION

SBT 100: CELLULAR BASIS OF LIFE

DATE: 26/4/2019

TIME: 11.00-1.00 PM

INSTRUCTIONS

1. Answer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

QUESTION ONE (20 MARKS)

- a) Describe the structure of the Golgi apparatus and explain their role in a cell (3 marks)
- b) Recount three postulates the describe “The Cell Theory”. (3 marks)
- c) Replicate the following segment of DNA to produce two copies of double stranded DNA (3 marks)

5’ A T C G G C T A C G T T C A C 3’
3’ T A G C C G A T G C A A G T G 5’
- d) Examine the following series of words and identify what kind of a mutation occurred in each case, considering that the first word is the non-mutated form: BEAST, FEAST, BREAST, BEST, BEATS (4 marks)
- e) Distinguish the following terms (4 marks)
 - i. Genome and gene
 - ii. phenotype and genotype

- f) Explain how ribosomes and the nucleolus are related in terms of function. (3 marks)
- g) Compare and contrast the smooth Endoplasmic Reticulum and the rough Endoplasmic Reticulum in structure and function. (3 marks)
- h) Describe three unique characteristics that a cell must possess (3 marks)
- i) Describe the building blocks of DNA and their mode of bonding to form the DNA polymer. (4 marks)
- j) The following sequence represents triplets on DNA: TAC CAG ATA CAC TCC CCT GCG ACT, give the mRNA codons and tRNA anticodons that correspond with this sequence (4 marks)

QUESTION TWO (20 MARKS)

- a) Compare and contrast with illustrations the structures and functions of the mitochondrion and the chloroplast. (10 marks)
- b) Distinguish between a prokaryotic and a eukaryotic cell. (10 marks)

QUESTION THREE (20 MARKS)

- a) The first meiotic division is often called the reductional division and the second meiotic division the equational division. Discuss (10 marks)
- b) Outline the stages in mitotic cell division. (10 marks)

QUESTION FOUR (20 MARKS)

Discuss the semi conservative nature of DNA replication

QUESTION FIVE (20 MARKS)

Discuss the structure and functioning of the cell membrane