KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: **BOTA 426**

COURSE TITLE: **CELL AND MOLECULAR BIOLOGY**

STREAM: **SESSION VIII**

DAY: **WEDNESDAY**

TIME: **9.00 – 11.00 A.M.**

DATE: **07/04/2010**

INSTRUCTIONS:
Answer **All** questions in SECTION (A) and any two (2) questions in SECTION (B)

PLEASE TURN OVER

SECTION A: Answer All Questions (40 Marks)

1. a) Distinguish between the following terms:
   i) Nucleosome and nucleolema
   ii) Terminal and initial meiosis
   iii) Frameshift mutation and non-sense mutation (6 mks)
   b) Describe the functions of the Golgi apparatus (4 mks)

2. a) List five differences between prokaryotic and eukaryotic cells. (5 mks)
   b) Give the structure of Guanosine 5'-monophosphate (2 mks)
   c) Describe three food species with genetically modified versions, and state the new property in them. (3 mks)

3. a) Discuss the significance of mitosis (2 mks)
   b) Explain how rate of cell cycle is regulated. (4 mks)
   b) Discuss the lines of evidence to show that cellular ageing is a genetically programmed event. (4 mks)

4. a) Draw a well labeled diagram of a plant cell. (5 mks)
   b) Describe five similarities between mitochondrion and chloroplast. (5 mks)

SECTION B: Answer Two (2) Questions Only (30 Marks)

5. a) Describe the key steps in gene expression. (12 mks)
   b) Given the genetic code, draw out the polypeptide formed from the DNA copy below: 5'-AGG TTG CGT TAG TAC-3' (3 mks)

6. Differentiate between mitosis and meiosis and describe the process of meiosis during oogenesis in humans. (15 mks)

7. Describe the process of energy production in mitochondrion. (15 mks)

1st base in codon	2nd base in codon: U	2nd base in codon: C	2nd base in codon: A	2nd base in codon: G	3rd base in codon
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

The mRNA genetic code