



KABARAK

UNIVERSITY

UNIVERSITY EXAMINATIONS

2010/2011 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF EDUCATION

SCIENCE

COURSE CODE: BOTA 426

COURSE TITLE: CELL AND MOLECULAR BIOLOGY

STREAM: Y4 S2

DAY: SATURDAY

TIME: 2.00 – 4.00 P.M

DATE: 27/11/2010

INSTRUCTIONS:

1. Answer **ALL** questions in section **A**
2. Answer only **TWO** questions in section **B**

PLEASE TURN OVER

Section A: Answer All Questions (40 Marks)

1. a) Distinguish between the following terms:
i) Plasmosome and Spliceosome
ii) Telomere and Centromere
iii) Nonsense and missense mutations **(6 marks)**
- b) Explain briefly the function of the following structures:
i) Caspases ii) Bacteriophage λ iii) *EcoRI* enzyme **(6 marks)**
2. a) Draw the structures of:
i) Adenosine 5'-monophosphate ii) tRNA **(4 marks)**
- b) Give reasons why eukaryotic genomes are large and complex. **(4 marks)**
- c) Describe the general structure of a eukaryotic gene including its promoter region. **(4 marks)**
3. a) Describe briefly the nature of eukaryotic ribosome. **(5 marks)**
- b) Describe the mechanism of regulation of cell cycle. **(5 marks)**
- c) Explain how chromatin structure is involved in regulation of gene expression. **(6 marks)**

Section B: Answer Two Questions Only (30 marks)

4. a) Describe the process of gene replication (5 marks)
- b) Describe the process of gene transcription. (5 marks)
- c) Use figure 1 to predict the amino acid sequence obtained from the DNA sense strand given below. (5 marks)
- 5' - ATGACTCTGCATGTGTGA - 3'
5. a) Describe the protocol of DNA isolation for gene cloning. (5 marks)
- b) Explain how Ti plasmid can be used to transform plant cells. (5 marks)
- c) Discuss the pros and cons of GMOs. (5 marks)
6. a) State the functions of the following organelles: (8 marks)
- i) Endoplasmic reticulum ii) Golgi complex
- b) Describe the post-translational processing of proteins. (7 marks)

Figure 1: The mRNA genetic code

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