(25)

(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR

SECOND YEAR 2ND SEMESTER
SPECIAL/SUPPLEMENTARY EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE AND BIOTECHNOLOGY

COURSE CODE: **SBT 224:**

COURSE TITLE: **INTRODUCTION TO MOLECULAR BIOLOGY**

DATE: 20/09/2017 **TIME: 8:00 – 10:00 A.M**

INSTRUCTIONS TO CANDIDATES

Answer **Question one (1)** and any other **two (2)** Questions. Question one is compulsory and carries 30 marks, the other Questions carry 20 marks each.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over

Question 1

a) What is a transcription unit? Is it the same thing as a gene?(2 Marks)

b) (i). Explain how an amino acid is activated and then attached to its specific tRNA.(2 Marks)
(ii).What is the evidence that a mRNA may be long enough to code for several proteins?(2 Marks)

c) Four samples of nucleic acid were analyzed for the proportion of the different bases present, with the following results:
(1) A = 30%, C = 30%, G = 20%, T = 20%.
(2) A = 27.5%, C = 22.5%, G = 22.5%, T = 27.5%.
(3) A = 18%, C = 32%, U = 32%, G = 18%.
(4) A = 18%, C = 32%, U = 18%, G = 32%.
Which of these samples were DNA and which were RNA? Which is double-stranded and why?(4 Marks)

d) RNA is of three types in eukaryotes and bacteria. What are they? Where are they located in the cell? Where are they produced? What are their characteristics and functions?(5 Marks)

e) The first step in protein synthesis is the formation of an initiation complex. What is the initiation complex, and what events follow to begin polypeptide synthesis?(4 Marks)

f) (i) Explain what is meant by a degenerate code and illustrate your answer to show degeneracy in translation.(4 Marks)
(ii) Do codons have the same meaning *in vitro* as *in vivo*?(2 Marks)

g) (i) What is recombinant DNA and how is it made?(2 Marks)
(ii) Enumerate various methods of synthesis of a gene. How can a gene be synthesized from an mRNA molecule?(3 Marks)

Question 2

Describe in brief various essential techniques of genetic engineering(20 Marks)

Question 3

Give a brief account of the methods for the isolation of genes in eukaryotes.(20 Marks)

Question 4

Describe the contribution of the following instrumentation and techniques in the growth of molecular biology:
(i) Electrophoresis; (ii) Chromatography; (iii) Denaturation and annealing of DNA; (iv)Radioactive labelling; and (v) Autoradiography. (20 Marks)

Question 5

Describe the general properties of the genetic code.(20 Marks)