(*Knowledge for Development*)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY

COURSE CODE: SZL 312

COURSE TITLE: ANIMAL GENETICS AND EVOLUTION

DATE: 21ST DECEMBER 2022 **TIME: 2.00 – 4.00 PM**

INSTRUCTIONS TO CANDIDATES

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

TIME: 2 Hours

This paper consists of 3 printed pages. Please Turn Over

Question One

a. Write short notes on the structure of Deoxyribonucleic acid (5 marks)

b. Define the following terms:

i. Mutation (2 marks)

ii. Species (2 marks)

iii. Evolution (2 marks)

iv. Genetic bottleneck (2 marks)

c. Draw and label an animal chromosome (3 marks)

d. Differentiate between nucleoside and nucleotide as used in genetics (4 marks)

e. List any four properties of the genetic code (4 marks)

f. Briefly highlight the concept of sex determination in animals (4 marks)

g. What is the difference between DNA and gene? (2 marks)

Question Two

Using relevant examples discuss the concept of selection (20 marks)

Question Three

a. Define Speciation (2 marks)

b. With examples, explain how species form (18 marks)

Question Four

Replicating the genetic material in living organisms is vital. With the help of well labelled diagrams, discuss this process. (20 marks)

Question Five

Using the genetic code and DNA strand below, answer the following questions.

ATGAAAAGCAGGCCATATTAA

The genetic code

SECOND LETTER

FIRST LETTER	U	C	A	G	THIRD LETTER
U	UUU Phe UUC Phe	UCU Ser UCC Ser UCA Ser UCG Ser	UAU Tyr UAC Tyr	UGU Cys UGC Cys	U C
	UUA Leu UUG Leu		UAA Stop UAG Stop	UGA Stop UGG Trp	A G
C	CUU Leu CUC Leu CUA Leu CUG Leu	CCU Pro CCC Pro CCA Pro CCG Pro	CAU His CAC His CAA Gln CAG Gln	CGU Arg CGC Arg CGA Arg CGG Arg	U C A G
A	AUU Ile AUC Ile AUA Ile	ACU Thr ACC Thr ACA Thr ACG Thr	AAU Asn AAC Asn AAA Lys AAG Lys	AGU Ser AGC Ser AGA Arg AGG Arg	U C A G
	AUG Met				
G	GUU Val GUC Val GUA Val GUG Val	GCU Ala GCC Ala GCA Ala GCG Ala	GAU Asp GAC Asp GAA Glu GAG Glu	GGU Gly GGC Gly GGA Gly GGG Gly	U C A G

i. Write the complementary strand of the DNA sequence above (2 marks)

ii. Transcribe the complementary DNA from (i) above (2 marks)

iii. Translate the sequence in (ii) above (4 marks)

iv. How many proteins were coded for in the DNA message? (2 marks)

v. Translate the mRNA sequence below listing the resultant amino acids.

AUGAUCGACUAAAUGAAGCCGUGA

vi. How many proteins would be represented by the strand in (v) above? (4 marks)

vii. How many amino acids are represented in your answer to question (v) above? (2 marks)

viii. List the codon(s) for each of the following amino acids.

a. Asparagine: (1 mark)

b. Lysine: (1 mark)

c. Threonine: (1 mark)

d. Valine: (1 mark)