TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BACHELORS OF SCIENCE IN MOLECULAR BIOLOGY AND FORENSIC

ABT 4212 : FUNDAMENTALS OF GENETICS AND EVOLUTION

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) List any **Four** contrasting traits used by Mendel in experimental approach with garden pea. (4 marks)

b) Cyanidin a red pigment in some plants is synthesized from a colorless precursor. The addition of hydroxyl group to the cyanidin molecule makes it purple. A cross involving two randomly selected purple plants produced the following results; 94 purple, 31 red and 43 colorless.

   i) How many genes are involved in the determination of the flower coloration? (2 marks)

   ii) Diagram the purple × purple cross, and determine the genotypes and phenotypes. (6 marks)

c) State the presumed conditions in the Hardy-Weinberg law. (4 marks)

d) Using the ABO blood groups types, determine the genotypes of the male parent and female parent below:

   i) Male parent with blood type B and whose mother was type O. (3 marks)

   ii) Female parent with blood type A whose father was type B. (3 marks)

   iii) Predict the blood type of the offspring that this couple may have and the expected proportion of each. (4 marks)

e)

Question TWO

Describe different types of speciation. (20 marks)

Question THREE

Discuss biological and behavioral properties of organisms that prevent or reduce interbreeding. (20 marks)

Question FOUR

Rice *tillering(t)* and *pepper-shaped husk(p)* are mutations located at locus 90 and 108 respectively in chromosome 3. Another mutation of *broad leaves (b)* was also found in chromosome 3. A map was obtained with plants which are heterozygous for all 3 mutations. The results were are follows;

	Phenotype	Number
1	t p b	211
2	+ + +	202
3	t + +	9
4	+ p b	8
5	t + b	37
6	+ p +	30
7	t p +	2
8	+ + b	1

Determine the location of broad leaves on chromosome 3. (20 marks)

Question FIVE

Discuss the differences between heterosis and inbreeding depression. (20 marks)