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University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF BIOCHEMISTRY

SBA 3250: GENERAL GENETICS

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a) Distinguish between the following;
- i. Genetic heterogeneity and genomic imprinting
 - ii. Gene and Allele
 - iii. Penetrance and expressivity (6 marks)
- b) Outline any three (3) inheritance involving multiple alleles (3 marks)
- c) Explain the term polyploidy and state two of its commercial applications in plants (3 marks)

- d) Freckles (F) are dominant to no freckles (f). Brown (B) eyes are dominant to blue (b) eyes. Both traits exhibit complete dominance. Two individuals are heterozygous for both genes. Show possible allele combinations that each individual can produce in their gametes. If these two procreate, state the likely phenotypic ratio of their offsprings.
(5 marks)
- e) Name three importance of gene mapping (3 marks)
- f) State any three qualities that make an organism suitable for genetic experimentation (3 marks)
- g) The speed of mice is controlled by two electrophoretically detectable co- dominant alleles, F and f. In a study involving 500 mice, the following genotypic frequencies were found;
FF=91, Ff=208, ff=201
- i. Calculate the frequencies of alleles F and f (5 marks)
- ii. Calculate the genotype frequencies (3 marks)

QUESTION TWO (20 MARKS)

Discuss the major evolutionary forces that influence the distribution and frequencies of alleles in a population

QUESTION THREE (20 MARKS)

Discuss the various structural aberrations in chromosome and their consequences in human

QUESTION FOUR (20 MARKS)

Discuss various systems of sex determination giving specific examples