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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES

**SBT 2301: PRINCIPLES OF GENETICS**

**DATE: NOVEMBER, 2015 TIME:** $2 $**HOURS**

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

**QUESTION ONE – (30 MARKS)**

1. Distinguish between the following; (6 Marks)
2. Monohybrid and dihybird crosses
3. Homozygous and Heterozygous chromosomes
4. Gene and Allele
5. Define gene linkage and explain how linkage interferes with independent assortment.(3 Marks)
6. State four reasons that make Drasophila melagaster an ideal organism for genetic experimentation

(4 Marks)

1. State four reasons why genetic mapping is important. (4 Marks)
2. State Hardy-Weinberg Equilibrium theory and list the conditions a population must meet in order to maintain the Hardy-Weinberg equilibrium. (3 Marks)
3. The following genotypes have been observed in a lion population in Lake Nakuru National park

A1 A1 - 18

A1 A2 - 4

A2 A2 - 3

Calculate the allele and genotypic frequencies in this population based on these genotypes.(5 Marks)

1. State two examples of inheritance involving multiple alleles. (2 Marks)
2. Explain briefly why you would expect genetic differences between cells to arise from meiosis and not from mitosis. (3 Marks)

**QUESTION TWO (20 MARKS)**

Discuss any four human mitochondrial disorders. (20 Marks)

**QUESTION THREE (20 MARKS)**

Discuss the major evolutionary forces that influence the distribution and frequencies of alleles in populations. (20 Marks)

**QUESTION FOUR (20 MARKS)**

Discuss in details any five gene interactions that deviates from Mendelian inheritance. (20 Marks)