



*(Knowledge for Development)*

**KIBABII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**  
**2020/2021 ACADEMIC YEAR**  
**FIRST YEAR SECOND SEMESTER**  
**MAIN EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF SCIENCE (BIORESOURCE  
CONSERVATION & MANAGEMENT)**

**COURSE CODE: SBT 112**

**COURSE TITLE: INTRODUCTION TO GENETICS**

**DATE:** Thursday 15<sup>th</sup> July, 2021.

**TIME:** 2:00 – 4:00 p.m.

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**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 3 printed pages. Please Turn Over  
KIBU observes ZERO tolerance to examination cheating

1. Provide short answers to the following questions:
  - a) Briefly describe the effects of failure in DNA repair. (5 Marks)
  - b) Explain the physical structure of DNA. (5 Marks)
  - c) What do you understand by the genetic code. (5 Marks)
  - d) Give the structural differences between: (5 Marks)
    - i. Purine and pyrimidine bases
    - ii. Nucleotide and Nucleosome
  - e) How are chromosomes classified? (5 Marks)
  - f) Damage that results in distortion of the DNA helix is often repaired by the *base excision repair pathway* that involves at least five distinctive steps. State the steps of this pathway. (5 Marks)
  
2. a) State the karyotypes and the primary sexual phenotypes associated with each of the following syndromes in humans: (6 Marks)
  - i. Turner syndrome
  - ii. Double Y
  - iii. Trisomy-21
  
- b) Use a Punnett square to list the predicted fractions for each genotype and phenotype for this cross: heterozygous (yellow seeds) and heterozygous (smooth seeds) X heterozygous (yellow seeds) and heterozygous (smooth seeds) ...where yellow seeds is dominant over green seeds and smooth seed is dominant over wrinkled seed. (10 Marks)
  
- c) With reference to the relevant Mendelian laws of inheritance, explain the outcome of the cross in b) above. (4 Marks)
  
3. a) Describe three different ways by which sex is determined. (6 Marks)
- b) Explain dosage compensation in fruit flies and then in mammals; for mammals, use the terms Barr body and mosaicism. (8 Marks)
  
- c) Independent assortment can lead to recombination: Discuss. (6 Marks)
  
4. Write brief notes on Mendelian inheritance patterns and their exceptions. (20 Marks)
  
5. a) Describe the mechanisms of gene regulation? (10 Marks)
  
- b) Identify the various courses of DNA damage and the mechanisms of damage involved in each case. (10 Marks)