



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**  
**FACULTY OF SCIENCE**  
**Department of Biological Sciences**  
**2025\_2 EXAMINATIONS**

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**BIO 301: Genetics II**

**Time: 2½ Hours**

**Credit Units: 3**

**Instruction: Attempt FOUR (4) questions only. QUESTION 1 is compulsory.**

- 1a. (i). Explain the Hardy-Weinberg principle **(6 marks)**  
(ii). List the four factors affecting the Hardy-Weinberg principle **(4 marks)**
- b. (i). In a tabular form, give four (4) differences between monoploids and haploids **(4 marks)**  
(ii). Mention five applications of aneuploids in crop improvement and genetic studies **(5 marks)**
- c. Describe the general lifecycle of a virus **(6 marks)**
- 2a. With particular reference to trisomy 21 (Down's Syndrome), explain nondisjunction as a common chromosomal abnormality in humans. **(8 marks)**
- b. Give explanatory notes on the ABO blood group system **(7 marks)**
- 3a. Describe genetic polymorphism **(7 marks)**
- b. Explain the mechanisms of balancing selection **(8 marks)**
- 4a. Give explanatory notes on **any two** of the following; (i) Homologous chromosome **(4 marks)**  
(ii) Nondisjunction **(4 marks)**  
(iii) Translocation **(4 marks)**  
(iv) Barr body **(4 marks)**
- b. Explain "codominance" **(7 marks)**
- 5a. Explain how genes determine sex in humans **(6 marks)**
- 5b. (i). What do you understand by the term 'polyploidy'? **(3 marks)**  
(ii). State two ways by which polyploidy can occur in plants **(4 marks)**  
(iii). Mention 4 examples of polyploid crops **(2 marks)**
- 6a. Give explanatory notes on polygenic inheritance **(6 marks)**
- b. Mention 3 ways by which polygenic traits can be distinguished **(3 marks)**
- c. List 6 human polygenic traits **(6 marks)**