



**National Open University of Nigeria**  
**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**  
**Faculty of Science**  
**Department of Pure and Applied Sciences**  
**2021\_1 EXAMINATION**

**COURSE CODE: BIO307**  
**COURSE TITLE: EVOLUTION**  
**CREDIT UNIT: 2**  
**TIME ALLOWED: 2 HOURS**

**INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER THREE QUESTIONS**

- 1a. Mention two (2) challenges that terrestrial plants had to overcome when they colonized land. **2 Marks**
- b. Enumerate the conditions for Natural Selection suggested by Charles Darwin **4 Marks**
- c. Highlight four (4) sources of uncertainty that can contribute to random extinction in a small population **4 Marks**
- d. With the aid of a diagram, explain the deterministic models of population ecology **7 Marks**
- e. One thousand groundnut genotypes were tested for presence of gene for resistance against *Cercospora arachidis*, a leaf spot pathogen. Two alleles were detected, R and S, for resistance and susceptible respectively. The following results were obtained: SS (660), RS, (200) RR (140). What are the allelic and genotypic frequencies in this population? **8 Marks**
- 2a. Enumerate the mechanism balancing selection **4 Marks**
- b. With reference to Human Immuno-deficiency Syndrome (HIV), discuss how natural selection explains both evolution and adaptation **6 Marks**
- c. Relate Biogeography to evolution of a species **5 Marks**
- 3a. Expatriate on the concept of Pleiotropism **5 Marks**
- b. Succinctly, explain the meaning of genetic drift **10 Marks**
- 4a. What is mutation rate? **3 Marks**
- b. State the effects of radiation on DNA **3 Marks**
- c. Mention three (3) individuals that contributed towards understanding of pre-Darwinian thought of evolution **4 Marks**
- d. Enumerate the conditions that will make a population remain at equilibrium **5 Marks**
- 5a. Explain the term Genetic Hitchhiking **5 Marks**
- b. Explain the importance of point mutation in evolution of new traits **10 Marks**