P530/2
BIOLOGY
PAPER 2
2½ hours
July. 2023

Uganda Advanced Certificate of Education
SET SEVENTEEN
PAPER 2
THEORY
2 hours 30 minutes.

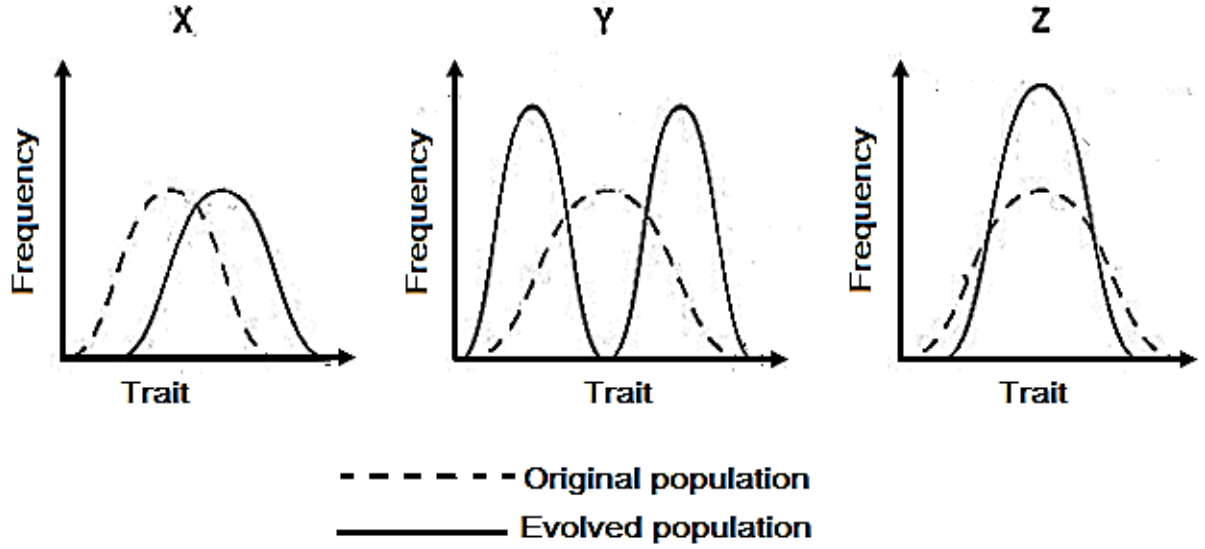
INSTRUCTIONS TO CANDIDATES:

- ✓ Answer question one in section **A** plus three others from section **B**.
- ✓ Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustrating with well labeled diagrams where ever necessary.
- ✓ Write on the answer sheet, your name, index number and the questions attempted in their order as shown in the table.

QUESTION	MARKS
TOTAL	

SECTION A: (40 MARKS)
Compulsory.

1. Figures X, Y and Z show three forms of natural selection that occurs in a population of organisms.



a) Describe how the different forms of selection affect the frequency of traits of the original population. **(09marks)**
   i. Figure X
   ii. Figure Y
   iii. Figure Z

b) With examples, explain how the different forms of natural selection arise and contribute the phenotypic frequency of the evolved population. **(13marks)**
   i. Figure X
   ii. Figure Y
   iii. Figure Z

c) Explain the genetic basis and evolutionary significance of the following;
   i. Sickle cell anaemia. **(05marks)**
   ii. Pesticide resistance. **(05marks)**
   iii. Formation of new species by allopolyploidy. **(05marks)**

d) How does selective inbreeding affect the phenotypic frequency of a population? **(03marks)**

SECTION B (60MARKS)

Attempt only three questions

2. (a) Describe the chemical nature and variety of carbohydrates. **(12marks)**
   (b) Outline the role of carbohydrates in life of a plant. **(08marks)**

3. (a) With an illustration, describe the structure of the chloroplast in a cell **(07marks)**
   (b) Explain how exocytosis and endocytosis occur across the plasma membrane. **(05marks)**
   (c) Explain the role of proteins within the plasma membrane **(05marks)**

4. (a) How are plants living under the canopy of forest trees are able to survive? **(10marks)**
   (b) Describe the process involved in transformation of light energy into chemical energy for dark assimilation **(07marks)**
   (c) Explain the role of water in photosynthesis. **(03marks)**

5. (a) Describe the distribution and structure of simple plant tissues in stems. **(10marks)**
   (b) Explain how the structure of tissues responsible for water transport in plants relates to functions. **(10marks)**

6. (a) Explain the factors that affect crossing over **(06marks)**
   (b) Outline four ideas put forward by Mendel's work on genetics. **(04marks)**
   (c) Examine the data for crosses in cats shown in the table:

Parents	Offsprings
Black male x Yellow female	½ Yellow males ½ Tortoise shell females
Yellow male x Tortoise shell female	½ Black males ½ Tortoise shell females
Yellow males x Tortoise shell female	½ Black males ¼ Yellow males ¼ Yellow females ¼ Tortoise shell females

   (i) From the data given, suggest the type of inheritance exhibited. **(01mark)**
   (ii) Using a Punnett square predict the results of a cross involving a black male and a tortoise shell female **(07marks)**
   (d) Explain why tortoise shell cats are normally females **(02marks)**

END