

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Q1.

Read the following passage.

5 Lake Malawi in East Africa has more species of fish than any other lake in the world. Many of these species have evolved from a common ancestor. Lake Malawi is one of the largest lakes in the world and was formed several million years ago. Since then, the water level has fluctuated greatly. As a result, what is now a large lake was at one time many smaller, separate lakes.

The country of Malawi has a total area of 118 000 km². The actual land area is only 94 080 km², because approximately one-fifth of the country is Lake Malawi.

10 In December 1990, forests covered 41.4% of the actual land area of Malawi. In December 2016, forests covered 26.4% of the actual land area of Malawi.

15 Deforestation and farming along the shores of Lake Malawi have caused increased soil erosion and loss of nutrients into the lake. This has resulted in a decrease in some fish populations. The mark-release-recapture method can be used to estimate the size of a fish population. However, this method can produce unreliable results in very large lakes.

Use the information in the passage and your own knowledge to answer the following questions.

(a) Lake Malawi in East Africa has more species of fish than any other lake in the world (line 1).

Suggest and explain how this speciation may have occurred.

- (4)

(4)

(4)

Answer _____ km² per week

- (2)**

(2)

(2)

(2)

- (4)**

(4)

(4)

(4)

- (1)**

(Total 15 marks)

Q2.

- (a) Mutation is one cause of genetic variation in organisms.

Give **two** other causes of genetic variation.

1 _____

2 _____

(2)

In a species of flowering plant, the **T** allele for tallness is dominant to the **t** allele for dwarfness. In the same species, two alleles **C^R** (red) and **C^W** (white) code for the colour of flowers. When homozygous red-flowered plants were crossed with homozygous white-flowered plants, all the offspring had pink flowers.

- (b) Name the relationship between the two alleles that code for flower colour.

(1)

- (c) A dwarf, pink-flowered plant was crossed with a heterozygous tall, white-flowered plant.

Complete the genetic diagram to show all the possible genotypes and the ratio of phenotypes expected in the offspring of this cross.

Phenotypes of
parents:

Dwarf, pink-flowered × Tall, white-flowered

Genotypes of
parents:

Genotypes of offspring: _____

Phenotypes of offspring: _____

Ratio of phenotypes: _____

(3)

- (d) A population of this species of plant contained 9% of red-flowered plants.

Use the Hardy–Weinberg equation to calculate the percentage of pink-flowered plants in this population.

Show your working.

Answer _____ %
(2)
(Total 8 marks)