**DECEMBER HOLIDAY ASSIGNMENT, 2022**

**FORM 3, BIOLOGY**

***Genetics***

1. Differentiate between continuous and discontinuous variations
2. Members of the same species of organism tend to differ due to variation. State **three** causes of variation in organisms.
3. Identify the type of gene mutations represented by the following pairs of words: -

 (a) Shirt instead of skirt

 (b) Hopping instead of shopping

 (c) Eat instead of tea

1. Wekesa and Wanjiku who are siblings are both normal as their parents but have a hemophilic brother. Give the Genotype of their parents.

 b) i) What do you understand by the phase a test cross?

1. There are at least 205 known sex – linked recessive disorder

 a) Name **any two** of them.

 b) State a reason why sex – linked recessive why traits tend to effect the male child.

 c) State why if a mother has the trait all her sons will have it

1. State the meaning of the following terms giving an example in each case:

 (a) Sex-linked genes

 (b) Multiple alleles

1. Give an example of a sex-linked trait in human on:

(a) **Y** – Chromosome

 (b) **X** – Chromosome

1. Explain why growth of long hair on the pinnae of the ears in human occurs in males only
2. Explain why **prophase 1** of meiosis contributes towards genetic variation in living

 organisms.

1. A pure Red flowered plant was crossed with a pure white flowered plant. All the F1 generation plants had pink flowers. (a) Give an explanation for the absence of Red and white flowered plants in the F1 generation.

 (b) If the F1 generation pea plants were selfed, state the phenotypic ratio of the F2

generation plants.

1. (a) Name a genetic disorder due to gene mutation that affects the malpighian layer of the

 skin in man.

 (b) Give **two** functions of the fluid produced by sebaceous glands.

1. (a) Define the term “Gene mutation.”

 (b) Name the genetic disorders that result from gene mutation in human beings.

1. (a) What are mutations

 (b) Name **two** mutagens

1. In a certain bird species, red flight feathers is controlled by gene **R** while white flight feathers is controlled by gene **r**. The heterozygous condition **Rr** results into pink flight feathers. The two genes are also sex linked and transmitted on X-chromosome.

 a) By use of fusion lines, find the genotypes of across between a male with pink flight

 feathers and a female with white flight feathers

 b) Which type of dominance is illustrated here?

 c) i) Identify the nucleic acid whose base sequence is shown below:

 G-A-C-U-A-G-A-C-G

 ii) Give a reason for your answer in **c (i)** above

 iii) If the nucleic acid was involved in protein synthesis, how many amino acids would

 be present in the protein synthesized? Give a reason

1. A cross between a red-flowered and a white flowered plant produced only pink –flowered

 F1 plants

 (a) There was neither a red nor white –flowered F1 plants. Explain

 (b) The F1 offspring were selfed to get F2 generation. Using appropriate letter symbols,

 work out the genotypes of F2 generation

(c) Give the genotypic and phenotypic ratios of F2 generation

(d) Distinguish between dominant and recessive genes

1. In man blood group inheritance is controlled by multiple alleles in which allele **A** is co dominant to allele **B**. a woman heterozygous for blood group **A** married a man heterozygous for blood group **B**

 a) State the genotype of both parents

 b) Using a punnet square, show the genotypes of F1 generation

 c) State **one** application of knowledge of blood group inheritance in man

 d) The nitrogenous bases in nucleic acids are Adenine (A), cytosine(C), Guanine

 (G),Thiamine (T) and uracil (U). Input of a molecule of DNA the sequence of bases

 is CTT. Using the letters **A, C, G, T, U** where appropriate, write down the base

 sequence in;

 i) Corresponding part of the complementary strand of DNA molecules

 ii) Corresponding part in mRNA

 iii) A change in the DNA molecules caused the base sequence in the triplets to

 change

 from CTT to CAT. State **one** factor which could have caused the change

 (c) (i) What is non— disjunction?

 (ii) Give **one** example of a genetic disorder associated with non-disjunction .