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P530/2

Biology

Paper 2

July/August 2023

2 ½ Hours



ENTEBBE JOINT EXAMINATION BUREAU

Uganda Advanced Certificate of Education

BIOLOGY

PAPER 2

2HOURS 30 MINUTES

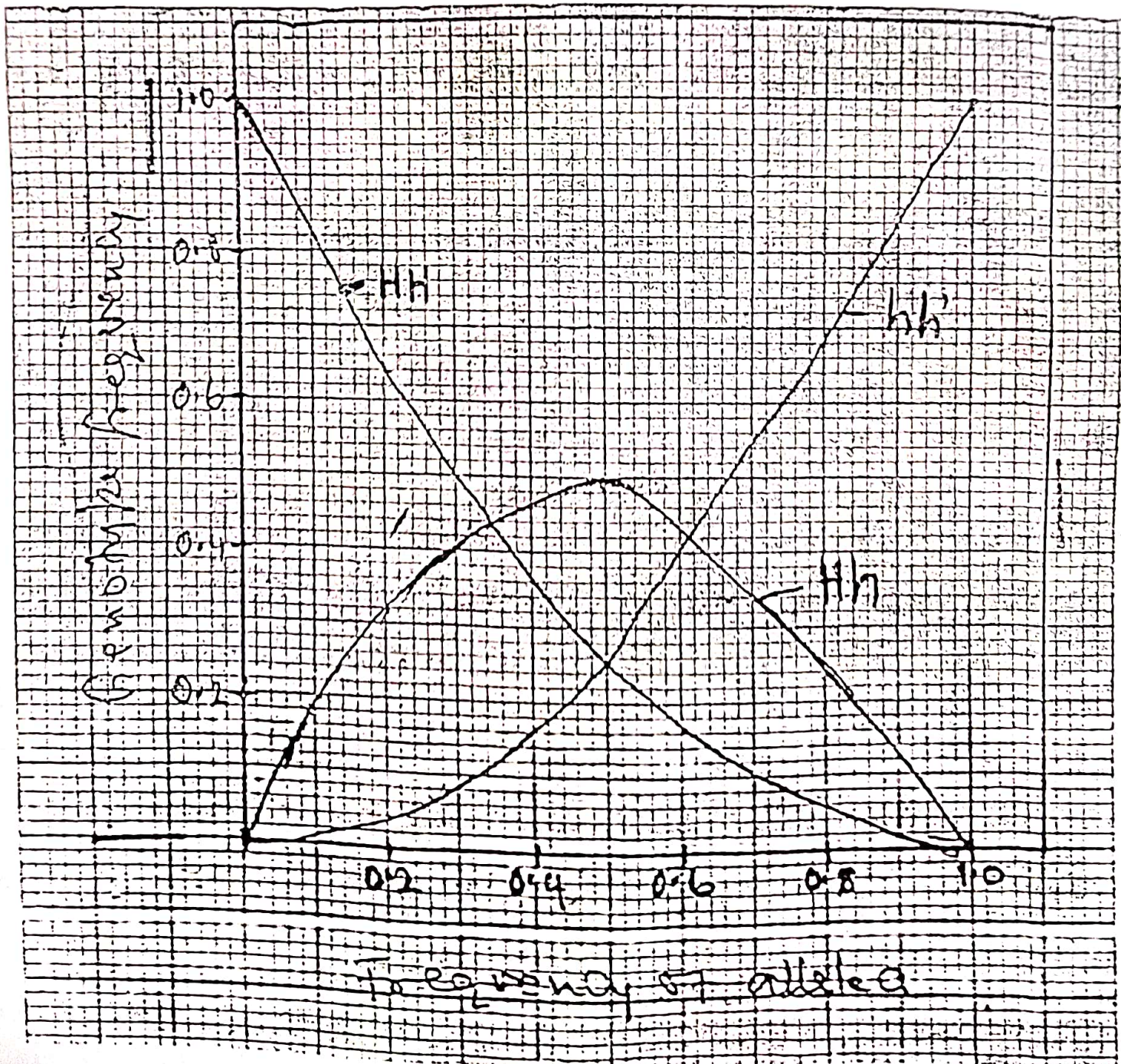
INSTRUCTIONS

Answer Section A and any 3 question in Section B

SECTION A (40 MARKS)

Question 1 is compulsory

- Studies were carried out to establish the frequency of an undesired recessive allele h and frequency of the genotype HH and Hh in a given population. The relationship between allele frequency and genotype frequency were plotted on the graph as shown in figure 1. Study the graph and answer the questions that follow;



- (a) Describe how genotype frequency of **HH**, **Hh** and **hh** varies with frequency of allele **h**. (13marks)
- (b)(i) Describe the relationship between the frequency of **HH** and the frequency of **hh**. (04marks)
- (ii) How does the relationship described in b (i) above affect the frequency of **Hh** in the population? (10marks)
- (c)(i) From the graph read and mark the percentage fraction of homozygous recessive individuals (**hh**) if the frequency of allele **h** is at 0.2. (02marks)
- (d)(i) Explain why it would be difficult to eliminate homozygous recessive individuals from the population if the frequency of undesired allele **h** was at 0.2. (04marks)
- (ii) List factors that limit the effectiveness of selection on eliminating undesired phenotypes from the population. (04marks)

SECTION B (60 MARKS)

Answer any three questions from this section.

- 2(a) Explain how blood capillaries increase efficiency of lungs in gaseous exchange. (09marks)
- (b) Explain how high temperatures affect stomata increment in plants habiting dry areas. (06marks)
- (c) What is the effect of water stress to plants? (05marks)
- 3(a) Explain the function of plasma protein in mammals. (07marks)
- (b) Explain how antidiuretic hormone (ADH) maintains blood pressure in man. (07marks)
- (c) What is the role of a trial-ventricular (AV) node in proper functioning of mammalian heart? (06marks)
- 4(a) Describe why Morgan preferred to use *Drosophila melangaster* (fruit fly) in genetic research. (07marks)
- (b) Explain;
- (i) how genetic variation causes evolution in a population? (06marks)
- (ii) why only a few mutations are spread in a population yet they occur often dry. (07marks)
- 5(a) With examples describe the role of vacuoles in plants (07marks)
- (b) Outline the functions of cytoskeleton of a cell. (13marks)
- 6(a) Explain how plants are adapted to maximum absorption for high rate of photosynthesis. (14marks)
- (b) Explain how CAM plants are adapted to surviving in arid areas. (06marks)

END