

P530/2
Biology
Paper 2
July/ August 2025



KAMSSA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

BIOLOGY

Paper 2

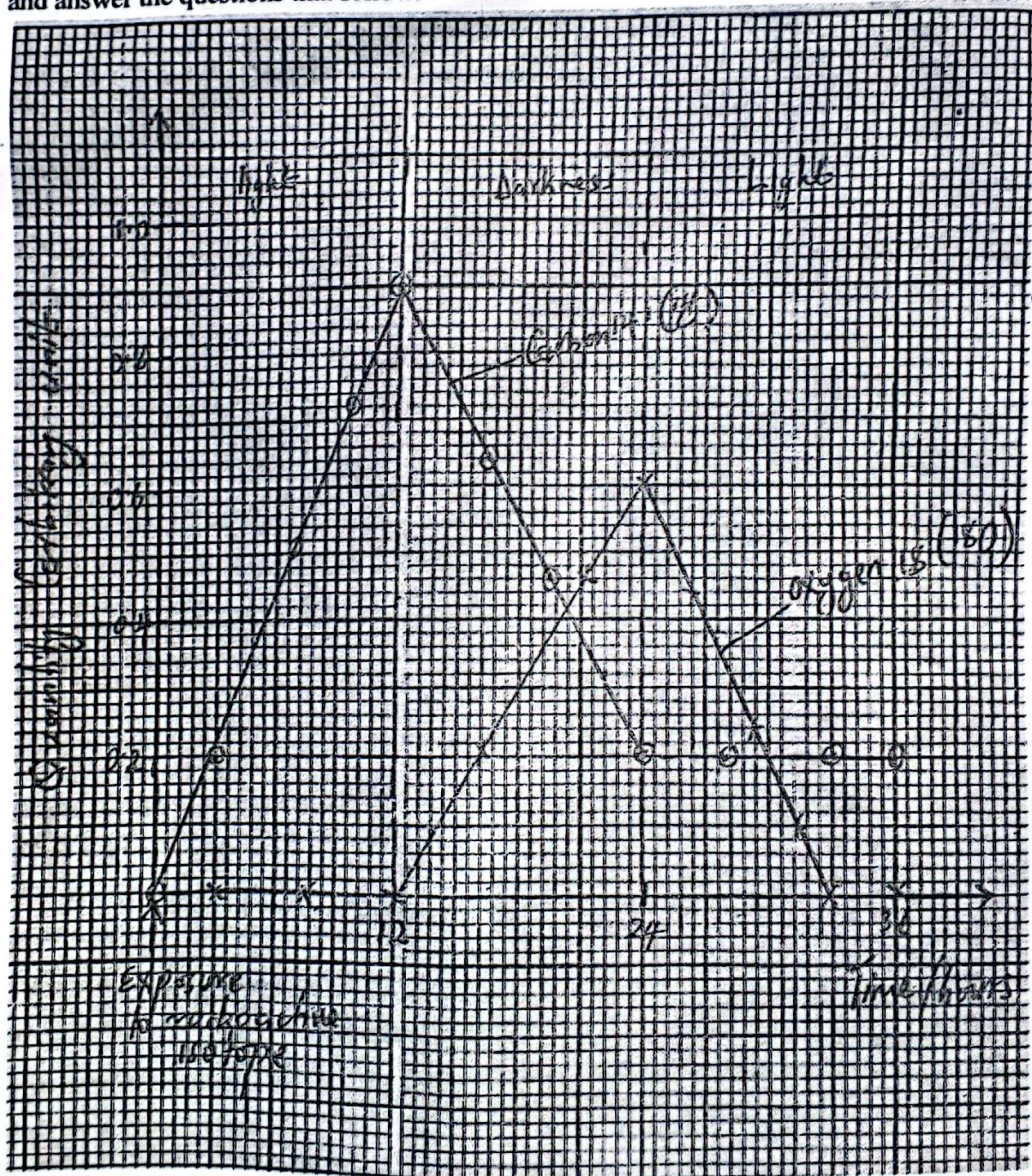
2hours 30minutes

Instructions to candidates:

- *This paper consist of section A and B.*
- *Answer question **one** in section A plus **three** others from section B .*
- *Candidates are advised to write their full names, index numbers, signature and question in the order attempted on the first page of their answer sheet.*
- *Candidate s should read questions carefully, organize their answers and present them precisely and logically, illustrating with well labeled diagrams where necessary.*

SECTION A

1. Radioactive ^{18}O and ^{14}C can be used to study respiration and photosynthesis, in an experiment, unicellular algae chlorella which had previously been exposed to ^{12}C and ^{16}O only was subjected to ^{14}C in form of $^{14}\text{CO}_2$ and ^{18}O in form of $^{18}\text{O}_2$ molecules for a period of 24 hours. The quantity of radioactive isotope ^{14}C and ^{18}O in the cells of algae were monitored and the results obtained were summarized in the figure below. Study the figure and answer the questions that follow.



- a) Describe the changes in the quantity of both ^{14}C and ^{18}O in the cells of algae chlorella. (08 marks)

- b) Explain the changes described in (a) above for
 i) ^{14}C (09 marks)
 ii) ^{18}O (11 marks)
- c) After 24 hours, dry mass of some algae cells was determined, however in this investigation radioactive ^{18}O was not found to be part of the algae and yet ^{14}C was. Explain this observation. (06 marks)
- d) From the graph, calculate the percentage of the organic substance respired in the darkness from 12 to 24 hours, (03 marks)
- e) State the differences between photosynthesis and respiration. (03 marks)

SECTION B

2. In maize, the genes for coloured seed and full seed are dominant to genes for colourless seed and shrunken seed respectively. Pure breeds of double dominant variety were crossed with double recessive variety and a test cross of the resultant F_1 offsprings produced the following.

Phenotype	Number of offsprings
Coloured, full seed	382
Coloured, shrunken seed	15
Colourless, full seed	13
Colourless, shrunken seed	394

- a) Suggest an explanation for the phenotypic ratio obtained as shown by the results in the table above. (04 marks)
- b) Using suitable genetic diagrams, show how you have reached the conclusion as in (a) above. (11 marks)
- c) (i) Calculate the distance in chromosome units between the genes for seed shape and seed colour on a chromosome. (03 marks)
 (ii) Outline two importances of crossover values (COV) in genetics. (02 marks)
3. a) Describe the mechanism of stomatal opening according to ionic theory. (06 marks)
 b) Describe how; (i) Abscissic acid leads to stomatal closure. (06 marks)
 (ii) Auxin promotes cell elongation (05 marks)
 c) Other than the function in b(ii) above, state three other roles of auxin. (03 marks)
4. a) Explain the factors which determine the level of deoxygenation of a water body. (09 marks)
 b) Describe the ecological effects of eutrophication on aquatic ecosystem. (07 marks)
 c) Suggest ways of reducing the effects in (b) above. (04 marks)
5. a) Describe the structure and distribution of parenchyma tissues. (06 marks)
 b) Describe the different modifications of parenchyma tissues in different parts of the plant to suit its functions. (14 marks)

6. a) Explain the glowing eyes of the cat at night when shone with light. (04 marks)
- b) Account for the difference in the sensitivity of rods and cones towards light. (06 marks)
- c) Describe the physiological behaviour of rods when in light. (10 marks)

END