

**P530/2**  
**BIOLOGY**  
**PAPER 2**  
**(THEORY)**  
**NOV 2020**  
**2½ hours**

**A**

**UGANDA ADVANCED CERTIFICATE OF EDUCATION**

**BIOLOGY**

**(THEORY)**

**PAPER 2**

**2 hours 30 minutes**

**INSTRUCTIONS TO CANDIDATES:**

*This paper consists of section A and B*

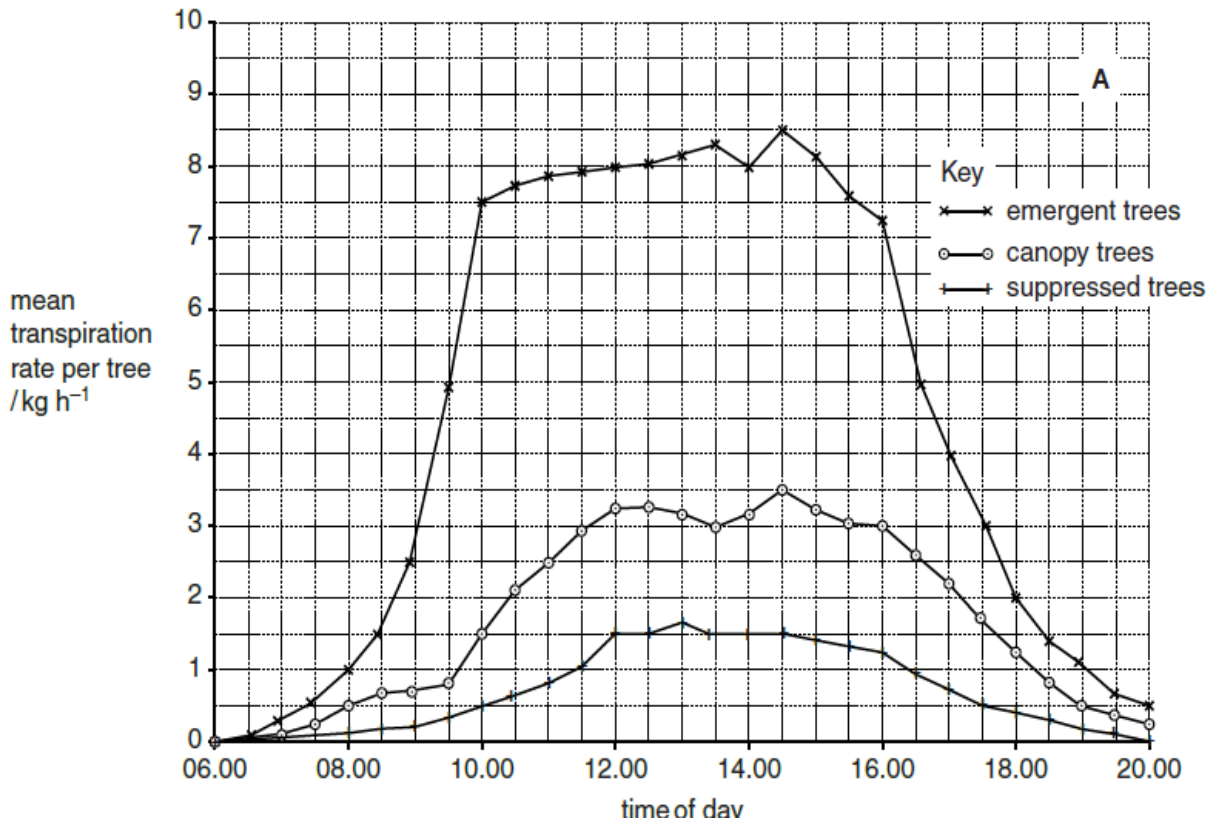
*Answer question one in section A plus three others from section B.*

*Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustrating with well labelled diagrams wherever necessary*

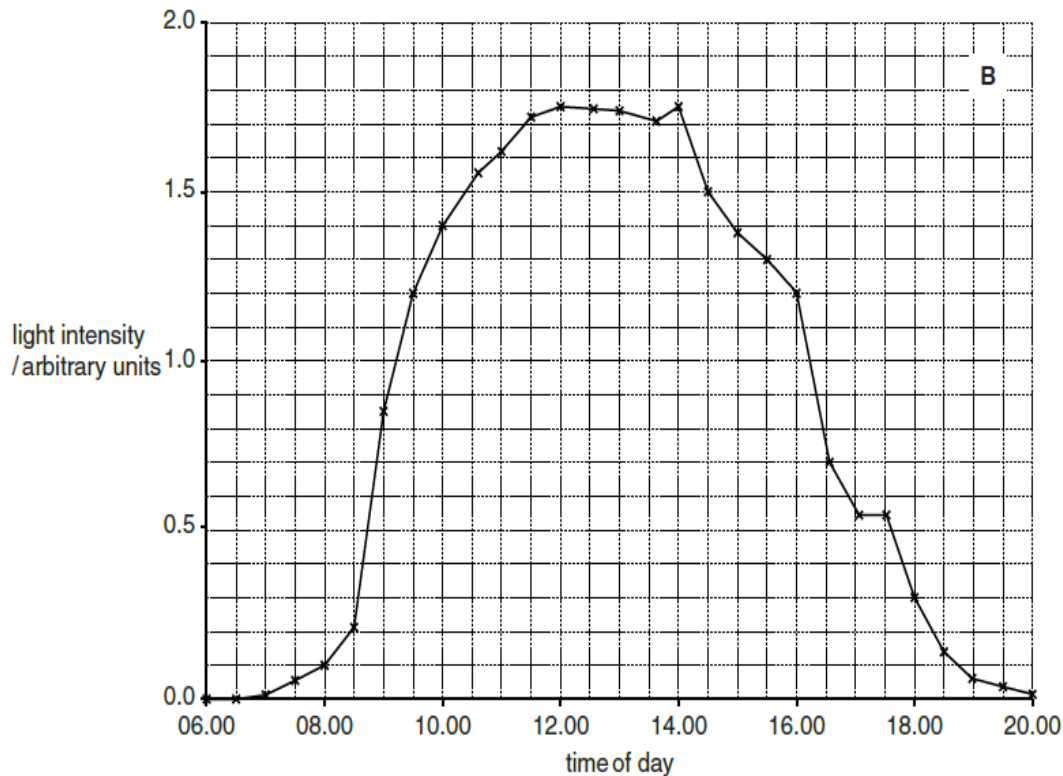
## SECTION A (40 MARKS)

**N.B QUESTION ONE IS COMPULSORY TO ALL CANDIDATES.**

**Mabira** forest is a tropical rain forest covering about 300 square kilometers'. Trees of genus *Nothofagus* grow in the forest at different levels forming ecological **stratifications**. Trees that can be identified in the strata include emergents, canopies and suppressed trees. Researchers determined the rates of transpiration of the trees in the different strata in relation with the variation of the light intensity from **6:00 hours** to **20:00 hours**. Study carefully **fig 4.2A** and **Fig 4.2B** and answer questions that follow.



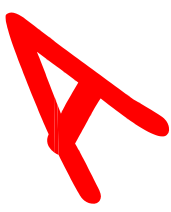
**Fig 4.2 A**



**Fig 4.2 B**

- a) (i) Use Fig. 4.2A to compare the transpiration rates of the emergent, canopy and suppressed trees in the forest over 20.00 hours. (8 marks)
- (ii) Use the information in Fig. 4.1 and Fig. 4.2 to explain the differences and similarities in the transpiration rates of the emergent and suppressed trees. (10 marks)
- b) Explain the relationship between the mean rate of transpiration of the emergent trees with light intensity. (12 marks)
- c) Suggest why Mabira forest was chosen for the study. (5 marks)
- d) Explain with reasons why errors could have risen during the study. (5 marks)

## SECTION B (60 MARKS)

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2. a) Describe the mechanisms that operate to preserve genetic diversity in the gene pool. (8 marks)
- b) Explain why natural selection alone cannot result into speciation. (8 marks)
- c) Using the knowledge of stabilizing selection, explain why babies with mean birth weight survive while those below or above die. (4 marks)
3. Explain how the effects of light intensity, nutrient status and turbulence interact to control primary productivity of a water body. (10 marks)
- b) Describe the different factors that determine the shape of an oxygen sag curve in an organically polluted water body. (10 marks)
4. a) Explain why diploidy is more advantageous compared to haploidy in plants. (4 marks)
- b) Describe the biogeography of the plants in relation to their evolutionary photosynthetic pathways. (8 marks)
- c) Explain strategies that have enabled plants to move to land. (8 marks)
5. a) (i) What is meant by Myofibril? (4 marks)
- (ii) Explain how the structure of actin and myosin relate to muscular contraction. (8 marks)
- b) Compare mode of operation of the neuromuscular junction and acetylcholine dependent synapses. (8 marks)
6. a) Explain why the S-shaped curve of haemoglobin is very significant. (8 marks)

**b) Explain how the respiratory centre interacts with the vasomotor centre in the medulla to bring about homeostasis in the body.**

**(8 marks)**

**c) Explain why there are different shapes of the oxygen dissociation curves of respiratory pigments.**

**(4 marks)**

**A**

**END**