P530/2
BIOLOGY
(Theory)
Paper 2
Aug./Sept. 2022
$2\frac{1}{2}$ HOURS

Uganda Advanced Certificate of Education

BIOLOGY

Paper 2

2 hours 30 minutes

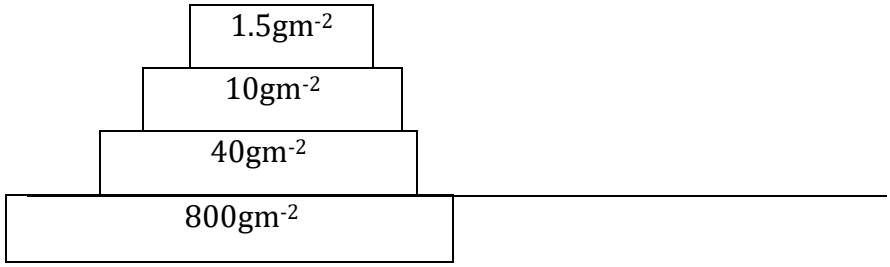
INSTRUCTIONS

- This paper consists of two sections A and B
- Attempt question 1 in section A and any three (3) from section B
- Any additional (s) will not be marked.
- You are advised to read the questions carefully, organize your answers and present them precisely and logically. Illustrate your answers with clear labeled diagrams where necessary.

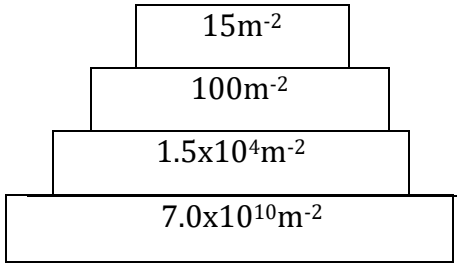
SECTION A (40 MARKS)

*Question **1** is **compulsory***

1. An ecologist conducted two experiments to investigate the productivity of an aquatic ecosystem.
   In experiment 1 Biomass and numbers of organisms were obtained. The illustrations below show pyramids of biomass and numbers in the ecosystem.

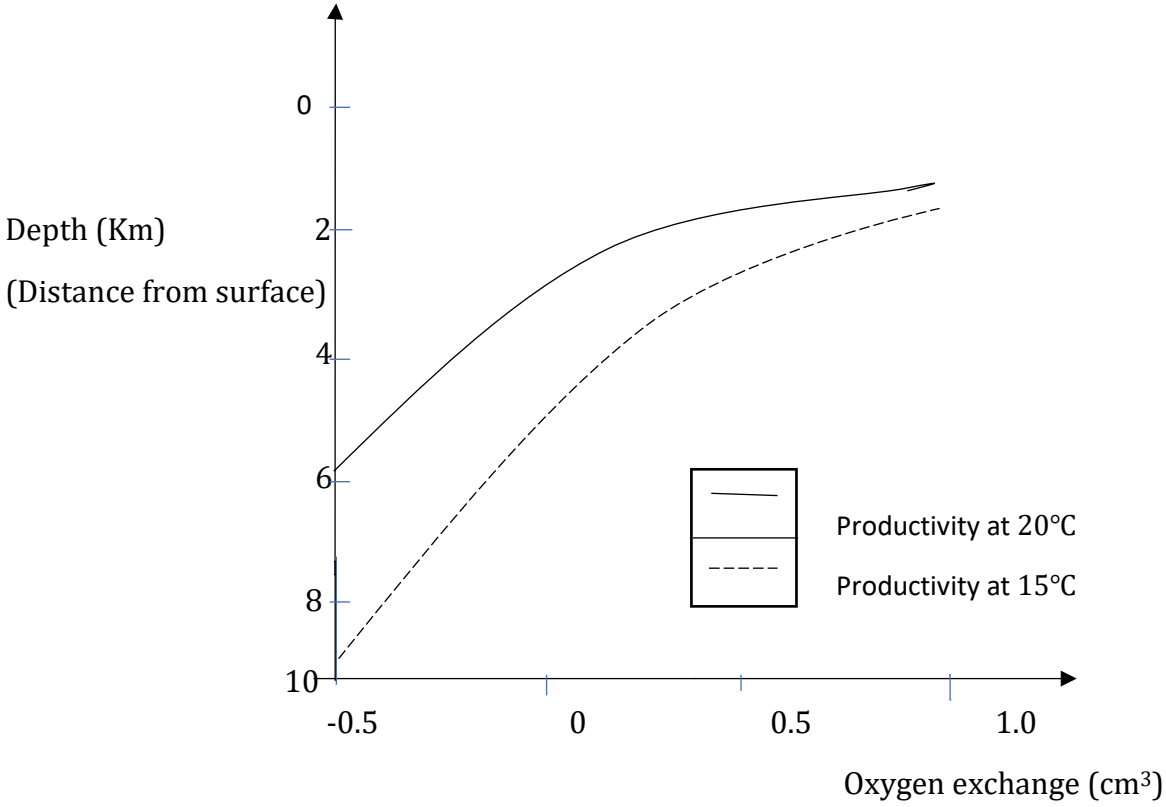


Biomass



Numbers

In experiment 2 the data obtained was plotted and the graph below shows how the net productivity of a marine algae varied with depth and temperature.



Using information from experiment 1;

a. What are the advantages and disadvantages of the two methods of measurement? (06marks)
b. What other kind of pyramid would be used to give further information about the four trophic levels? (01marks)
c. Why are there seldom more than four trophic levels in each pyramid? (04marks)
d. i). What is a pesticide? (02marks)
   ii). Explain why pests may flourish after application of pesticides. (07marks)
e. what is meant by the term net primary productivity? (02marks)
f. Explain why oxygen exchange can be taken as an indicator of net primary productivity. (02marks)
g. i). Using the graph, state the relationship between net productivity and depth. Suggest an explanation for this relationship. (08marks)
   ii). Show clearly on each curve the position of compensation point. (01mark)
h. Account for the differences of compensation point at each temperature. (04marks)
i. Give three ways in which primary productivity can be measured. (03marks)

SECTION B (60 MARKS)

*Answer any **three** questions from this section.*
*Any additional question(s) answered will **not** be marked.*

2.
(a) Discuss the significance of **conservation** of natural resources in an ecosystem. (09 marks)
(b) Explain the different ways by which **nitrogen** enters into an ecosystem. (11 marks)

3.
(a) State and explain **competitive exclusive principle**. (04 marks)
(b) Describe the relationship between organisms in lichens. (06 marks)
(c)
(i) Compare mutualism and parasitism. (07 marks)
(ii) What is the significance of mutualism. (03 marks)

4.
(a) What is ***reproductive potential***? (02 marks)
(b) State the effects of fire on ecosystem. (04 marks)
(c) How do soil factors influence the distribution of plants? (13 marks)

5.
(a) What is meant by **population distribution**? (04 marks)
(b) Give **reasons** for population distribution. (03 marks)
(c) Describe the **factors** that affect population distribution. (05 marks)
(d) Outline the **uses** of population counting. (08 marks)

6.
(a) Explain why in most ecosystems, less than 5% of sunlight is converted in chemical energy by green plants. (08 marks)
(b) With reference to pyramids of energy, discuss the transfer of energy between trophic levels. (10 marks)
(c) Why generally the pyramid of number goes on decreasing? (02 marks)