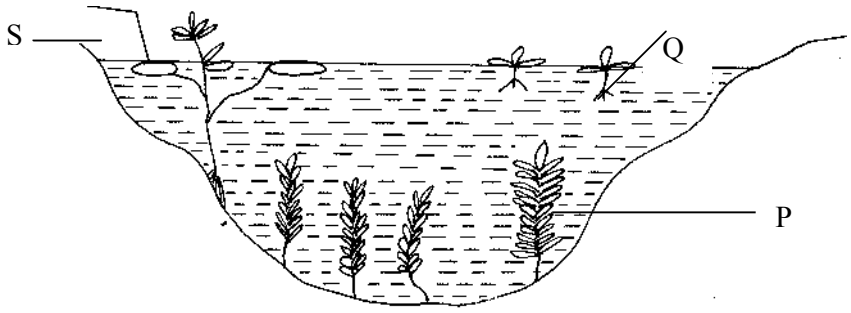
BIOLOGY

231/ 2

SECTION A (40 MARKS)

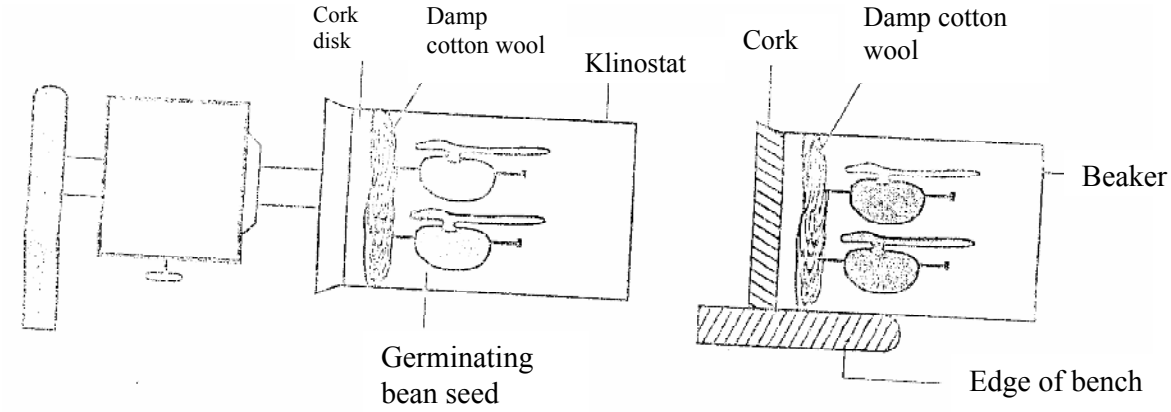
1. The diagram below shows a fresh water ecosystem. Study it carefully and answer the questions that follow.



a) What is an ecosystem. 1mk*UG*
b) Identify the type of plants labeled S,P and Q. 3mks*UG*
c) Explain adaptations of plant P to their environment. 4mks*UG*

2. a) A person of blood group B marries another person with blood group B. State the possible blood groups of their children 2mks*UG*
b) A portion of a DNA strand has the following base sequence CTAGG. Write down the base sequence of
(i) m-RNA transcribed by this portion of DNA. 1mk*UG*
(ii) The DNA complementary strand. 1mk*UG*
b) An albino man marries a normal woman whose father was an albino.
i) What is the probability that their first child will be an albino (show your working) 3mks*UG*
(ii) Why are women less frequently colour blind. 1mk*UG*

3. Study the set-up below and answer the questions that follow.



SET UP A
Klinostat set up

aim of the experiment.
Observations made in both set-ups

SET UP B
Beaker set up

1mk *UG*
2mks*UG*

Set – up A
Set – up B

c) Briefly explain the observations you have indicated in 3(b) above. 4mks*UG*
d) What is the significance of set-up A 1mk*UG*

4. A student was given the following instructions during a practical class.

- A semi-permeable membrane that is permeable to iodine molecules.
- Solution R is a solution of sucrose and starch in water
- Take a visking tubing and open it
- Tie it at one end with a piece of thread and ensure no leakage.

- Half fill the tubing with solution R and tie this end also.
- Immerse the visking tubing in solution T which is a mixture of iodine in water.
- Leave the set up to stand for 30 minutes.

a) State the observation made in the visking tubing after 30 minutes 2mks*UG*

b) Account for the observations made in 4 (a) above. 4mks*UG*

c) Name the processes that were being investigated in the above procedure. 2mks*UG*

5. The table below shows some results from a series of experiments made using a potometer. Each experiment lasted 10 minutes.

	Experiment 1		**Experiment 2**		**Experiment 3**	
	Room temperature + bright sunlight		Room temperature + Bright sun + fan		Room temperature in the dark	
	Start (cm^3)	Finish (cm^3)	Start (cm^3)	Finish (cm^3)	Start (cm^3)	Finish (cm^3)
Reading 1	0.8	3.4	0.7	4.3	0.4	1.5
Reading 2	1.1	4.2	0.6	5.1	1.2	2.1
Reading 3	0.6	3.3	0.5	4.7	0.3	1.6
Reading 4	1.3	4.9	1.1	5.8	0.9	1.4
Reading 5	1.1	4.4	0.9	6.1	1.2	2.1
Average value	Average value=		Average value=		Average value=	

a) Calculate the average rate of transpiration in each experiment. 3mks*UG*

b) Which variables are being changed in the experiment. 2mks*UG*

c) Explain the differences in the rates of transpiration. 3mks*UG*

SECTION B (40 MARKS)

Question 6 is compulsory. Then answer either 7 or 8.

6. A person had gone for 24 hours without food. Then he was served with a well balanced meal, after which the concentration of glucose and amino acids in the blood were determined every one hour for the next 8 hours after the meal. The concentration were measured as blood passed through the hepatic portal vein and hepatic vein. The results were as shown in the data below.

Time in hours	Concentration of Glucose and amino acids in blood (mg/100cm^3 of blood)			
	HEPATIC PORTAL VEIN		HEPATIC VEIN	
	GLUCOSE	AMINO ACIDS	GLUCOSE	AMINO ACIDS
0	79	1.0	85	1.0
1	79	1.0	85	1.0
2	160	1.0	110	1.0
3	140	4.0	100	3.0
4	120	6.0	90	3.0
5	100	5.0	90	2.0
6	90	2.0	90	1.0
7	90	1.0	90	1.0
8	90	1.0	90	1.0

a) On the same axis plot graphs of glucose concentration in hepatic portal vein and hepatic vein against time. 7mks *UG*

b) Account for the difference in blood sugar level in hepatic portal vein and hepatic vein;

(i) between 0 – 1 hours 4mks*UG*

(ii) Between 2 – 4 hours. 5mks*UG*

c) (i) Give one reason that delayed increase in amino acids concentration in hepatic portal vein. 1mk*UG*

ii) Account for the difference in concentration of amino acids in hepatic portal vein and hepatic vein between 3^{rd} – 6^{th} hours. 2mks*UG*

d) Name the enzyme that completes fat digestion in man. 1mk*UG*

7. A student ate lean meat for breakfast. Explain fully how the meat eventually becomes part of the body tissue. 20mks *UG*

8. a) With the aid of a large labelled diagram describe the process of fertilization in a flowering plant. 4mks *UG*

b) How does the process above differ from that in Bryophytes. 6mks *UG*