MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education
PRE-MOCK EXAMINATIONS 2022

231/2 BIOLOGY Paper 2

JUNE 2022 – 2Hours

Name: Marking Guide .....Adm No: .....

Class: .....Candidate's Signature: .....Date: ...../6/2022.

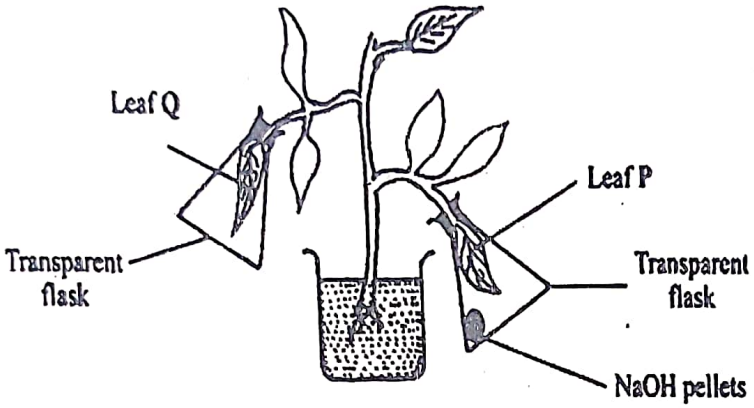
INSTRUCTIONS TO CANDIDATES:

- *Write your name and admission number in the spaces provided.*
- *Sign and write date of examination in the spaces provided above*
- *Answer all the questions in section A in the spaces provided.*
- *In section B answer question 6 (compulsory) in the spaces provided and either question 7or8.*
- *You are required to spend the first 15 minutes of the 2hours allowed for this paper reading the whole paper carefully.*

FOR EXAMINER'S USE ONLY

Section	Question	Maximum score	Candidate's score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
TOTAL SCORE		80	

1. 1. In an experiment to investigate a certain aspect of photosynthesis, two leaves Q and P from a de-starched potted plant were treated as shown on the diagram below.



The plant was then placed in an open field for three hours after which a certain test was carried out on the two leaves to find out if photosynthesis had taken place.

a i) Which aspect of photosynthesis was being investigated? (1mark)

Necessity of carbon (IV) oxide in photosynthesis;

ii) How was the potted plant de-starched? (1mark)

Placing the potted plant in darkness for 48hrs;

bi) What test was carried out to tell whether photosynthesis has occurred? (1mark)

Starch test / Iodine test;

ii) Account for the expected result when the test named in b(i) above was carried out on leaves Q and P. (4marks)

Iodine soln turn blue-black

Leaf Q/ starch was present; this is because there was carbon (IV) oxide gas inside the flask hence photosynthesis occured with formation of starch; (2mks)

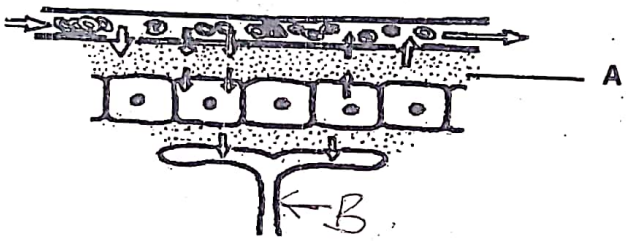
Iodine soln retains brown colour.

Leaf P/ starch would be absent; Sodium hydroxide inside the flask would absorb carbon (IV) oxide inside the flask hence no photosynthesis would take place; (2mks)

c) Suppose in the set up Sodium hydroxide pellets were replaced with Sodium hydrogen carbonate in the flask with leaf P. Explain the result of the same test on the leaf P. (4mark)

Starch would be present/leaf would turn blue-black; because $NaHCO_3$ would decompose releasing ~~CO_2~~ CO_2 which is used by the leaf to photosynthesize;

2. The diagram below represents cells of a tissue and associated circulatory vessels. SPOTLIHGT



a) Name the fluid that filters from the capillary into space A (1mark)

Tissue fluid/intercellular fluid;

bi) Name two substances that the cells obtain from the fluid in space A. (2marks)

✓ Oxygen; R.J. Symbol

✓ Nutrients/glucose/amino acids;

ii) Name two components of blood that do not filter into space A. (2marks)

✓ Plasma proteins acc. named protein ie fibrinogen | albumin

✓ Blood cells/red blood cells/platelets; some wtic

ci) Name the fluid in vessel B. (1mark)

Lymph;

ii) State two differences in composition between blood in arteriole and that in venule. (2marks)

First 2

Arteriole	Venule
✓ Has more oxygen	- Has less oxygen;
✓ Has less carbon (iv) oxide	- Has more carbon (iv) oxide;
✓ Has more nutrients acc. named example e.g glucose	- Has less nutrients;
✓ Has less metabolic wastes acc. named example eg urea	- Has more metabolic wastes;

3. The diagram below shows a root system from a certain plant

ai) Name structure Q (1mark)

Root nodule;

ii) Explain briefly the significance of having structures Q in the root system of the plant represented above. (4marks)

Q contain (large number) of bacteria; that fix free nitrogen from atmosphere into nitrates/a form that can be utilized by the plant;

b) What mode of nutrition is demonstrated in the diagram? (1mark)

Symbiosis;

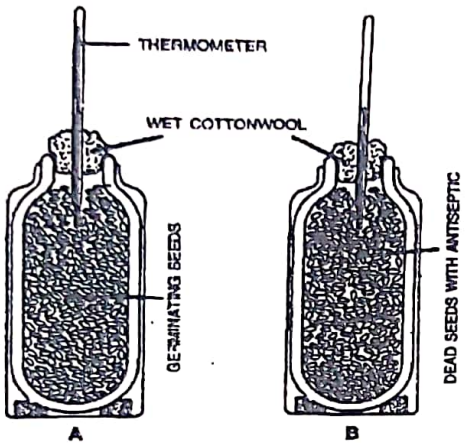
c) With a reason, state the class to which the plant represented in the diagram belong? (2mark)

Class Dicotyledonae;

Reason Has fibrous (tap) root system;

Rj. 'what system

4. A student set up the following apparatus using socked been seeds and boiled been seeds to investigate a certain biological phenomenon.



a) What is the aim of the experiment? (1mark)

To investigate the release of heat (energy) in germinating seeds; OWTTE

b) State the expected observations after 3 days. (2marks)

A: Temperature (Thermometer) reading increased;

B: Temperature (Thermometer) reading remains the same;

c) Account for the observations made after 3 days. (2marks)

Flask A

Germinating seeds respired releasing heat;

Flask B

Boiling killed the embryo of the seeds hence they don't not respire;

d) Why was it important to wash the dead seeds with antiseptic? (2marks)

To kill all micro-organisms/decomposers; since they may respire releasing heat which may cause a rise in temp;

e) What is the purpose of set up B? (1mark)

Control Experiment;

5.A baby has blood group B while the mother's blood group is A. The paternal grandfather is blood group B and the paternal grandmother is blood group A.

a) Determine the genotypes of the baby's: - (4marks)

i) Paternal grandfather BO / BB ;

ii) Paternal grandmother AO ;

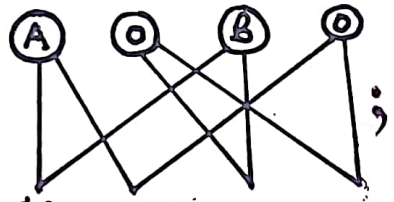
iii) Father BO / AB ;

iv) Mother AO ;

b) If the mother and father have non-identical twins, what is the probability that both children will have blood group B? Show your working. (4marks)

Blood group A ♀ Blood group B ♂

AO × BO ;



;

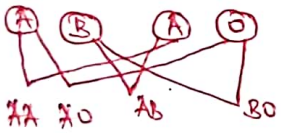
F1 gen: AB AO BO OO ;

Blood groups AB, A, B and O.

The probability of blood group B is 1/4 or 25% ;

NB
✓ gametes fully circled
✓ fussion lines not hanging and at the
✓ cross btwn genotypes

AB × AO



AA AO AB BO

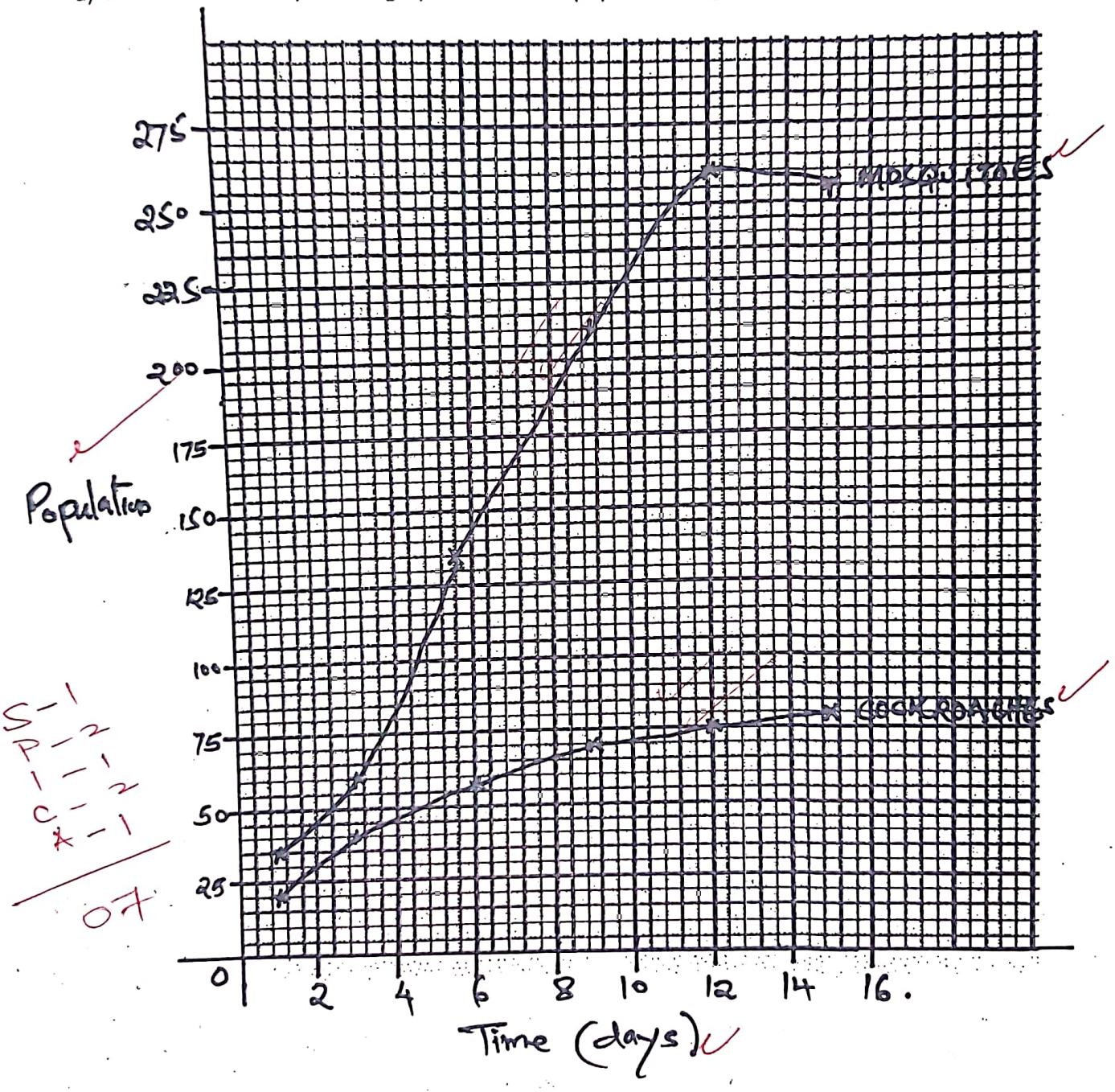
⇒ AA, AB AO BO

acc. punnet sq.

6.In a certain school invaded by mosquitoes and cockroaches, students collected a data on the population of each species over a period of two weeks. The results are tabulated below.

DAY	1	3	6	9	12	15
Number of mosquitoes	35	60	130	210	260	250
Number of cockroaches	20	40	56	70	75	80

a) On the same axes plot the graphs of the two populations against time. (7marks)



S – 1
P – 2
I – 1
C – 2
* – 1
07

b) State the most suitable equipment to collect each of the species: - (2marks)

i) Cockroaches ---- Pit-fall trap; acc. Pooter ----

ii) Mosquitoes ---- Sweep net; ----

c) Account for the shape of the curve for the mosquitoes between: - (4marks)

i) 1st and 3rd day

The pop of mosquitoes increases gradually; slowly because they had not adjusted to the environment; there were fewer reproducing mosquitoes;

ii) 12th and 15th day

The pop of mosquitoes decreased slowly gradually; because carrying capacity has been stretched/resources have become limited e.g food, space

d) Mosquitoes are vectors of a certain parasite.

i) Name the parasite. (1mark)

Plasmodium; Acc any correct named species; - malariae - ovale - vivax - falciparum

ii) Name the disease caused by the parasite named in d(i) above. (1mark)

Malaria

e) Explain: -

i) One way that makes cockroaches better adapted in the environment than the mosquito. 1mark)

✓ They have hard exoskeleton for protection against mechanical injury; They camouflage well with the background;

✓ They feed on a variety of plant and animal materials (Scavengers)

✓ Dorsal-ventrally flattened body to enable them hide in crevices against predation;

ii) Why the population of mosquitoes is not affected by the population of the cockroaches. (1mark)

They belong to different species and occupy different niches hence do not compete for resources;

7 Describe the nitrogen cycle. (20 mks)

8 a) Define a reflex arc (2 mks)

b) A young boy accidentally touched a sharp pin. He suddenly gave a shout and withdrew the hand from the pin. Describe the activities that led to withdrawal of the hand from the pin. (18 mks)

Qn 7 The Nitrogen Cycle:

During thunderstorm / lightning; nitrogen gas combines with oxygen to form nitrogen oxides; which dissolve in water to form nitric acid; the acid is deposited in the soil by rain; nitric acid combines with chemical substances in the soil to form nitrates; / dissociates to form nitrates; which are absorbed by plants; Symbiotic bacteria / Rhizobium; found in the root nodules of leguminous plants; fix free nitrogen to nitrates Free living bacteria / Clostridium / Azotobacter; fix nitrogen to nitrates; Free living organisms / Nostoc / algae / Anabaena / Chlorella; fix nitrogen to nitrates; Plants use nitrates to form plant proteins; Animals feed on plants and convert plant proteins into animal proteins Plants / Animals die and decomposed by bacteria / fungi Saprophytes; thereby releasing Ammonia; which is converted into Nitrites by Nitrosomonas / Nitrococcus bacteria; the nitrites are converted into Nitrates; by Nitrobacter bacteria; Nitrates in the soil can be converted to free Nitrogen / Denitrification by some fungi; Pseudomonas / Thiobacillus / other denitrifying bacteria;

8a) It's the route followed by the nerve impulse; from the receptor to the effectors; (2mks)

b) When ~~the footsteps on the~~ finger touches the ~~sharp~~ pin; pain receptors; in the skin are stimulated; and an impulse is generated; The impulses are transmitted along the sensory neuron; to the grew matter of the spinal cord; through the dorsal root;

The impulse is then transmitted to the relay/intermediate neuron; through a synapse;

The impulse is integrated; and is then transmitted to the motor neurone; and through another synapse; The motor neurone found in the ventral root; transmits the impulses to the effector muscle ~~behind the fibula/leg~~ of the hand (Biceps); which responds by contracting; At the same time, the ~~muscle on the front of the leg/tibia~~ tricaps relaxes; and the ~~leg flexes~~ hand/ folds; withdrawing from the sharp pin;

At the same time, the relay neuron, connects through a synapse, to another motor neurone; that transmits an impulse to the vocal cords; to produce the shouting.

Max 18marks