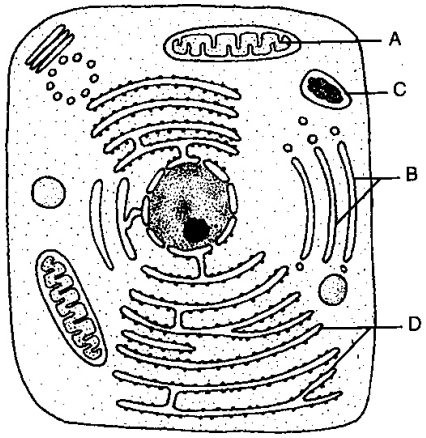
MOKASA 2015

BIOLOGY P1 MARKING SCHEME

1. State **two** characteristics of living organisms that are specific to plants. (2marks)
   Autotrophic nutrition; Limited movement,
   Limited excretory products/unspecialized excretory structures;
   Growth takes place in specific region; Alternation of generation;
2. State **one** use for each of the following apparatus in the study of living organisms.
   a) Pooter. (1mark*)*
   Sucking small organisms from rock and bark surfaces;
   b) Pitfall trap. (1mark)
   Trapping crawling organisms;
3. (a) Name **two** tissues in plants which are thickened with lignin. (2marks)
   Sclerenchyma; Xylem vessels/Tracheids;
   (b) How is support attained in herbaceous plants? (1mark)
   Cells take in water and become turgid; owttte
4. The diagram below represents a cell as seen under an electron microscope.



   a) Identify the parts labeled **A** and **D**. (2marks)
      i) **A** *Mitochondrion;* rej plural
      ii) **D** *Rough endoplasmic reticular;* rej singular
   b) State the function of the structures found on the part labeled **D**. (1marks)
   Site for protein synthesis;
5. a) Using a microscope, a student counted 55 cells a cross a field of view whose diameter was 6000µm. Calculate the average length of the cells. **Show your working**. (2marks)
   Length of a cell= diameter of field of view
   Number of cells ;
   6000
   55 ;
   109;

b) State the function of the following parts of a light microscope

i) Objective lens. (1mark)
Magnification (of images); owtte

ii) Diaphragm. (1mark)
Regulation of a mount of light (falling on the object/specimen on microscope);

6. (a) Name the fluid that is produced by sebaceous glands. (1mark)
Sebum;
(b) What is the role of sweat on the human skin? (2marks)
Kills micro-organisms; cools the body; getting rid of wastes/excretion;
7. What is the importance of the following in an ecosystem? (2marks)
a) Decomposers
Recycling off nutrients; owtte
b) Predation
Regulation of numbers/population; owtte
8. (a) State **two** functions of bile juice in the digestion of food. (2marks)
Emulsification of fats/breaking into small droplets; increase surface area for digestion; neutralizing acidity of chime/provide alkaline medium (for enzyme action);
(b) How does substrate concentration affect the rate of enzyme action? (1mark)
9. Name the features that increase the surface area of small intestines. (2marks)
Presence of villi;
Long length;
10. Describe what happens during the light stage of photosynthesis. (3marks)
Light (energy) is observed by chlorophyll; the light splits/photolysis water molecule; to form hydrogen ions/atoms and oxygen gas; (Light is converted to) and also forms Adenosine triphosphate (ATP);
11. (a) Define the following terms. (2marks)
i. Population
The number of organisms of a species occupying a given habitat;
ii. Community
(populations) of different species of plant and animals in a given area and are interacting with each other;
(b) Name a method that could be used to estimate the population size of the following organisms.
i. Fish in a pond. (1mark)
Capture – recapture (method);
ii. Black jack in a garden. (1mark)
Line transect/ Belt transect/ Quadrat;
12. (a) What is meant by the term allele? (1mark)
(A gene is an) Alternative form of a gene;
(b) Explain how the following occur during gene mutation.
(i) Deletion. (1mark)

Some bases/nucleotides of a gene are removed;

(ii) Inversion. (1mark)

The order of some bases/nucleotides is reversed;

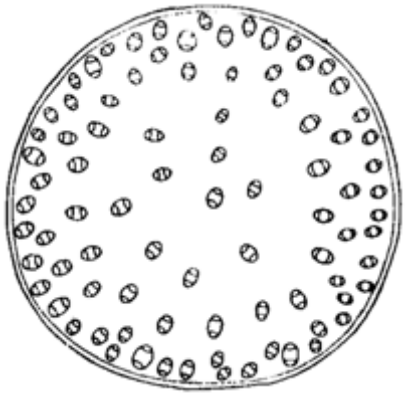
(c) What is a test-cross? (1mark)

A cross made between a homozygous recessive individual/parent and a parent/individual of unknown genotype (to determine whether the unknown genotype is homozygous or heterozygous for dominant gene);

13. Explain what happens when there is oxygen debt in human muscles. (2marks)

Muscles are subjected to respire anaerobically; resulting in accumulation of lactic acid in the tissues; causing fatigue/and muscle cramps;

14. The diagram below shows a transverse section of a plant organ.



a) Name the class to which the plant organ was obtained. (1mark)

Monocotyledonae;

b) Give a reason for your answer in (a) above. (1mark)

Vascular bundles scattered/not arranged in a ring; absence of pith; absence of vascular cambium;

15. Giving a reason in each case, name the class to which each of the following organisms belong: (4marks)

Bean plant

Dicotyledonae;

Reason

Leaves are net veined; have leave petiole/tap root system/cross-section of vascular bundles are arranged (around pith) star shaped xylem in roots/phloem in between arms of xylem/ floral parts are in 4s or 5s or multiples of 4a/5s/ two cotyledons; **Any one**.

Bat

Mammalian;

Reason

Presence of fur/hair/mammary glands/sweat glands/ presence of two pina/heterodont dentition/ear oscicles; **Any one**.

16. (a) Name the causative agents of the following diseases in humans. (2marks)

Typhoid

Salmonella typhi
Amoebic dysentery
Entamoeba hystolytica;

(b) Name the disease in humans caused by *Plasmodium falciparum*. (1mark)
Malaria;

17. State **three** differences between Chilopoda and Diplopoda. (3marks)

Chilopoda	**Diplopoda**
A pair of (walking) legs per segment;	*two pairs of walking legs per segment;*
Body flattened dorsoventrally;	*Body cylindrical*
Body divided into head and trunk/two parts;	*Body divided into head, thorax, trunk / three parts;*
Has poisonous claws;	*lacks poisonous claws;*
Posterior genital aperture;	*posterior*

18. What are the limitations of fossil records as evidence of organic evolution? (1mark)
Several missing fossils records (missing links); these have occurred due to complete decomposition of whole organism/scavenged upon/lack of conditions for fossilization/discovery of few fossils;
Distortion of parts of fossil during sedimentation which gives wrong impression of the structures;
Distortion of fossils by geological activities e.g. earthquakes, faulting, uplifting and mass movement.

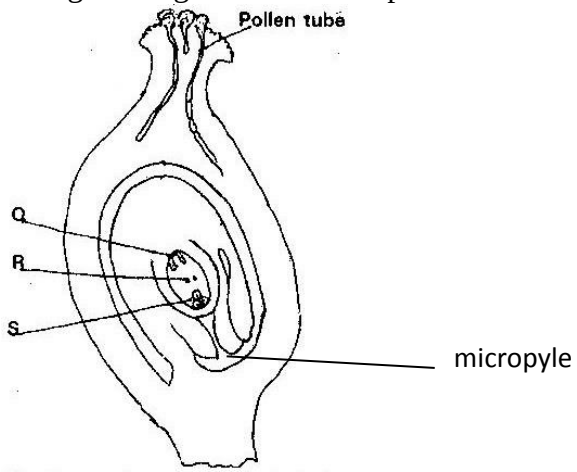
19. The diagram below represents a member of the kingdom Animalia.

i) Name the phylum to which the organism belongs. (1mark)
Arthroppoda;

ii) Using observable features in the diagram, give three reasons for the answer in (i) above. (3marks)

Segmented body;
Jointed appendages;
Presence of exoskeleton;

20. The diagram below shows a stage during fertilization in plants.

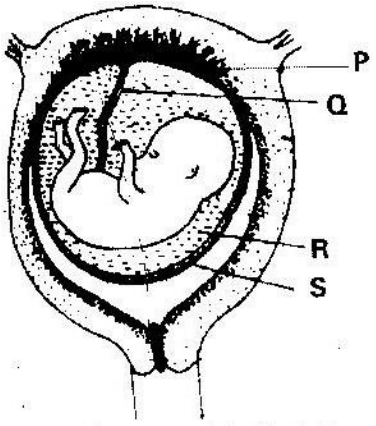


a) Name the parts labeled **Q** and **R**. (2marks)
Q *Antipodal cell(s);*
R *Polar nucleus/nuclei:*

b) State the function of the pollen tube. (1mark)
Secretes enzymes that digest the stigma/style/ovary tissue; Offer passage for male nuclei to ovum and polar nucleus/embryo sac;

c) On the diagram, label the micropyle. (1mark)

21. The diagram below represents a human foetus in a uterus.



a) Name the types of blood vessels found in the structure labeled **Q**. (2marks)
Arteries; Veins;

b) Name **two** features that enable the structure labeled **P** carry out its function. (2marks)
Highly vascularised; has (villi) that provide a large surface area; presence of secretory cells (glandular) that produce progesterone;

22. Name the type of skeleton that makes up each of the following animals. (3marks)

a) Cockroach
Exoskeleton;

b) Bird
Endoskeleton;

c) Earthworm
Hydrostatic;

23. (a) Highlight **two** survival values of tropic response. (2marks)

Phototropisms expose the leaves in position to maximize light absorption thereby enhancing photosynthesis
Hydrotropism enables the roots of the plant to seek water important in biochemical processes in plants.
Haptotropism enables the plants obtain mechanical support, especially in those plants lacking woody stems.
Geotropism enables plants roots to grow deep into the soil thus offering firm anchorage;
Chemotropism enables the pollen tubes too grow towards the embryo sac thereby facilitating fertilization; (first two)

(b) What is a klinostat? (1mark)
A device/instrument which slowly rotates a plant to nullify the effect of unidirectional stimulus;

(c) Name the type of movement that occurs within a plant cell. (1mark)
Cytoplasmic streaming;

24. Name:-
a) The pressure sensitive swellings at the base of some leaves and petals which through loss or gain of turgidity bring about nastic movements. (1mark)
Pulvini;
b) The structure in cockroach used for detecting stimuli. (1mark)
Cerci/circus;
c) The growth movement of part of plants in response to a unidirectional external stimulus. (1mark)
Tropic (response);

25. The diagram below shows a transverse section of a leaf. Study it carefully then answer the questions that follow.
a) Name the habitat of the plant from which the leaf was obtained. (1mark)
Aquatic/fresh water;
b) Give t**wo** reasons for your answer in (a) above. (2marks)
Large air spaces/aerenchyma tissues;
Sclereids;
Stomata on upper epidermis/surface//absence of stomata on lower epidermis;
Absence of cuticle;
Poorly developed vascular bundles;

26. (a) Name the gaseous exchange surface in insects. (1mark)
Tracheoles;
(b) How is the surface named in (a) above suited to its function. (2marks)
Moist for gases to dissolve in solution; Branched/many/numerous to increase surface area; thin for fast diffusion;

27. Most carbon (IV) oxide is transported from tissues to the lungs within the red blood cells and not in the blood plasma. Give two advantages of this mode of transport. (2marks)

PH of blood plasma is not altered/homeostasis is maintained; within the red blood cells, there is enzymes (carbonic anhydrase) which help in fast loading/combination and offloading/dissociation of carbon (IV) oxide.

MOKASA BIOLOGY PP2 MARKING SCHEME 2015

1. a) (i)change in environment that brings about change in activity of an organism or part of it.

   (ii)Locomotary response by whole organism or motile gamete in response to unidirectional stimulus

   b) Part A – Gravity causes auxins to accumulate on lower side. The high concentration on lower side inhibits growth, more cell elongation occur on upper side thus grows downwards.

   Part B – the high concentration of auxin on lower side of shoot

   c) – To get limited resources
   - Escape harmful stimulus

2. (a) Parental phenotype black bull/♂ white cow ♀

   Parental genotype B B × W W

   Gamete B B W W

   F_1 genotype BW BW BW BW

   OR

♂ / ♀	B	B
W	BW	BW
W	BW	BW

   (b) Codominance

   (c) Alternative form of a gene controlling a particular characteristic

   (d) – mental deficient

   - slit eye appearance

- reduced resistance to infection

3. (a) Absorb Oxygen

(b) A – Necessity of oxygen in germination
B - Necessity of water in germination
C - Necessity of optimum temperature in germination

(c) Germination; water in moist cotton softens seed coat/activates enzymes/ hydrolyses food substances

(d) – Inhibits growth of adventitious roots
- Inhibits formation of abscission layer hence retards leaf abscission

4. (a) (i) Dentition – shape and specialization of teeth while
Dental formula is number and position of different types of teeth in jaws of mammals

(ii) homodont same size and shape of teeth while heterodont different shape and size of teeth in animal

(b) – Absorption of digested food substances
- Digestion

(c) Have chlorophyll pigments which trap light energy for photolysis
Have enzymes in stomach; for carbon (iv) oxide fixation reactions

5. (a) From liver——heart —— aorta ——Renal artery——arteriole

(b)

PROCESS	NAME	ORGAN
S	Deamination	Liver
T	Excretion	Kidney

(c) – structural functions
- Source of energy during starvation
- Metabolic regulators

SECTION C

6. b) utilize sugar in guard cells
c) the % number of stomata open KCl solution is higher than the % in NaClsolution,when guard cells are exposed to light chroloplasts make ATP in that drive K+ to guard cells
during day light accumulation of K+ ion guard cells increases osmotic pressure ;water is absorbed from neighbouring cells ;by osmosis;guard cells become turgid ;the stoma opens;
d) no stomata opens
e)
-thick waxy cutide
-leaf lamina reduced by being needle like ,spine and like
-scales on leaves
- reduced number of stomata
-hairy leaves
-sunken stomata
-rolling / folding of the leaves

7. a)
-avoid collecting more organisms than you need;
-avoid harming the animals during capturing;
-habits should be left just as they were before;
-whenever possible captured animals should be returned to their habits alive and undamaged.

b)
-oxides of sulphuric by industries enter soil as acid rain;
-acid rain alters PH which kills fauna(animals) and plants (flora);
-use of aerosols release heavy metals like copper and mercury;
-the metals increases toxicity and kills animals;the chemicals also kill nitrogen fixing bacteria;hence lowers fertility;
-oil tankers spill petroleum products;which saturate soil making organisms unable to get oxygen; thus killing;
-some of the petrol products coat plants parts or respiratory surfaces of animals; thus killing them;
-use of inorganic fertilizers which contain phosphates and nitrates ;
That increase acidity of soil; reducing micro-organisms thus low formation of soil organic matter;
-soil structure is changed hence encouraging soil erosion;

-solid wastes from households and industrial wastes such as (food residues) (clothing) and papers; ornon-biodegradable like rubber plastic, glass cause nuisance ;injury; and destroy the environment aesthetic (beauty) state;some offer breeding sites for pests,rodents and insect vectors; they also limit aeration;

8. b)

-it occurs at the upper part of the oviduct after copulation;

-Sperms are drawn by section of cervix to the uterus;

-sperms swim up to the oviduct using their tails;

-when sperms come into contact with the egg the aerosome bursts;

-Releasing lytic enzymes that dissolve the egg membrane;

-theaerosome turns inside-out forming a fine filament that penetrates the egg;

-the head of the sperm enters the ovum and tail left behind ;

-Vitelline membrane changes to prevent further entry of sperms to ovum;

- male nucleus fuses with female nucleus forming adeploid zygote;

-zygote undergoes a series of mitotic divisions forming blastocytes;

-blastocytes develop villi which grows into uterus;

-villi together endometrium develop the placenta;

-blastocytes become embryo after implantation ;

-implantation take place in the uterus ;

-zygote moves from oviduct to uterus by cilia movements ;and contractions of smooth muscles along the oviduct;

CONFIDENTIAL FOR EXAM REQUIREMENT

MOKASA JOINT EXAMINATION

Kenya Certificate **of Secondary Education**

231/3

BIOLOGY

Paper 3

(Practical)

March/April 2015

The teacher in-charge of Biology to provide the following specimens and apparatus to each candidate.

1. A piece of Lung (about 20 cm^3) obtained from a mammal like a cow or goat labeled specimen T.

Provide specimen T on a Petri-dish or on a flat surface.

2. A gill obtained from a bony fish like Tilapia labeled specimen R.

3. Partially unripe pawpaw (small size) labeled specimen K.

4. Means of cutting e.g. sharp Knife/sharp scalpel/surgical blade.

5. Tap water labeled solution X. (Provide 100 ml for each candidate)

6. Concentrated salt solution labeled solution Y. (Provide 100ml per candidate)

7. A transparent ruler.

8. A pair of forceps.

MOKASA JOINT EXAMINATION
Kenya Certificate **of Secondary Education**
231/3
BIOLOGY Paper 3 (Practical)
March/April 2015

1. You are provided with two specimens labeled T and R. Study each of the speciments carefully and use them to give accurate responses to the questions and procedures below.

(a) Take the whole of specimen T. Softly press it downwards on the petri dish using your first finger, then remove your finger. Observe and record what happens to the specimen.

(i) Observation (2 marks)

- *Spongy/loose/ soft; Specimen/ T bounces/ resumes its shape;*

(ii) Explain the observation recorded in (a) (i) above. (2 marks)

- *Has air sacs/ alveoli; which makes specimen/T spongy*

(b) (i) Specimens T and R perform some functions in the organisms from which they were removed from. State one function common to both specimens T and R. (1 mark)

- *Gaseous exchange*

(ii) Using observable features only on specimen R, describe how it is adapted to the function named in (b) (i) above. (3 marks)

- *Has horny gill bars to support the other part of the gill/ specimen;*
- *Has curved/pointed rakers to prevent solids from reaching/damaging the delicate filaments/parts of the specimen;*
- *Filaments are numerous to increase surface area over which gaseous exchange occur;*

(c) Explain the main features that adapts specimen T to the function named in (b) (i) above. (4 marks)

- *Has numerous air spaces/alveoli to increase area over which gaseous exchange occur;*
- *Supplied with a lot of blood/served by numerous capillaries/highly vascularised for transportation of blood to and from the structure in order to maintain a steep concentration gradient;*
- *Has thin walls/epithelia reduce distance of diffusion of gases.*

- *Its walls are lined with a film of moisture to dissolve the gases before diffusion into the blood;*

(d) Identify the group of organisms that use specimen R. (1 mark)

- *Fish*

2. The picture below shows series of beaks in birds.

(a) State the type of evolution that may have led to the emergence of the different beaks shown on the pictures above. (1 mark)

- *Devergent/Adaptive radiation*

(b) Name the type of evolution structure represented by the beaks shown on the pictures above. (1 mark)

- *Homologous*

(c) Observe the pictures carefully. From your observations, what features are responsible for the different types of beaks? (3 marks)

- *Length; shape; size;*

(d) Suggest the type of food likely eaten by birds whose beaks are shown in pictures A, B, C and D. (4 marks)

A - *Flesh;*
B - *Nectar;*
C - *Seeds;*
D - *Insects;*

(e) Briefly state how beak shown in picture A is adapted to feeding. (1 mark)

- *Hooked for eating flesh;*

(f) Below are pictures from two different organisms.

(i) What is the specific function of the two structures shown in the pictures? (1 mark)

- *Flight;*

(ii) What type of structures are represented by the two structures shown on the pictures? (1 mark)

- *Analogous structures*

3. You are provided with a specimen labelled K.

(a) (i) With a reason, identify the part of the plant represented by the specimen. (2 marks)

Part - *Fruit*
Reason- *Has two scars;*

(ii) Cut the specimen into two halves across its long length. Observe the arrangement of seeds inside the specimen. Suggest its placentation. (1 mark)

- *Parietal*

(b) (i) Suggest the mode of dispersal for specimen K. (1 mark)

- *Animal dispersal*

(ii) Give one reason for your answer in (b)(i) above. (1 mark)

- *Fleshy/succulent*
- *Sweat tasting*

(c) (i) Specimen K in its raw state has an excretory substance in its skin. Name the excretory substances. (1 mark)

- *Papain*

(ii) How is the excretory substance named in (c)(i) importance to man? (1 mark)

- *Contains a proteolytic enzyme; used as meat tenderizer*

(d) From the remaining parts of specimen K, cut out thin strips measuring 1cm wide and 5cm long. Place two of the stripes in tap water (solution X) and the other 2 in concentrated salt solution (solution Y). Allow the set ups to stand for 30 minutes.

(i) After the 30 minutes, remove the stripes from the two solutions. Observe and record the shape of the strips from each solution. (2 marks)

Observation
- *Strips in solution X: Curved towards the epidermis*
- *Strips in solution Y: Curved towards the inner surface*

(ii) Using your fingers, feel the texture of the strips from the two solutions. (2 marks)

Texture
- *Stripes in solution X: Hard/firm/rigid*

- *Stripes in solution Y: Soft/flappy/flexible*

(e) Explain the observations made in (d) (i) and (ii) above. (3 marks)

- *Stripes in solution X were hypertonic to tap water; water molecules moved into the cells of the stripes by osmosis; causing them to bend/curve and become firm/rigid/hard;*

- *Stripes in solution Y were hypotonic to the salt solution; water molecules moved out of their cells by osmosis; causing them to become soft/flexible/flappy and to bend towards the inner surface;*