

NAME..... MARKING SCHEMECLASS.....ADM.....

231/1
BIOLOGY
PAPER 1
JULY 2021
TIME: 2 HOURS

MOKASA EXAMINATIONS
(Kenya Certificate of Secondary Education)

BIOLOGY THEORY

Instructions

- Write your name, class and admission number in the space provided above.
- Write the date of the examination and sign in the space provided above.
- Answer *all* the questions in the spaces provided.
- You may be *penalized* for wrong spelling especially technical terms.

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1-29	80	

This paper consists of 12 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing

1. (a) State the contents of lysosomes.

(1 mark)

Lytic enzymes;

(b) State the functions of the contents named in (a) above.

(2 marks)

Destroy aged and unwanted cell organelles;

~~They~~ Breakdown Materials taken in by the cell eg. food substances and bacteria; sometimes destroy the entire cell.

2. What is cell specialization?

(1 mark)

The process by which newly formed cells undergo structural modification so as to perform specific functions.

3. It was found that during germination of bean seeds, 9.2 cm^3 of carbon IV Oxide was produced while 9.0 cm^3 of oxygen was used up.

(a) (i) Calculate the respiratory quotient of the reaction:-

(2 marks)

$$RQ = \frac{\text{Volume of Carbon(IV) Oxide Produced}}{\text{Volume of Oxygen Consumed}} = \frac{9.2 \text{ cm}^3}{9.0 \text{ cm}^3} = 1.022 \approx 1.0$$

(ii) Identify the substrate being metabolized.

(1 mark)

Carbohydrates;

(b) In which part of the cell does glycolysis occur?

(1 mark)

Cytoplasm;

4. How is the tracheal system adapted to its function

(3 marks)

- The spiracles are supplied with a muscular valve that controls ~~the~~ opening and closing; spiracles has hairs that help to prevent excessive loss of water from the body tissues by evaporation; The trachea consist of chitinous spiral bands that keep them open to allow gases to pass through;

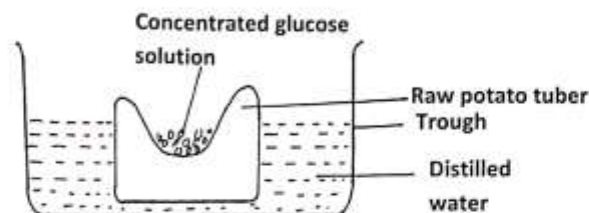
21 Page The tracheoles ramify the body tissues of the insect for direct supply to individual cells; Mokasa 2021

Tracheoles lack the spiral chitinous bands to permit gaseous exchange across their thin walls.

5. Name two sites where gaseous exchange takes place in terrestrial plants. (2marks)

Stomata;
Lenticels;

6. The experiment illustrated below was set up to investigate a certain physiological process using a raw potato tuber



(a) Suggest a possible physiological process that was being investigated. (1 mark)

Osmosis;

(b) Explain the results obtained in the above experiment after a few hours (3 marks)

The glucose solution increased while the volume of distilled water in the trough decrease; This is because of a concentration gradient that exist between the glucose solution and distilled water; and water moved to the glucose solution by osmosis;

(c) State the observations that would have been made if the experiment was repeated using boiled potato. (2 marks)

There will be no observable change; Since when the potato is boiled; the cell membrane is destroyed and osmosis will not take place;

7. State the end products of anaerobic respiration in: - (2marks)

(a) Animals

Lactic acid and energy;

(b) Plants

Ethanol, Carbon(IV) oxide and energy; *Rev. If not all are given.*

8. State two properties of the cell membrane (2marks)

Semi-permeability;

Sensitivity to changes in temperature and pH;

It is polarised; *Any 2.*

9. State two guidelines that should be followed when typing of scientific names (2marks)

They should be typed in italics;

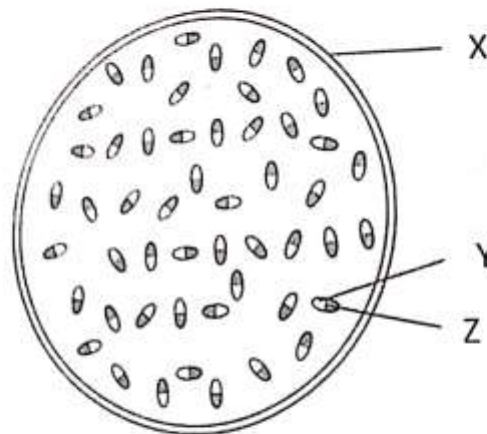
The first letter of the genus name should be typed in capital letter and the species name written in small letters. (2marks)

10. State two roles of luteinising hormones in female reproduction. (2marks)

Stimulates the maturation of the Graafian follicle;

Stimulates the remains of the Graafian follicle to form Corpus luteum; Stimulates the Corpus luteum to release prog

11. The diagram below shows a cross section of a plant stem.



(i) State the class of the plant from which the organ was obtained (1 mark)

Monocotyledonae;

(ii) Name the parts labeled X Y and Z (3 marks)

X Epidermis;

y Xylem ;

z Phloem ;

12. What are the causative agents for the following sexually transmitted diseases? (2marks)

(i) Gonorrhoea

..... Neisseria gonorrhoea ;

(ii) Syphilis

..... Treponema pallidum ;

13. (a) What is meant by the following terms as used in ecology : (2marks)

(i) Population

..... Refers to all members of a given species in a
..... particular habitat at a particular time ; eg :
..... population of lions in Tsavo National park in the
..... month of June.

(ii) Carrying capacity

..... Refers to the maximum number of organisms a given
..... area can comfortably support without depletion of
..... available resources ; eg. the maximum number of
..... cattle a paddock can hold without getting overgrazed.

(b) During an ecological visit to Maasai Mara students were able to see antelopes, lions, vultures, and pastoralists grazing their cattle. Construct a food chain with four consumer levels ending with the vulture to illustrate the energy flow in the ecosystem. (2marks)

Grass → Antelopes → Lion → Vulture ;
Acc. Any other Appropriate

14. Give **three** reasons why plants have not evolved complex excretory organs. (3marks)

Plant's ^{simple} physical activities leads to production of fewer wastes
plants produce less toxic wastes;
Use diffusion to excrete gases; and evaporation, transpiration
and guttation to eliminate water;
Store the waste products in organs which eventually fall off
together with the waste products;

15. State **one** adaptation of the xylem vessels to its functions. (1marks)

Deposition of lignin in the vessels to prevent them from collapsing;

16. State **three** factors that increases the rate of diffusion. (3 marks)

- Steep diffusion gradient; large surface area;
- Thinner Membranes; High surface area to volume
High Temperatures; ratio;

Any 3.

17 The diagram below represents a certain plant, study it and answer the questions that follow



(a) (i) Name the division to which the plant belongs

(1marks)

Bryophyta;

(ii) The plant only survives in wet areas. Give a reason (1 mark)

..... Their fertilization depends on the availability.....
..... of water:.....

(b) What is the function of part labeled A (1 mark)

..... Absorb water and dissolved mineral salts:.....

18. Give the roles of each of the following important excretory products in plants (3 marks)

(i) Quinine

..... Used in the manufacture of drugs to treat ailments.....
..... Such as Malaria.....

(ii) Colchicine

..... Induce polyploidism in plants:.....
..... Used in genetics in plant and animal breeding research:.....

(iii) Papain

..... Contains a proteolytic substance used in the food.....
..... industry as food tenderiser:.....

19. During a medical examination, a patient presented with the following symptoms; passing of large amounts of urine which when tested contained a lot of glucose.

(i) What hormone was deficient in the patient (1 mark)

..... Insulin:.....

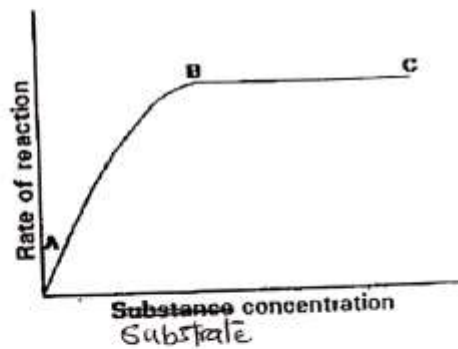
(ii) What disease was the patient suffering from (1 mark)

..... Diabetes Mellitus:.....

20. State **three** characteristic features used to classify members of phylum Arthropoda (3marks)

Jointed appendages; - Have bilateral symmetry;
Body covered by chitin;
Segmented body;

21. The graph below shows the effect of substrate concentration on the rate of enzyme reaction.



(a) Account for the shape of the graph between A and B

(2marks)

There is increasing substrate concentration; resulting
in an increased rate of enzymatic reaction;

(b) How can the rate of reaction be increased after point B?

(1mark)

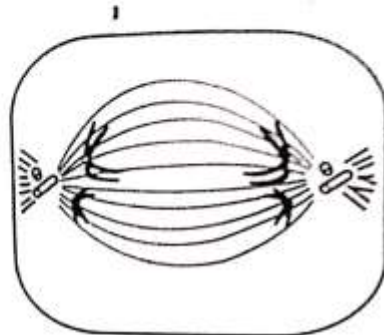
Increasing the ~~substrate~~ ^{enzyme} concentration;

(c) State one other factor that affects the rate of enzyme reaction.

(1mark)

Temperature; pH; Enzyme Co-factors and Co-enzymes
Enzyme inhibitors;

22. The diagram below shows stage during cell division.



(i) Identify the stage of cell division in the diagram above (1 mark)

Anaphase I;

(ii) Give reasons for your answer in (i) above (1 mark)

Homologous chromosomes separate and migrate to opposite poles with the centromeres leading;

(b) How are the spongy mesophyll cells adapted to their functions? (1 mark)

They are loosely arranged to create large air spaces providing spaces for gases to diffuse;

23. Name one cofactor and one co-enzyme required for a blood clotting process to be normal.

a) Co-factor - Calcium ions; KCl Ca^{2+} ; (1 mark)

b) co-enzyme - Vitamin K; (1 mark)

24. Define the following terms; (2 marks)

i) Taxonomy

The science of classification;

ii) Binomial nomenclature

Binomial nomenclature is a system of naming.

In which an organism is given a name composed of two parts; the first ~~part~~ ^{part} is the genus and the second is species.

25. In what ways do emotions affect the rate of breathing in humans

(2marks)

Emotions affect the production of hormone adrenaline; which increases the general metabolism hence increases the rate of breathing;

(1 mark)

26 (i) Define the term predation

A feeding relationship in which an organism (predator) kills another organism (prey) for food;

(ii) State three behavioral adaptations displayed by the prey to minimize predation (3mks)

Mimicing; for example the stick insect mimics a dry stick;

Confrontational display in porcupine;

Swift Movement to escape predators;

Camouflage; eg. in stripes of the zebra and spotted pattern of the giraffe.

27. Differentiate between the following terms:-

(2marks)

(i) Hypogynous flower and epigenous flower

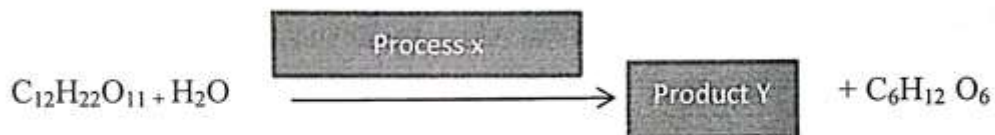
Hypogynous flower is a flower whose ^{Other} floral parts occur ~~at~~ ^{below} the ovary; while epigenous flower

is one in which the ovary is placed such that the other floral parts occur above the ovary;

(ii) Gamopetalous corolla and polypetalous corolla

Gamopetalous Corolla is one in which the petals are fused while polypetalous Corolla is one in which the petals are free;

Study the following chemical equation and answer the questions that follow



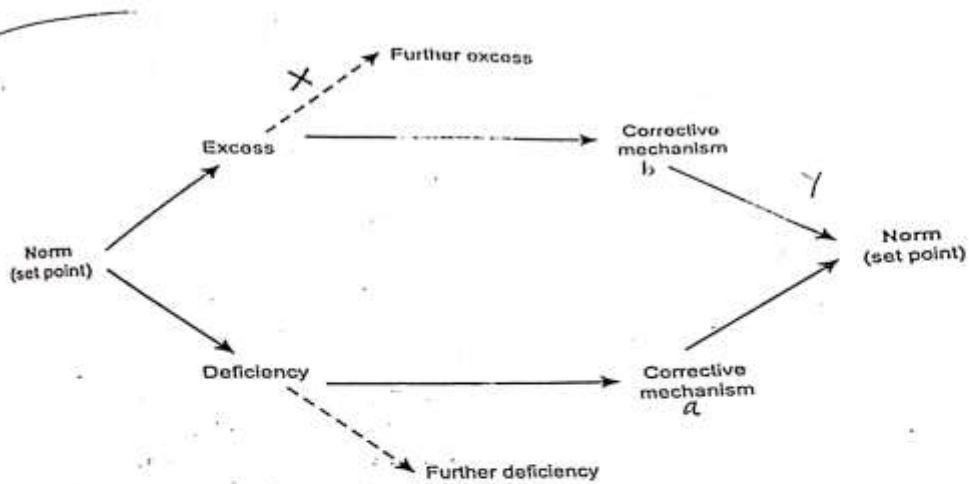
(i) Identify process x and the enzyme that catalyses the process (2mark)

Process - Hydrolysis; Enzyme - Hydrolyase;

(ii) Product Y (1mark)

Glucose;

9. Study the diagram below and answer the questions that follow



a) Name the mechanism labeled X

(1 mark)

..... *Positive feedback mechanism;*

c) If the above diagram represented temperature regulation.

(i) State ^{one} the corrective mechanisms carried out at a

(1 marks)

..... *No sweating / Hair raised / Blood kept from the surface / Increased metabolism; Any one.*

– (ii) The condition that may result from the further excess

(1 mark)

..... *Hyperthermia;*