Marking Scheme

231/1
Biology Theory.
Paper 1
May/June 2019
Time: 2 Hours

NABISTA JET 5

Biology Examinations
Kenya Certificate of Secondary Education (K.C.S.E) - 2019

Instructions to candidates

1. *Answer all questions in this paper in the spaces provided after each question.*
2. *This paper consists of 9 printed pages. candidates should check the question paper to ensure all pages are printed as indicated and that no questions are missing.*
3. *Candidates should answer the questions in English.*

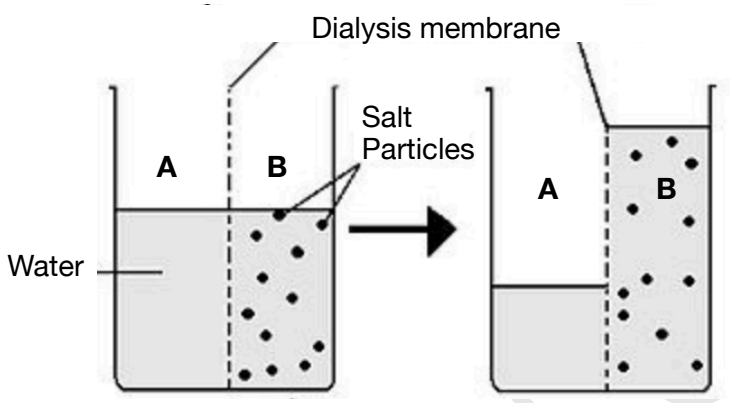
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

18	19	20	21	22	23	24	25	26	27

TOTAL

1. Study the illustration below.



a) Name the substance responsible for the change illustrated. (1 mark)

Water molecules;

b) Account for the change observed in the illustration. (2 marks)

Solution B is hypertonic (compared to A); water moves from A to B (increasing the volume of B);

2. a) Name a method that could be used to estimate the population size of the following organisms.

Fish in a pond. (1 mark)

Capture recapture/capture-recapture; rej. Capture and recapture

Black jack in a garden. (1 mark)

Quadrat;

b) Name the type of skeleton that makes up each of the following animals. (2 marks)

Centipede

Hydroskeleton;

Bird

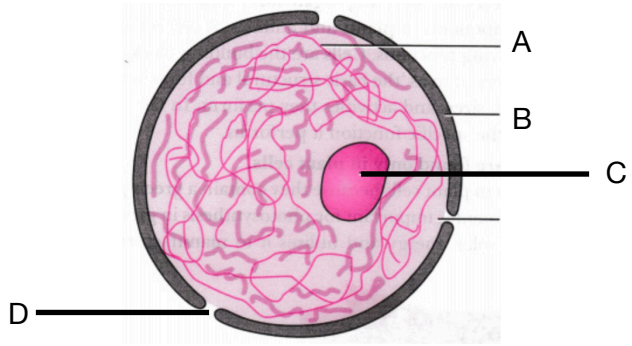
Endoskeleton;

3. State two characteristics of organisms that belong to the same species. (2 marks)

-they are hereditary distinct;

-they give rise to fertile offsprings;

4. The diagram below shows cell structures.



a) Name the structures labelled C and D (2 marks)

C **Nucleolus;** rej. Incorrect sp

D **Nuclear pore;**

b) State the functions of the structures; (2 marks)

A - **Carries the genetic material;**

B- **Regulates movement of substance into and out of the nucleus;**

5. a) Live specimens should always be returned to their habitats whenever possible. What is the biological significance of this practice? (1 mark)

Maintaining the ecological balance;

a) Why is a dissecting pin important in biological experiments? (1 mark)

Used to hold specimens into the dissecting board during dissection;

6. Mutations form basis for variations. Name the type of mutation that cause the following human disorders.

Albinism. (1 mark)

Gene substitution; rej substitution alone

Down's syndrome. (1 mark)

(Chromosome) non-disjunction;

7. A number of industries in Nairobi and Machakos counties have recently been found to direct their effluents into Nairobi river and river Athi respectively. State the effect of the following substances present in the industrial effluents.

a) Lead (2 marks)

- Can cause mental retardation in children;

- Can block the stomata of aquatic plants;

- Interferes with proper physiological functioning of body organs such as kidneys;

b) Oils (2 marks)

- Blocks light penetration hindering primary productivity;

- Clogs respiratory surfaces of aquatic animals;

- Reduces the amount of dissolved oxygen causing suffocation to aquatic animals;

8. a) During a field trip, plant that had flowers drew the attention of a student. Name the division of the plant (1 mark)

Spermaphyta;

b) Students observed an animal with the following features.

- Dorsoventrally flattened body
- One pair of legs per segment
- Poison claws on the head

i. Name the class to which the animal belongs. (1 mark)

Chilopoda;

ii. State the mode of feeding of the animal. (1 mark)

Carnivorous;

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

Glucose $\xrightarrow{\text{Process P}}$ Pyruvic acid + Energy

a) Name process **P**. (1 mark)

Glycolysis;

b) Name the part of a cell in which the process named in a) above occurs. (1 mark)

Cytoplasm;

10. For a long time, chloroquine was the most effective in the treatment of malaria. Explain why it is becoming more difficult to treat malaria using chloroquine? (4 marks)

Some plasmodium have gene for resistance/acquire resistance through mutation; the plasmodia with resistance gene survive; and reproduce offsprings with the resistance gene; leading to a strain of resistant plasmodia;

11. Account for the following observations.

a) When a fish is taken out of water, it dies. (2 marks)

The gill filaments clump together reducing the surface area for gaseous exchange; this causes suffocation of the fish;

b) The palisade cells are closely packed together. (1 mark)

To ensure maximum trapping of light;

12. Other than sugars name two compounds that are translocated in phloem. (2 marks)

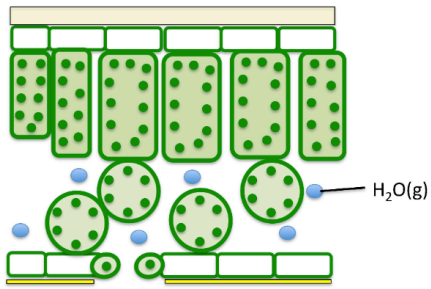
Proteins;

Lipids;

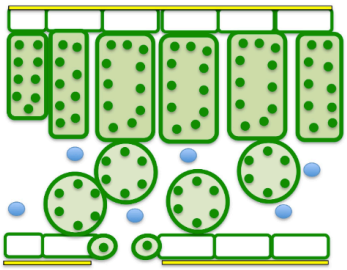
napista

13. The diagrams below shows leaves obtained obtained from plant A and C grown in the same habitat.

Leaf A



Leaf C



Identify the leaf that will lose the least amount of water. Justify your answer. (3 marks)

A;

It has a thick(er) cuticle; which increases the distance of diffusion lowering transpiration;

14. a) Name the chemical abundant in the mitochondria. (1 mark)

Adenosine triphosphate; rej ATP

b) Name the respiratory gas necessary for the synthesis of the chemical named in (a) above. (1 mark)

Oxygen;

15. State two differences between the products of mitotic division and those of meiotic division. (2 marks)

In mitosis 2 daughter cells formed, in meiosis 4 daughter cells formed;

In mitosis the daughter cells are diploid, in meiosis the daughter cells are haploid;

16. a) Give the significance of the following features of the red blood cells.
Being biconcave in shape. (1 mark)

Increases the surface area for gaseous exchange;

Lacking mitochondria. (1 mark)

Ensures the red blood cells do not utilise the oxygen they carry;

b) State two ways by which the leucocytes protect the human body against infections. (2 marks)

Phagocytosis;

Production of antibodies;

17. a) A person fell from the third floor of a building and had part of his brain damaged. Name the part of the brain damaged if the person suffers from the following.

Loss of speech (1mark)

Cerebrum;

Inability to regulate body temperature. (1mark)

Hypothalamus;

Lack of body balance. (1 mark)

Cerebellum;

18. Describe the changes that occur in the eye when a person enters a poorly lit room.

(3 marks)

Radial muscles of the iris contract; while the circular muscles relax; the pupil dilates/ enlarges;

19. a) Complete the table below. (2marks)

Hormone	Endocrine gland	Target organ
Insulin	**Pancreas;**	**Liver;**
Antidiuretic hormone	**Pituitary gland;**	**Kidney;** rej. nephron

b) Explain why glucose and proteins are absent in the urine of a healthy person. (2marks)

<u>All</u> glucose (actively) reabsorbed at the PCT; proteins are large molecules and do not filter out of the glomerulus;

20. (a) Name the gaseous exchange surface in cockroaches. (1mark)

Tracheole;

(b) How is the surface named in (a) above suited to its function. (3 marks)

Lacks chitin hence permeable to respiratory gases;

Thin walled to reduce the distance of diffusion of respiratory gases;

Has moist tips to dissolve respiratory gases;

rej numerous .....

21. In body cells of all organisms chromosomes occur in pairs. Members of each pair have a characteristic length and shape.
a) What is the scientific name of such a chromosome pair? (1 mark)

Homologous chromosomes;

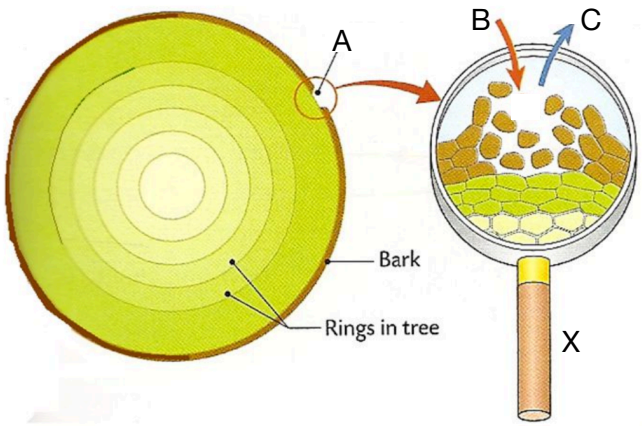
b) What name is given to a cell that contains one member of each pair of chromosomes? (1 mark)

Haploid;

c) Name the parts in humans where meiosis takes place (2 marks)

testis/testes; ovary/ovaries;

22. The diagram below shows a gaseous exchange structure in the stems of angiosperms.



Name;

a) Part labelled A. (1 mark)

Lenticel;

b) Apparatus X. (1 mark)

Hand lens;

c) Substances represented by arrows B and C. (2 marks)

B - **oxygen gas;** C- **Carbon (IV) oxide gas acc. Water vapour**

23. In what ways do muscle fibres of the biceps differ from those of the stomach? (3 marks)

Bicep muscles are striated;

Bicep muscle cells are multinucleated;

Bicep muscle cells are elongated;

Bicep muscles contract and fatigue rapidly;

24. Name;

The causative agent for tuberculosis in humans. (1 mark)

Mycobacterium tuberculosis; observe rules

The gaseous exchange structure in amoeba. (1 mark)

Cell membrane;

26. In an experiment, some germinating seeds were placed in a large air tight flask and left for 3 days.

a) What are the expected changes in composition of air inside the flask? (1 mark)

Increase in amount of CO_2 and decrease in amount of O_2 ;

b) Name the physiological process responsible for the changes mentioned in (a) above.

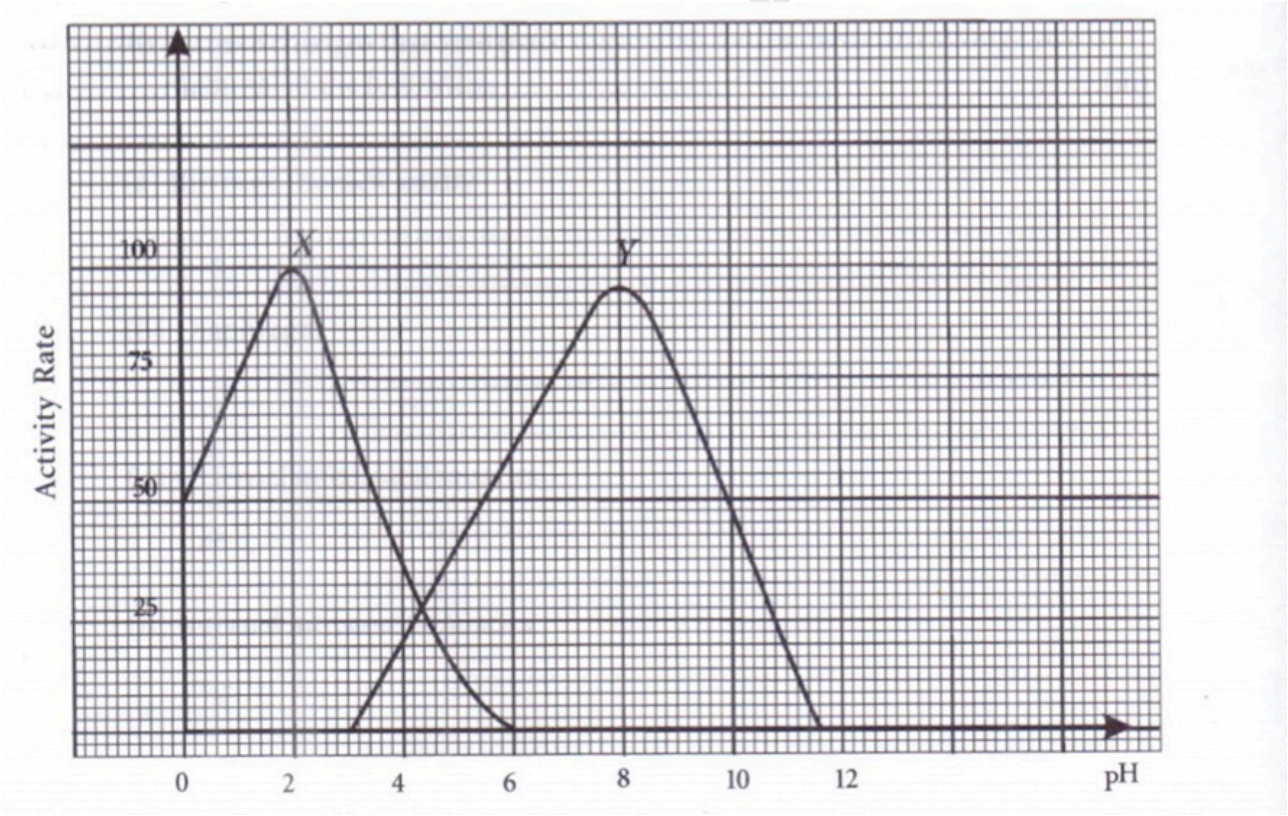
(1 mark)

Respiration;

c) Besides the change in composition of air, suggest one other possible observation that would occur inside the flask. (1 mark)

Increase in temperature;

27. The graphs below shows the effect of pH on the rate of activity of two digestive enzymes X and Y.



a) Name one protease enzyme that could be represented by X and Y (2marks)

X **pepsin; / rennin;** Y **- trypsin;**

b) How is an optimum pH for enzyme X attained in the human body? (2marks)

Secretion of gastric juice; containing hydrochloric acid to maintain acidic pH;