NAME……CLASS…….

INDEX NO……..DATE: ……..

ADM NO……....

231/1
BIOLOGY P1
THEORY
JUNE 2023
TIME: 2 HOURS

MARKING SCHEME.

KASSU JET EXAMINATIONS

Kenya Certificate of Secondary education
Biology Paper I
June 2023
2 Hours

Instructions

- Write your name, class and admission number in the space provided above.
- Write the date of the examination in the space provided above.
- Answer all the questions in the spaces provided.

For Examiner's use only

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1 - 27	**80**	

This paper consists of 11 printed pages.
Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.

1. One of the function of the nucleus is storage of hereditary material also known as gene.

   (a) what is a gene. (1mks)

   -Genetic make-up of a living organism; (hereditary factor)

   (b) State the three functions of DNA. (3mks)

   - Stores genetic information in coded form.

   - Transfers genetic information from parents-offspring's unchanged through replication

   - Translate genetic information in characteristics through protein synthesis.

2. State any two species of schistosoma that transmit bilharzia. (2mks)

   - *Schistosoma mansoni;*
   - *Schistosoma haematobum;*
   - *Schistosoma japonicum;*

3. a) State three importance of photosynthesis in nature. (3mks)

Photosynthesis converts radiant/solar energy into chemical energy used by living organisms;

It provides oxygen in atmosphere for all living organisms;

It maintains the balanced level of oxygen and carbon dioxide ecosystem;

b) How does nutrition differ in plants and animals? (1mk)

Plants are autrotrophs while animals are heterotrophs;

4. (a) Identify the organelle shown below (1mk)

Mitochondrion ; rej mitochondrioa

b. How is the organelle you have identified in **(a)** above suited to its function? (2mks)

Has cristae which increase the surface area for attachment of respiratory enzymes;
Has matrix which is fluid filled to provide medium for enzyme activities;

5. During a practical class, form four students estimated the field of view to be 3.5mm. Using the low power objective, they observed spirogyra cells across the same field of view and counted 8cells. Calculate the size of each cell and give your answer in micrometer. (3mks)

$$\text{cell length} = \frac{\text{Diameter of the field of view}}{\text{Number of cells}}$$

1mm = 1000 micrometer

3.5mm = ?

3.5x 1000 = 3500 micrometer

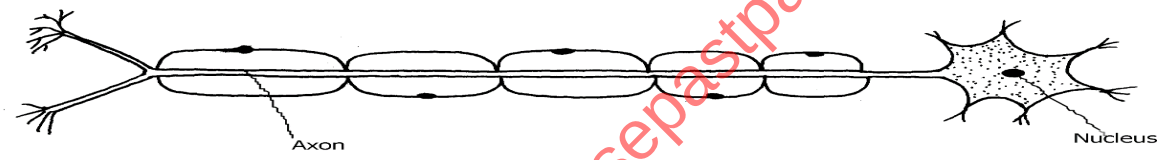
$$cell\ length = \frac{3500}{8}$$

=437.5µm

6. a) Explain what happens when a wilting plant is watered. (2 marks)

the plant cell sap gains water absorbed from the roots by osmosis; becomes turgid;

7. The diagram below represents a type of neurone.



(a) (i) identify the neuron above. (1 mark)

Motor neuron

(ii) Give a reason for your answer in a (i) above.

multipolar

(b) With an arrow, indicate on the diagram the direction of an impulse transmission through the neuron. (1 mark)

(c) Name the chemical substance that brings about transmission of impulse across a synapse

Acetylcholine (1mark)

8. The diagram below represent a mamarian jaw

(a) State the mode of feeding for the mammal. (1 mark)

herbivorous

b) Describe three adaptations for this mammal from jaw to its mode of feeding.(3 marks)

Has diastema for the frequent movement of the tongue when collecting vegetation;

have a long tongue for cutting and turning grass;

no upper incisors/ horny pad to press grass against it when cutting;

(c) Where are the following structures found along the mammalian digestive tract? (2 marks)

(i) Pyloric sphincter

End valve of stomach

(ii) Crypt of Lieberkuhn

Ileum

9. Explain how crops grown along roads can be a source of lead poisoning to human beings. (2 marks)

Crops absorb lead from car exhaust fuses; and pass it to animals and humans through/along the food chain;

10. State the characteristics that can separate the following organisms into respective classes; millipedes, tsetsefly and spider. (3marks)

Body parts;

Number of limbs

Body segments

11. The diagrams below show organs obtained from members of Angiospermatophyta

A B

To which classes do the plants from which the organs were obtained belong? (2marks)

B Dicotyledonae;

A Monocotyledonae;

a) Small insect-eating birds are feeding on the caterpillars and caterpilars are eating the leaves of a tree. A pair of sparrow hawks is hunting for small birds to feed their young.

(i) Represent the information on a food chain. (1 mark)

b) ways through which energy is lost in ecocystem (2marks)

excretion

defecation

12. Give two ways by which prey are adapted to escaping predators (2marks)

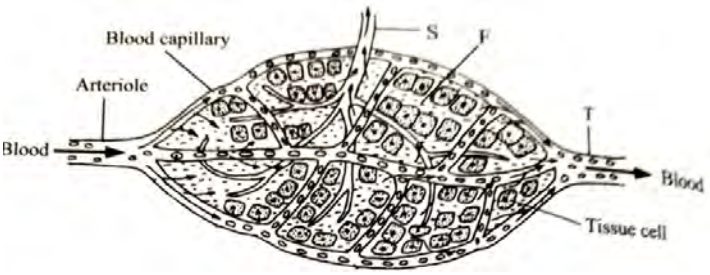
Ability to run fast;agility

Camouflage;

Staying and feeding in large numbers;

Confrontational display;

13. The diagram below shows the site where exchange of substances takes place in the mammalian circulation.



a) Name the vessel labelled **T** [1mark]

Venule

b) Name the fluid labelled **F** and state its importance [2marks]

Tissue fluid ; forms medium through which exchange of materials between blood and tissue cells takes place;

c) Explain the mechanism of formation of the liquid named in (b) above [3marks]

The pumping force from the heart together with the narrow lumens of capillaries exert a high pressure; that forces the fluid part of the blood to filter out of the capillary walls into intercellular space;. This occurs by ultra filtration/pressure filtration;

14. Briefly give clear explanations to the statements below. [2marks]

a) In mammals haemoglobin is confined to erythrocytes. Give two advantages of this

If haemoglobin were dissolved in plasma, osmotic pressure of blood would increase considerably ; (and this would interfere with other physiological processes)

If haemoglobin were dissolved in plasma, the viscosity of the blood would increase considerably;(this would require the heart to work much harder to pump blood throughout the body)

b) People living in high altitude areas have a higher erythrocyte count and more haemoglobin than people living in low altitudes. Suggest a reason for this adaptations

At high altitude, the partial pressure/concentration of oxygen is low; The high erythrocyte count and the a large amount of haemoglobin enhances the oxygen carrying capacity of their blood ;(ensuring that blood takes up sufficient oxygen in the lungs in spite of low partial pressure)

15. Color blindness is a sex-linked trait controlled by a recessive gene b if a mother is carrier and father is normal what is the chance that their son will be colour blind? Show your working. (4mks)

Parental phenotype	Normal colour vision man	Normal colour vision woman
Parental genotype	$X^B Y$	$X^B X^b$
Gametes	X^B Y	X^B X^b
F1 generation genotype	$X^B X^B$ $X^B X^b$	$X^B Y$ $X^b Y$

16. a) State the role of a generative cell during fertilization in flowering plants. (2mks)

divides mitotically to give rise to two male nuclei; one male gamete fuses with egg cell to form diploid zygote and the other fuses with polar nuclei to form primary endosperm;

b). State two differences between prophase and prophase I. (2mks)

prophase I there is chiasmata formation;

prophases I homologous chromosomes forms a bivalent;

17. Using the named parts of a flower in the table below. State the differences between insect pollinated flower and wind pollinated flower. (3marks)

Part	Insect pollinated	Wind pollinated
Pollen grain	*Large, heavy and rough*	*Light*
Stigma	*sticky*	*Feathery*
Anthers	*Small and firmly attached to filament*	*Large and loosely attached*

18. (a) Name the part of the eye in which the light sensitive cells are located. (1mark)

Retina

(b) List the **two** types of sensory cells found in the part named in (a) above (2 marks)

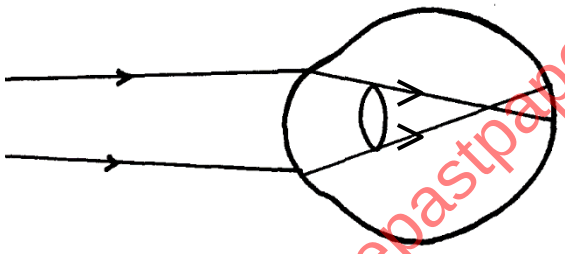
Rods

Cones

19. State the function of conjunctiva. (1 mark)

Protects the front part of cornea

20. The diagram below shows the position of an image formed in a defective eye:-



(a) Name the defect (1 mark)

Short-sightedness (myopia)

(b) How can the defect be corrected. (1 mark)

By wearing concave (converging lenses)

21. Name the disorder characterized by the following. (2marks)

(a) Having extra somatic chromosome

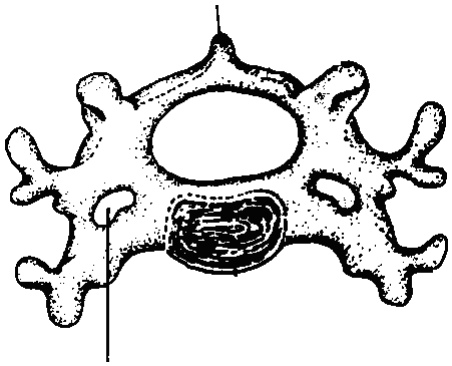
Down's syndrome

(b) Missing one of the sex chromosome

Turner's syndrome

22. Study the figure below then answer questions that follow.

B



(a) Identify the bone on the diagram above. (1mk)

Cervical vertebra

(b) Name the part labelled **A** and **B.** (2mks)

A *Vertebraterial canal*

B *Neural spine*

23. Name the type of joints found in the following regions. (2 marks)

(a) The anterior end of atlas.

Pivot joint/ Hinge joint

(b) The articulation of glenoid cavity and head of humerus bone.

Ball and socket

24. A boy who is learning how to swim in sea water accidentally drinks a lot of sea water. Explain the effect this will have on his kidneys. (3mks)

– Salt from sea water is absorbed into blood stream which rises the osmotic pressure above normal level;
- The increase is delected by osmoreceptors in hypothalamus which in turn send impulses to pituitary gland;
- Pituitary gland will produce more antidiuretic hormone;
- Antidiuretic hormone increase permeability of water which lowers the osmotic level;

25. (a)Name the fluid that is produced by sebaceous glands. (1mk)

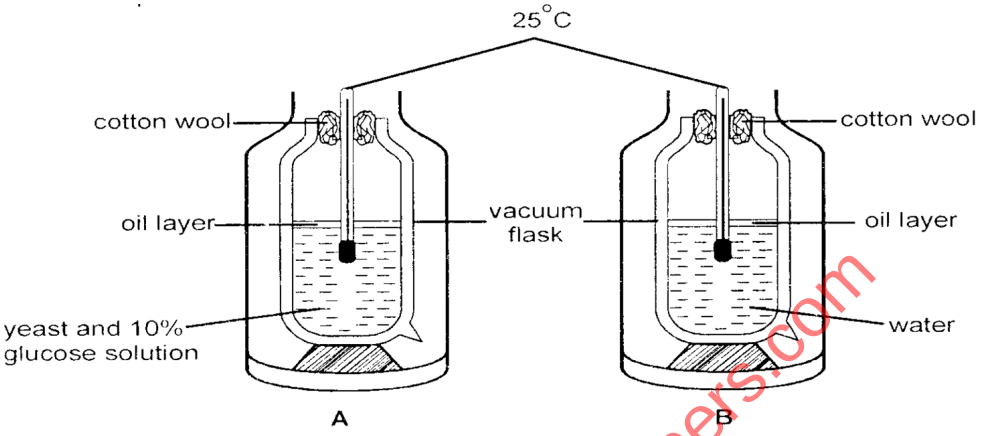
Sebum

(b) State **two** functions of sweat on the human body. (2mks)

-Cools the body.

-Getting rid of waste/excretion/removal of lactic acid/removal of excess salts/removal of excess water.

26. Two flasks were set up as shown below.



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

To investigate anaerobic respiration

b) Explain why the vacuum flasks were used instead of conical flasks. (1mark)

To conserve the heat energy that is produced

c) What is expected of the thermometer reading after 2 hours in A? (2marks)

The temperature rise in the thermometer;as yeast cells respire using glucose to release heat energy that raises the temperature

27. Explain what happens when there is oxygen debt in human muscles (2mks)

Muscles respire anaerobically, resulting in accumulation of lactic acid in the tissues, causing fatigue/muscle crumps; the rate of breathing and heartbeat increases; toxic lactic acid is broken down into carbon (IV)oxide and energy in the muscle or transported to liver and converted to glycogen for storage;