MARANDA HIGH SCHOOL

Kenya Certificate Of Secondary Education

THE 2024 MOCK EXAMINATION

231/1 **BIOLOGY** **PAPER 1**

June, 2024 **TIME: 2 Hrs**

Name: .....Admission No: .....

Stream: ..... Signature: .....

231/1- BIOLOGY
Monday, 6th June, 2024
Afternoon
2.00-4.30pm

Instructions

(a) *Write your* ***name, admission number, date, stream and signature*** *in the spaces provided above.*

(b) *All answers must be written in the spaces provided in the booklet.*

(c) ***This paper consists of 12 printed pages with 32 questions. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing***

(d) *Candidate should answer the questions in* ***English***

FOR EXAMINERS'USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-32	80	

1. **(a)** Other than having many features in common, state another characteristic of species.

(1 mark)

Breed freely to produce fertile offsprings;

(b) State **two** characteristics of Kingdom Monera that are not found in other Kingdoms.

(2 marks)

Have a cell wall made of myrein;

Lack mitochandria;

Prokaryotic; / nucleus not bound by a cell membrane;

2. **(a)** Name the cell organelle found in abundance in white blood cells. (1 mark)

Lysosome;

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

Lysomes secrete lytic enzymes that destroy pathogens;

3. A tall, light skinned lady with pimples on her face has long hair and limbs.

(a) List **two** characteristics which the lady has that are due to inheritance (2 marks)

Tall; acc. height

Light skin; acc. skin colour.

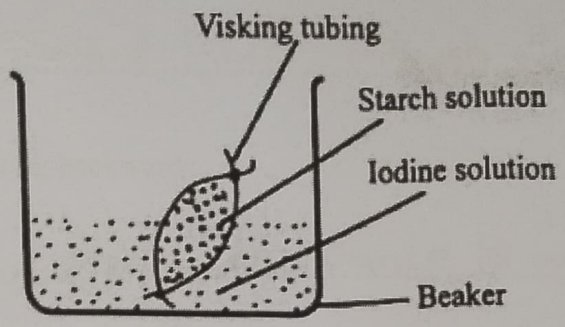
(b) Explain why most recessive genes expressed phenotypically are found in male offspring in humans. (2 marks)

Males are ~~homozy~~ heterogametic (have one X chromosome) hence require only one recessive gene on the X-chromosome to be affected;

4. How is the sebaceous gland in the human skin adapted to its function? (2 marks)

Secretes sebum; that make the skin supple;

5. An experiment was set up as shown in the diagram below.



(a) At the end of the experiment it was observed that the starch turned Blue-black while the colour of iodine solution in the beaker did not change. Account for this observation.

(3 marks)

The wall of the visking tubing is semi-permeable; it allows small iodine molecules to pass through from the beaker which reacts with the starch in the visking tubing forming a blue-black colour. Starch molecules are larger; cannot pass through the small pores;

6. **(a)** Name the cartilage found between the bones of vertebral column. (1 mark)

Intervertebral disc;

(b) State the function of the cartilage named in **(a)** above. (1 mark)

Gives flexibility to the vertebral column;
Absorb shock;
Reduces friction between the vertebrae;

7. Explain why low blood sugar level is harmful to the health of a human being. (2 marks)

Less glucose available for respiration; less energy for metabolism;

8. **(a).** Give reasons for the following:

i. The head of the fish is inflexible. (1 mark)

Ensures forward thrust through water;

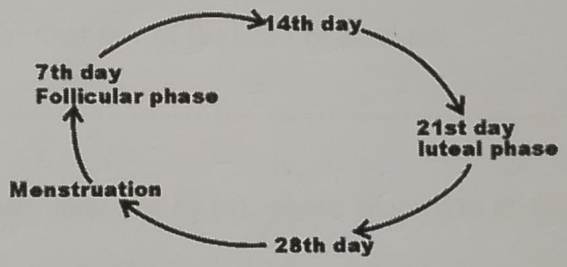
ii. Scales overlap facing backwards. (1 mark)

Reduce friction; resistance to water;

(b) Name the type of fins that prevent pitching in a tilapia fish. (1 mark)

Pectoral
Pelvic

9. The illustration below shows a summary of the main phases of the human menstrual cycle.



(a) Name the process that takes place around the 14th day. (1 mark)

Ovulation;

(b) Name **two** hormones produced at the follicular phase. (2 marks)

Follicle stimulating Hormone;
Luteinizing hormone;
Oestrogen;

(c) Under which **two** conditions would the cycle be interrupted? (2 marks)

Menopause;
Pregnancy;
Sickness;
Emotional instability (anger, stress, anxiety);
Drastic environmental or weather changes;

10. Distinguish between dioecism and monoecism conditions in flowering plants. (2 marks)

Dioecism is a condition in which a plant has either male or female parts only; Monoecism is a condition in which a plant has both male and female parts; ~~on the~~ (O.W.T.E)

11. (a) What is the end product of respiration in animals that is not found in plants when there is insufficient oxygen supply? (1 mark)

Lactic acid;

(b) What is glycolysis? (1 mark)

Breakdown of glucose in absence of oxygen to form pyruvic acid/ pyruvate;

12. (a). Name the opening to the chamber of the heart of an insect. (1 mark)

Ostium;

(b). Explain how the structure named in **12 (a).** above adapted to its function. (2 marks)

Has valves; to prevent back flow of haemolymph;

rej: blood;

13. Name **two** nutrients that are absorbed without being digested by enzymes the alimentary canals of humans. (2 marks)

Vitamins;

Water;

Mineral ions;

14. Other than transport, state **two** functions of blood plasma. (2 marks)

Regulation of body temperature;

Regulation of pH of body fluids;

Defence against infections;

15. If anti **B** serum was added into two blood samples, agglutination occurred. Name **two** possible blood groups of the samples. (2 marks)

(Blood group) B;

(Blood group) O;

16. State the function of the following parts of the ear.

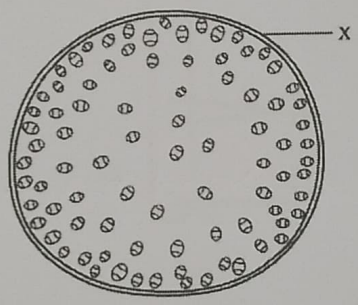
(a). Oval window. (1 mark)

Transmits sound vibrations from the ear ossicles;

(b). Semi-circular canals. (1 mark)

Maintenance of balance (in relation to movement of the head);

17. The diagram below is a transverse section of a plant organ.



(a) Name the plant organ from which the section was obtained. (1 mark)

Stem;

(b) Name the class to which the organism from which section was obtained belongs. (1 mark)

Monocotyledonae;

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

Vascular bundles are randomly scattered in the cortex;

18. Give **two** roles of ethene hormone in plants. (2 marks)

Promote; Ripening of fruits

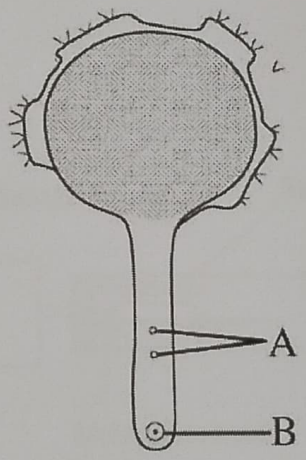
Falling of the fruit and leaves (stimulate formation of abscission layer)

Thickening of stems;

19. Explain how convergent evolution occurs. (3 marks)

Structures of different organisms with different embryonic origin; evolve over time to perform same functions as a result of occupying same ecological niche/habitat;

20. The diagram below illustrates a growing pollen tube.



(a) Name the part labeled **B.** (1 mark)

Tube nucleus;

(b) Explain the role of the part labeled **A.** (2 marks)

One male nucleus fuses with functional egg to form a diploid zygote; another male nucleus fuses with polar nuclei to form a triploid nucleus / primary endosperm;

21. (a) Give a reason why the image is **not** formed when light is focused on the blind spot. (1 mark)

There are no photoreceptors / cones and rods in the blind spot;

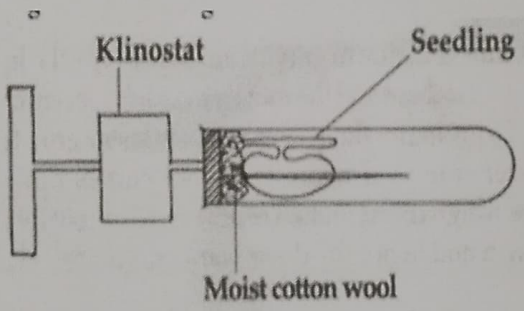
(b) When reading a book, the letters looked directly are clear and sharp whereas the surrounding letters are blurred. Explain. (2 marks)

Images from the letters looked directly are focused on the Fovea centralis that has high concentration of cones; while those from the neighbouring letters are focused at the periphery of the retina with high conc. of rods;

22. Distinguish between Parthenogenesis and Parthenocarpy. (2 mark)

Parthenogenesis is a process by which an egg develops into an organism without fertilization while parthenocarey is the process by which the ovary develops into a fruit without fertilization;

23. The diagram below shows a bean seedling pinned in a horizontal position inside a klinostat.



(a) State the role of a klinostat in tropism. (1 mark)

Nullifies the effect of a unidirectional stimuli;

(b) What observation would be made if the klinostat was rotating. (1 mark)

Seedling radicle and plumule continue to grow horizontally;

24. Name **two** glands that secrete hormones that control metamorphosis in insects. (2 marks)

Prothoracic;

Corpus allatum;

25. Distinguish between mutualism and commensalism. (1 mark)

Mutualism is an association between two organisms in which the organisms benefit from one another; Commensalism is an association in which one organism benefit entirely on another without causing injury to the organisms

26. Explain why flying birds and insects excrete their wastes in form of uric acid. (2 marks)

Less toxic and less water soluble; hence water conservation; They carry less water hence lighter for flight;

27. The table below shows the concentration in parts per million of sodium and iodide ions in sea water and cell sap of a plant.

	Sodium ions	Iodide ions
Sea water	200	22
Cell sap	35	487

(a) Which **one** of the two ions intake will be affected if the plant was sprayed by cyanide.

(1 marks)

Iodide;

(b) Explain your answer in (a) above. (2 marks)

Uptake of iodide ions is by active transport that require energy; ~~I~~ Cyanide inhibit respiration therefore no energy for active transport that therefore stops;

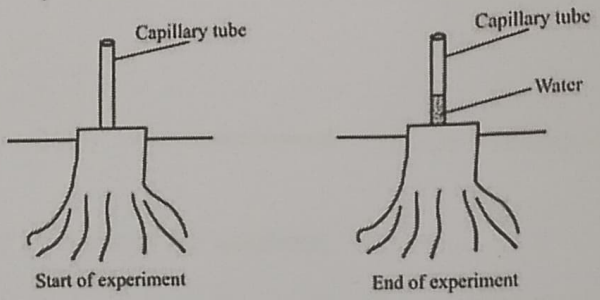
28. (a) 100 white and 100 black mice were released in an area inhabited by jackals. After six weeks, it was established that 80 black and 23 white mice had remained. Account for the above observation. (3 marks)

More black mice remained compared to white mice; black mice camouflaged against the background hence more protected, white were conspicuous hence easily spotted by jackals and predated upon;

(b) Name the evolution theory that supports this observation. (1 mark)

(Darwin's theory of) Natural selection;

29. In an experiment, the stem of a plant was cut above the soil surface and a thin, transparent tube inserted immediately as shown below.



(a) Account for the observation made at the end of the experiment. (2 marks)

Water is forced across the endodermis by used energy (active transport); this results to root pressure that forces water to rise up the capillary tube

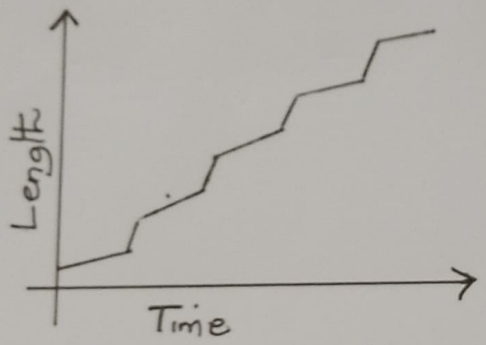
(b) Give one adaptation of phloem to its function. (1 mark)

- Has companion cells; that contain numerous mitochandria to yield energy for translocation;
- Has plasmodesmata for passage of energy between the companion cells and sieve tube elements;
- Perforated sieve plates for passage of cytoplasmic filaments;
- Numerous cytoplasmic filaments through which manufactured food is transported;

30. A student inserted a nail into the stem of a plant a 1 metre above the soil. 2 years late he noticed the plant had grown taller yet the nail was still 1 metre above the soil surface in the stem. Account for the observation. (2 marks)

Primary Growth; in plants takes place at root and shoot tips;

31. A locust moults 5 times before reaching adult size. Draw a graph of growth curve expected if the length of the locust is plotted against time. (2 marks)



34. The equation below represents a certain physiological process. Study it and answer the questions below.

$$C_{18}H_{36}O2 + 26O_2 \longrightarrow 18CO_2 + 18H_2O + ATP$$

(a) Calculate the respiratory quotient of the substrate. (2 marks)

Respiratory quotient = Volume of Carbon IV Oxide produced
Volume of Oxygen used/consumed

$= \frac{18}{26}$

$= 0.6923$ rej; 0.7

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