BIOLOGY
231/1
MOKASA 2019
MARKING SCHEME

- 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.

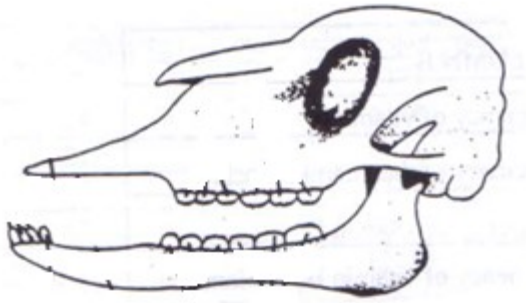
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Question	Maximum Score	Candidate's Score
1-31	80	

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. The figure below is a diagram of a skull. Use the diagram to answer questions.



(a) Identify the type of food utilized by an organism with such a skull.

(1 mark)

Grass/vegetation;

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

(1 mark)

Absence of upper incisors indicating presence of a horny pad against which grass is pressed for cutting;

A gap between lower canines and premolars, diastema, for manipulation of food;

2. (a) Explain why specimens important in studying biology.
(1 mark)

Proper study and understanding of living things in laboratory;

(b) Identify an apparatus that is effective in capturing:

(i) A scorpion.

(1 mark)

Pair of forceps;

(ii) Butterfly
(1 mark)

Sweep net;

3. (a) Identify an organelle that is most abundant in the proximal convoluted tubule. (1 mark)

Mitochondria; mitochondrion;

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

(1 mark)

Yield energy for active transport;

4. A student enclosed a leafy shoot using a transparent polythene bag, after 45 minutes clear droplets were observed on the walls of the polythene bag. Anhydrous cobalt (II) chloride paper was used to determine the identity of the clear droplets.

(a) Identify the process under investigation.
(1 mark)

Transpiration;

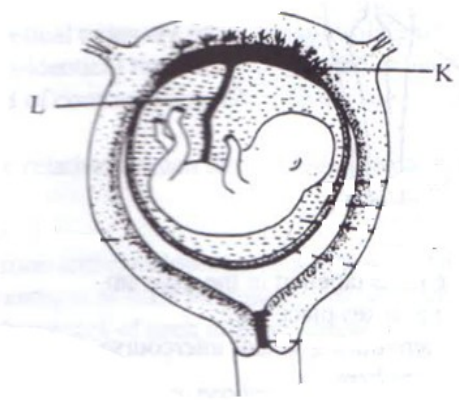
(b) State the expected colour changes of anhydrous cobalt (II) chloride paper.
(1 mark)

Blue to pink;

(c) Explain why the clear droplets cannot be observed when the leafy shoot is not enclosed in a polythene paper.
(1 mark)

Plants lose water in form of water vapour;

5. The figure below illustrates the relationship between a developing foetus and maternal tissues



(a) Give two roles of part labeled K.

(2 marks)

Exchange of substance between mother and foetus;

Production of hormones;

(b) Name a vessel in L that supplies nutrients and oxygen to the foetus.

(1 mark)

Umbilical vein;

6. Explain why deficiency of vitamin K leads to excessive bleeding even in small cuts. (2 marks)

Vitamin k is required for synthesis of prothrombin ; prothrombin is converted to thrombin that activates fibrinogen to fibrin;

7. Identify the parts of the mammalian heart that plays the following roles

(a) Prevents oxygenated blood from mixing with oxygenated blood.

(1 mark)

Septum;

(b) Secretes pericardial fluid.

(1 mark)

Pericardium;

(c) Prevents valves from turning inside out.
(1 mark)

Tendons ;

8. A flower was observed to be scented.
(a) Identify the phylum of living organisms that transfer pollen grains within the species of plants having the flower.
(1 mark)

Arthropoda

(b) Name a physiological process that aids the organisms in (a) above effect the transfer of pollen grains while giving a reason.
(2 marks)

Diffusion; scent diffuses from flower-region of high concentration to region of low concentration;

9. Explain why maize stalks do not undergo secondary growth yet they increase in girth. (3 marks)

Maize are monocots, no vascular cambium; responsible for secondary growth; increase in girth is due to enlargement of primary cells;

10. A food sample was made into suspension and a few drops of iodine was added into it. A blue black colour was obtained. A Benedict's test on the sample gave a

clear blue colour. Another sample of the same food was made into suspension. Some millet seeds which had been soaked for 48 hours were crushed and mixed with suspension. The mixture was incubated in warm water bath for six hours at 35^0c. After incubation, the sample gave a negative test with iodine and positive test with Benedict's solution.

(a) Explain why the iodine test was negative after incubation. (2 marks)

Starch is hydrolysed to reducing sugars; by enzymes present in the germinating seeds;

(b) Explain why it is necessary to incubate the mixture in warm water bath. (1 mark)

Optimum temperature;

11. Explain why rate of absorption of mineral salts reduce with less oxygen concentration. (2 marks)

Oxygen is required in the process of respiration; to yield energy for active transport;

12. Name the:

(i) Material that strengthens xylem tissue (1 mark)

Lignin;

(ii) Tissue that is removed when the bark of a dicotyledonous plant is ringed. (1 mark)

Phloem;

13. State two functions of a cell sap. (2 marks)

Maintain cell shape;

Contain sugars and salts hence cause osmotic pressure;

14. Below is an apparatus used estimate the population of organisms especially plants



(a) What is the name of the apparatus?
(1 mark)

Quadrat;

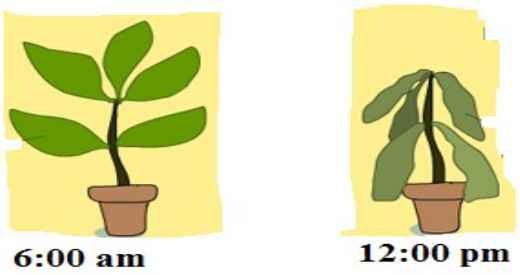
(b) Explain why the apparatus is not suitable for estimation of animal population. (1 mark)

Animals are highly mobile;

(c) State a one feature that can be used to identify the plants under enumeration above. (1 mark)

Flowers;

15. Below are photographs of plant taken at different times of the day.



(a) Give a term for used to describe the nature of cells obtained from the plant at;

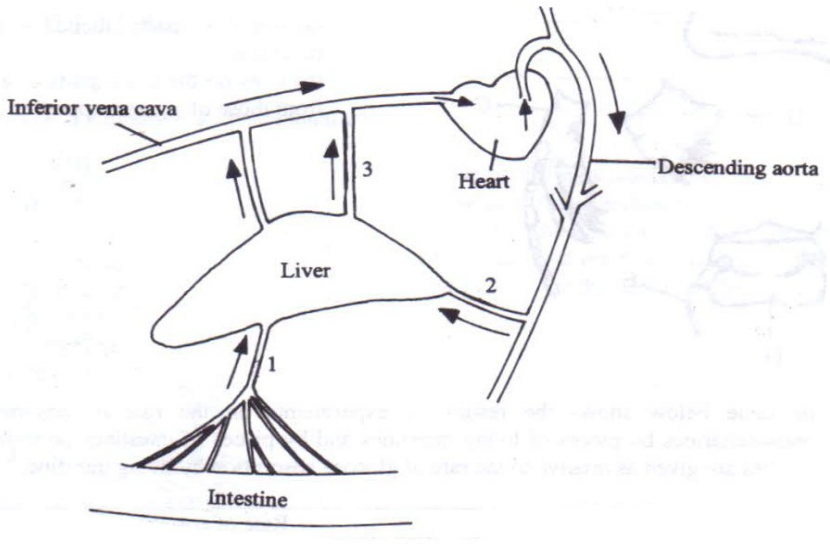
(i) 6:00 am **turgid;**
(1 mark)

(ii) 12:00 pm **flaccid:**
(1 mark)

(b) What is the significance of this phenomenon to herbaceous plants?
(1 mark)

Support; expose leaves for photosynthesis;

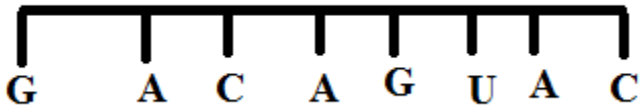
16. The figure below illustrates the blood supply and drainage of the liver



(a) In which of the vessels labeled 1, 2 and 3 would you expect the highest concentration of glucose after an overnight of fast? Give a reason. (3 marks)

3;stored glucose/glycogen; is broken down to glucose due to low glucose concentration by hormone glucagon;

17. The illustration below represents the base sequence of a segment of a nucleic acid.



(a) Which nucleic acid does the above segment represent? (1 mark)

mRNA

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

Presence of uracil;

(c) Name the part of the cell where the segment of nucleic acid is used. (1 mark)

Ribosome/cytoplasm;

18. Describe how the following structures lower the rate of transpiration;

(a) Sunken stomata. (2 marks)

Water vapour accumulates in the pits lowering saturation deficit;

(ii) Hairy leaf. (1 mark)

Hairy leaf traps a layer of moisture lowering saturation deficit;

19. Explain the following observation made by Gregory Mendel in his experiments, A cross between a pure breed tall plant and a pure breed dwarf

plant had all the first filial generation being tall. (2 marks)

Complete dominance; gene for tallness is dominant;

20. During an ecology field trip, students came across a pond with several bird species, upon closer look the students noted that the beaks of the birds were different in length, shape and size.

(a) Identify the type of evolution responsible for the beaks length, shape and size. (1 mark)

Divergent evolution;

(b) What is the significance of the phenomenon to the birds? (2 marks)

Allows organisms to exploit different ecological niches;eliminating competition;

21. (a) Explain why excessive use of pesticides in the soil lowers the concentration of nitrates. (2 marks)

Pestcides kill nitrogen fixing bacteria; that convert atmospheric nitrogen to nitrates;

(b) Explain why a total of 1000 animals that include; giraffes, elephants and zebras can occupy 10 acres of land without depletion of food and yet 1000 cattle

will deplete resources in the same piece of land. (1 mark)

Exploit different ecological niche; feed on different parts of vegetation unlike cattle;

22. Name two end products of anaerobic respiration in animals. (2 marks)

Energy; lactic acid ;/ Co2

23. Explain why the presence of air bubble in a xylem vessel would cause drying up of a plant (2 marks)

Breaks the cohesion force between water molecules; interrupting the continuous column of water;

24. (a) Identify a useful excretory plant product obtained from raw paw paw fruits. (1 mark)

Papain;

(b) Give the use of the plant excretory product named in (a) above. (1 mark)

Tenderize meat;

25. Name the method by which the following excretory products are removed from plants.

(i) Excess water. (1 mark)

Transpiration;

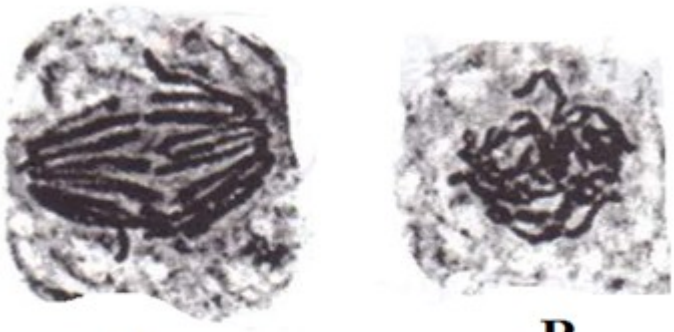
(ii) Carbon (IV) oxide from cellular respiration. (1 mark)

Diffusion;

26. In view of modern genetics, explain why the Lamarckian theory of evolution is not accepted. (2 marks)

Acquired characteristics; are not inherited in genes;

27. Below is a photograph on cell division.



Identify the stages labeled;

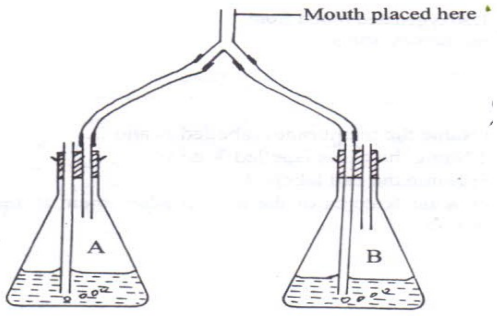
(a) A **anaphase;**

(1 mark)

(ii) B **interphase;**

(1 mark)

28. The diagram below illustrates an experiment to show that there is much more carbon (IV) oxide in exhaled air than inhaled air. Calcium hydroxide is used in both flask A and B.



(a) Explain why it is necessary to use calcium hydroxide solution and not water. (2 marks)

Calcium hydroxide reacts with CO2; to form a white precipitate;

(b) Identify the flask that shows higher presence of carbon (IV) oxide after five minutes. (1 mark)

B;

29. Explain why fertilization in flowering plants is termed double fertilization. (2 marks)

Egg cell fuses with one of the male nuclei to form a diploid zygote and the other male nuclei fuses with polar nuclei to form triploid endosperm;

30. (a) What are the roles of testes in the mammalian reproductive system?
(2 marks)

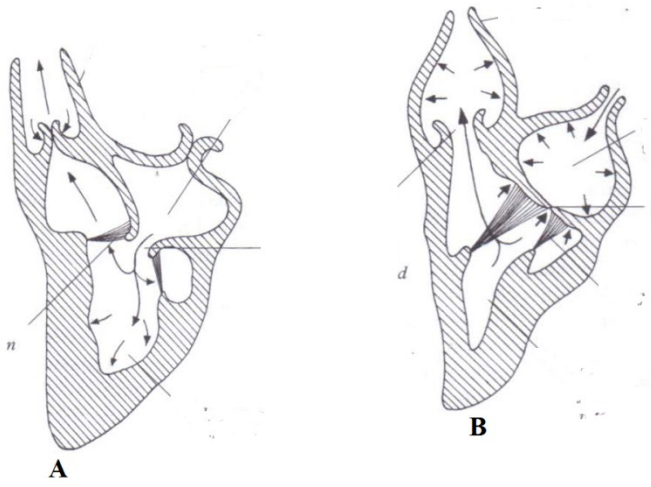
Produce sperms;

Production of hormones;

(b) Explain why female frogs produce large number of eggs.
(2 marks)

External Fertilization; to increase chances of fertilization;

31. The diagrams below represent a process of the heart that constitutes a heartbeat. Observe and answer questions that follow.



(a) Identify each of the process labeled;

(i) A **Diastole;**

(1 mark)

(ii) B **Systole;**

(1 mark)

(b) Give a reason for answers in (a)(i) above

(1 mark)

Volume of ventricles increase;/Cuspid valves open;/Semilunar valves close;