***INSTRUCTION TO CANDIDATES***

1. **Write your name and admission number in the spaces provided above.**
2. **Sign and write the date of the examination in the spaces provided.**
3. **Answer ALL the questions in this question paper.**
4. **Answers must be written in the spaces provided**
5. **This paper consists of 10 printed pages**.
6. **Candidates should check the question paper to ascertain that all the pages are printed as** **indicated and that no questions are missing.**
7. **Candidates should answer all the questions in English**.

**FOR EXAMINER’S USE ONLY.**

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| **QUESTION** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **SCORE** |  |  |  |  |  |  |  |  |  |

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| **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
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| **20** | **21** | **22** | **23** | **24** | **25** | **26** |
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Answer all the questions in the spaces provided.

1. State two characteristics of organisms that are easily observed in both animals and plants. (2 marks)

***-Growth and development;***

***-Reproduction;***

2. Fingerlings of fish were introduced to two different ponds. Those fingerlings in bond one all died within four days but the fingerlings in pond two survived.

Suggest the likely reasons why the fingerlings in pond one died. (3 marks)

***-Lack of food / algae;***

***-Presence of predators;***

***-Presence of disease causing microorganisms;***

***-Insufficient oxygen in water;***

3. A student observing a specimen through a microscope viewed a blurred image of the specimen. Suggest two possible reasons for this observation. (2 marks)

***-Diaphragm was not fully opened;***

***-Mirro did not reflect enough light;***

***-Objective lense not properly aligned;***

***-Fine adjustment knob not properly adjusted;***

4. State two processes that take place during anaphase of mitosis. (2 marks)

***-Centyromere split;***

***Chromatids pulled away towards the poles of the cell;***

5. Distinguish between convergent and divergent evolution. (1 mark)

***-Convergent evolution occurs when organisms with different ancestral origin develop analogous structures;***

***-Divergent evolution occur when organisms with common ancestral origin adapt along different lines;***

6. (a) Terrestrial insects such as locusts were captured and their blood was analysed. It was found that the blood does not have blood pigments such as haemoglobin. Explain. (2 marks)

***-Insect blood does not transport respiratory gases; hence does not contain haemoglobin;***

(b) State how the tracheal system in insects is adapted to gaseous exchange. (3 marks)

***-Numerous to increase surface area for diffusion of gases;***

***-Lack chitin to allow gases to diffuse;***

***-Have thin epithelial lining to shorten diffusion distance;***

7. State two functions of a diastema in herbivores. (2 marks)

***-Provide space for tongue to move food within the mouth;***

***-Enables the animal to separate newly cut vegetation/food from regurgitated food;***

8. The diagram below shows part of a starch molecule.

      

(a) Identify what the circles and the lines joining them represents. (2 marks)

 Circles ***Glucose / Monosaccharides;***

 Lines ***Glycosidic bond;***

(b) Draw how the structure will appear after the enzyme amylase has acted on the starch molecule and name the products. (2 marks)

Drawing: ;

Products -***Maltose;***

9. Explain two ways in which the chloroplast is adapted to photosynthesis. (2 marks)

***-Contains numerous chlorophyl pigments to trap light;***

***-Arranged near the upper epidermis to trap maximum light;***

***Has enzymes;***

10. The diagram shown below represent cells from a certain type of epithelial tissues in mammals.

 

(a) Name the part labeled V. (1 marks)

***-Cilia;***

(b) Identify the region of the mammalian body where the epithelial tissue maybe found. (1 mark)

***Trachea / Fallopian tube / Oviduct;***

(c) What is the role of the numerous mitochondria in the epithelial cells as shown above. (2 marks)

***-Provide / release energy; for movement of cilia / structure V:***

11. Explain what would happen to red blood cells if blood glucose concentration increased due failure of the secretion of insulin. (3 marks)

***-They loss water to plasma; by osmosis; and become creanated;***

12. State three biotic factors that could affect an antelope living in Masai Mara. (3 marks)

***-Competition; -Predator – prey relationships; -Diseases; -Parasitism;***

13. A drop of a person’s blood shows clumping in serum of blood group B but not in serum of blood group A.

(a) Identify the blood group of this person. (1 mark)

 ***-A;***

(b) Name the antibodies found in blood of the following groups. (2 marks)

(i) Blood group A ***b;***

(ii) Blood group AB ***None;***

14. list three methods used to show energy flow through the ecosystem. (3 marks)

***-Food chain;***

***-Foodweb;***

***-Ecological pyramids;***

15. Name three organelles that would be abundantly present in secretory cells. (3 marks)

***-Endoplasmic reticulum;***

***-Golgi apparatus;***

***-Mitochondria;***

16. Give three ways in which the red blood cell is adapted to transport oxygen? (3 marks)

***-Lack a nucleus and most organelles to provide more room for packaging of haemoglobin to transport oxygen;***

***-Biconcave to increase surface area for diffusion of oxygen into the red blood cells;***

***-Has numerous haemoglobin with high affinity for oxygen;***

17. Describe how the leaves of submerged plants are adapted to gaseous exchange. (3 marks)

***-Leaves lack a cuticle for gases to diffuse in and out;***

***-Leaves have large air spaces to store air for gaseous exchange;***

***-Leaves are thin to reduce distance for movement of gases;***

18. Name the part of the seed whose growth brings about epigeal germination. (1 mark)

 ***-Hypocotyl;***

19. State three aspects of light that affect the rate of photosynthesis. (3 marks)

***-Duration; -Quality; -Intensity;***

20. (a) Identify the class with organisms that have three body parts and three pairs of legs. (1 mark)

 ***-Insecta;***

(b) Suggest three reasons why members of the class named in (a) above are adapted to all types of habitats. (3 marks)

***-Show internal fertilization to increase chances of survival;***

***-Excreate uric acid hence can survive in any environment;***

***-Have a chitinous exoskeleton to protect them against water loss;***

21. (a) List three types of gene mutation. (3 marks)

***-Deletion; -Insertion; -Inversion; -Duplication; -Substitution;***

(b) (i) What are sex-linked genes? (1 mark)

***-Genes located on sex chromosome and are transmitted together with those that determine the sex of the individual;***

(ii) Name two conditions that are sex-linked. (2 marks)

***-Haemophilia; -Colour blindness; -Premature baldness; -Achondroplasia;***

22. (a) State any two rules of binomial nomenclature. (2 marks)

***-Organism is assigned a name with two parts,generic and specific parts;***

***-Name is italicised in print or underlined separately when hand written;***

(b) Define the term species. (2 marks)

***-A group of organisms that can naturally; interbreed to produce a fertile offspring;***

23. (a) Name two digestive enzymes produced in their inactive form. (2 marks)

***-Pepsin; -Trypsin;***

(b) Explain why the enzymes named in (a) above are produced in inactive form. (2 marks)

***-To prevent autolysis / digestion of cells producing it;***

***-To prevent digestion / breakdown of alimentary canal walls;***

24. (a) Define immunity. (1 mark)

***The ability of the body to resist infections;***

(b) Giving an example in each case, give two main types of immunity. (4 marks)

***Natural immunity; Examples – Antibodies in colostrum / antibodies from mother to foetus;***

***Artificial immunity; Examples – Introduction of antibodies against ………..;***

25. Identify three methods that cause fruit dispersal. (3 marks)

***-Wind dispersal; -Water dispersal; Animal dispersal;***

26. State three factors that increase the rate of traspiration. (3 marks)

***-High temperatures; -Low humidity; -High light intensity;***