

Name: ..... Adm No. ....

231/1

FORM 3-BIOLOGY

PAPER 1



KENYA CERTIFICATE OF SECONDARY EDUCATION

BIOLOGY PAPER1

TIME: 2 Hrs

TERM ONE 2022

Instructions to candidate

- Atika School
- Write your name and admission number in the spaces provided.
  - Answer all the questions in the spaces provided.
  - All working must be clearly shown where necessary.
  - Additional pages must not be inserted.

**For examiner use only**

| Question | Maximum score | Candidates score |
|----------|---------------|------------------|
| 1 – 22   | 80            |                  |

1. (a) Name two structures found in a plant cell but are absent in animal cell. (2 marks)

(b) Name the organelle in which protein synthesis takes place. (1 mark)

2. State what would happen in each of the following:

(a) If a plant cell is placed in

(i) Strong salt solution. (1 mark)

(ii) Distilled water (1 mark)

(b) If a red blood cell is placed in:

(i) Strong salt solution (1 mark)

(ii) Distilled water(1 mark)

3. Name the most appropriate biological tool that an ecologist student can use for collecting:

(i) grasshoppers from grass (1 mark)

(ii) Ants from a tree trunk (1 mark)

4. *Mangifera indica* is the name given to a mango tree. What does each of the name represent?

Indica (1 mark)

*Mangifera* (1 mark)

(b) Name this method of identifying organisms. (1 mark)

5. (a) What do you understand by the term cell specialization as used in biology? (2 marks)

(b) Name any two specialized cells in plants and state how each is modified.

| Cell       | Modification | (4 marks) |
|------------|--------------|-----------|
| (i) _____  | _____        |           |
| (ii) _____ | _____        |           |

6. (a) Name a word that can be used in microscopy to describe the ability to see two structures which are close together as separate structures. (1 mark)

(b) State the functions of the following parts of a microscope

(i) Diaphragm (1 mark)

(ii) Condenser (1 mark)

7. (a) Name the sites where light and dark reactions of photosynthesis take place (2 marks)

Light stage \_\_\_\_\_

Dark stage \_\_\_\_\_

(b) Describe what happens during light stage of photosynthesis. (3 marks)

8. (a) The action of ptyalin stops at the stomach. Explain (1 mark)

(b) State a factor that denatures enzymes. (1 mark)

(c) Name two features that increase the surface area of small intestines. (2 marks)

9. (a) Identify two ways by which blood protects the human body. (2 marks)

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(b) (i) What prevents blood in veins from flowing backwards? (1 mark)

(ii) State the form in which oxygen is transported in blood. (1 mark)

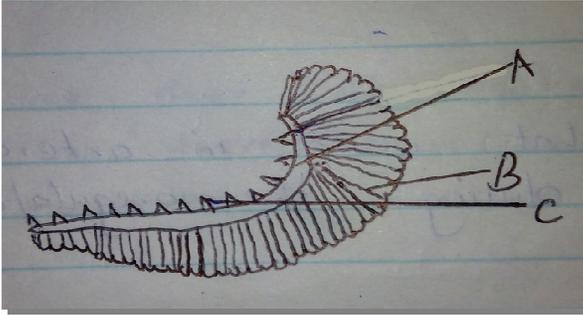
10. (a) State the form in which the root hairs are adapted to their functions. (2 marks)

(b) Name the tissues in plants responsible for:

(i) Transport of water and mineral salts. (1 mark)

(ii) Transport of carbohydrates (1 mark)

11. Study the diagram below and answer the questions that follow



(a) Label the structures labeled A, B, C, and D. (3 marks)

A

B

C

(b) State the functions of the structure labeled C. (1 mark)

12. (a) In man, aerobic breakdown of glucose yields 2880 KJ of energy whereas anaerobic breakdown yields 150KJ. Give an explanation to account for this difference. (2 marks)

(b) Differentiate between aerobic and anaerobic respiration. (2 marks)

13. State the changes that occur in arterioles in human skin during thermoregulation. (2marks)

14.(a) State the role of the carnassial teeth in a lion. (1 mark)

(b) An organism was found to have the dental formula  $i \frac{1}{1} c \frac{0}{0} pm \frac{3}{2} m \frac{4}{4}$

(i) Calculate the number of premolars in the upper jaw. (1 mark)

(ii) Giving a reason, suggest the mode of feeding of the organism. (2 marks)

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15.(a) State the role of the following in osmoregulation

(i) Hypothalamus (1 mark)

(ii) Pituitary gland (1 mark)

(b) What causes diabetes mellitus in man? (1 mark)

16.(a) Name three sites where gaseous exchange takes place in terrestrial plant (3 marks)

(b) Name the gaseous exchange surface in insects. (1 mark)

17. (a) State three factors that affect the rate of diffusion (3 marks)

(b) What does a semi-permeable membrane correspond to in an animal cell?  
(1 mark)

18.(a) What is the formula for calculating linear magnification of a specimen when using a hand lens? (1 mark)

(b) Give a reason why staining is necessary when preparing specimens for observation under the light microscope. (1 mark)

19.(a) State three external differences between chilopoda and diplopoda (3 marks)

(b) Name the taxonomic unit that comes immediately after a phylum in classification. (1 mark)

20. The diagram below shows the complete classification of lion, tiger, fruit fly and red fox

| Taxon   | Lion      | Wolf      | Tiger     | Fruit fly     | Red fox   |
|---------|-----------|-----------|-----------|---------------|-----------|
| Phylum  | Chordata  | Chordata  | Chordata  | Athropoda     | Chordata  |
| Class   | Mammalia  | Mammalia  | Mammalia  | Insecta       | Mammalia  |
| Order   | Carnivora | Carnivora | Carnivora | Diptera       | Carnivora |
| Family  | Felidae   | Canidae   | Felidae   | Drosophilidae | Canidae   |
| Genus   | Panthera  | Canis     | Panthera  | Drosophila    | Vulpes    |
| Species | leo       | lupus     | tigris    | melanogaster  | vulpes    |

(a) Identify one organism which is not related to the others. Give a reason for your answer in (a) above (1 mark)

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(b) Which organism is most closely related to the wolf? Give a reason for your answer. (1 mark)

(c) Which organism would you expect to have more common features with the lion? Give a reason for your answer? (1 mark)

21. (a) Give a reason why two species in an ecosystem cannot occupy the same niche. (1 mark)

(b) Distinguish between a community and a population. (1 mark)

22.(a) Distinguish between interspecific and intraspecific competition. (2 marks)

(b) Distinguish between carrying capacity and biomass. (2 marks)

(c) (i) Which instrument is used to measure the light intensity? (1 mark)

(ii) Name the equipment used to measure atmospheric pressure

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