

# MARKING SCHEME

231/1

BIOLOGY

PAPER 1

THEORY

## LAIKIPIA EAST TERM 2 2022 FORM 4 EVALUATION EXAM *Kenya Certificate of Secondary Education – K.C.S.E*

1. Give the structure of the cell that perform the following function:- (2Mks)
  - a) Regulate exchange of substances in and out of the nucleus
    - ❖ Nuclear membrane,    **Rej cell membrane.**
  - b) Synthesis of ribosomes :-
    - ❖ Nucleolus
2. State the functions of the followings apparatus in collecting and observing specimens (3Mks)
  - a) Pooter
  - b) pair of forceps
  - c) bait trap
3. Define the term resolution (1Mk)
  - ❖ Ability of a microscope to distinguish between two close points as distinct entities
4. Explain the absence of the following components in urine of a healthy person (2Mks)
  - i) Glucose
    - ❖ All glucose are actively reabsorbed in the blood stream
  - ii) Plasma proteins
    - ❖ Have large molecules size hence not filtered through small pores of the capillary walls of glomerulus
5. Differentiate between primary and secondary growth (2Mks)

❖ **Primary growth occurs at the tip of the roots and shoots due to the activity of apical meristems resulting in increase in height. While secondary growth increase width/ girth due to activity of cambium meristem.**

6. a) Give a reason why lack of roughage in diet often leads to constipation. (1Mks)

❖ **Lack of roughage results in slow movement of food**

b) Two fat soluble vitamins manufactured by human body: 2mks  
**Vitamin D, K,**

7.a) State the role of the following bacteria in the nitrogen cycle (3Mks)

i) Rhizobium bacteria: **Convert nitrogen gas into nitrates**

ii) Nitrosomonas : **Convert ammonia to nitrites**

iii) Nitrobacter : **Convert nitrites to nitrates**

8. a) What is the function of carnassials teeth. 1mk

❖ **Slice flesh**

❖ **Crush bones**

b) canines are long, conical shaped and sharp to grip and pierce prey 1mk or

**incisors are well developed, chisel shaped and closely fitted to seize prey and strip off flesh from bones.**

9. List the changes that take place during inhalation in the breathing cycle of mammal in the following (2Mks)

a) Ribcage :-

❖ **Moves upwards and outwards**

b) Diaphragm :-

❖ **Flattens**

10.a) What is metamorphosis (1Mk)

❖ **Changes in the body form during the life cycle of animal**

b) What is the biological importance of the larval stage during metamorphosis (2Mks)

❖ **There is vigorous feeding; hence the insect obtains enough nutrients; rapid cell division for growth**

11.a) i) C

ii) A 3mks

iii) B mark letters not names

b) the narrow lumens of capillaries that exert a high pressure that forces the fluid part of the blood to filter out of the capillary walls. 1mk

12. Name the causative agent of the following diseases in man (2Mks)

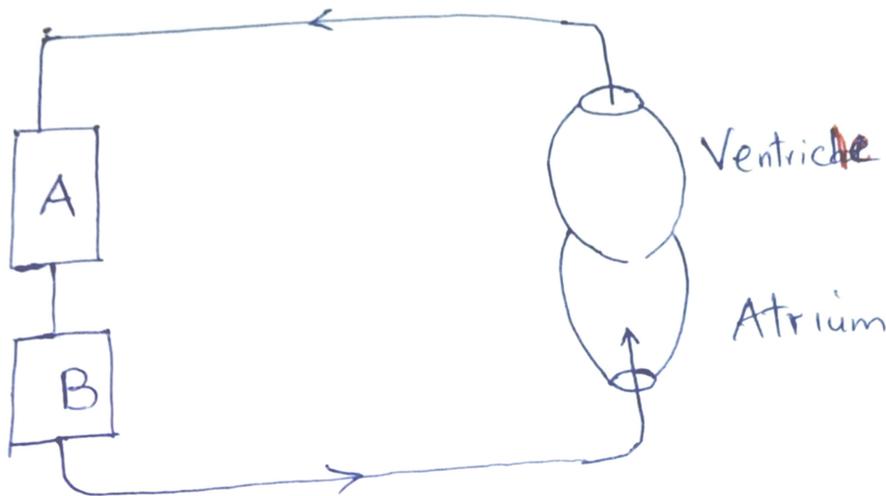
a) Candidiasis :-

❖ Candida albicans

b) Syphilis:-

❖ Treponema pallidum

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



a. i) Identify the type of circulatory system shown above (1Mk)

❖ **Single circulatory systems**

ii) Give a reason for your answer in (a) (i) (1Mk)

❖ **Blood flows through the heart once in a complete circulation**

ii) Give a disadvantage of this type of circulation (2Mk)

❖ **Blood flows under low pressure ; making circulation slow hence the animals are less active;**

14. Give a reason for each of the following biological phenomena (2Mks)

a) A mature plant cell does not lose its shape after losing water

❖ **Has a cell wall which gives a plant a regular shape**

b) Amoeba will not burst when placed in a hypotonic solution

❖ **Has a contractile vacuole for excretion of excess water.**

15. Mention two differences between pollen grains of wind and insect pollinated flower

(2Mks)

<b>Wind</b>	<b>Insect</b>
<b>small</b>	<b>Large</b>
<b>Light</b>	<b>Heavy</b>
<b>Smooth</b>	<b>Rough/sticky</b>
<b>Numerous</b>	<b>Few</b>

16. State the functions of the following structures in human reproductive system (3Mks)

- ❖ Seminiferous tubules :- **Produce sperms**
- ❖ Interstitial cells:- **Produces androgen / testosterone**
- ❖ Epididymis: - **Store sperms**

17. The following are text messages on a cell phone that represent gene mutation

Intended message

Actual message

A- Buyme a coat

Buyme a goat

B- John is paying

John is praying

a) Identify the type of gene mutation that is represented in each case (2Mks)

- ❖ **A – Substitution**
- ❖ **B – Insertion**

b) Identify any two disorder arising due to gene mutation in humans (2Mks)

- ❖ **Albinism**
- ❖ **Sickle cell anaemia**
- ❖ **Haemophilia**
- ❖ **Colour blindness**

18.a)role of enzyme produced by R.2MKS

i)**Neutralizes heparin (anticoagulating factor)**

ii)**Activates conversion of prothrombin to thrombin:**

**OR Initiates clotting process.**

b)**Granulocytes:They attack and engulf pathogens ,digest and destroy them.1mk**

19.Characteristic features of bryophytes

- ❖ **Absence of vascular bundles**
- ❖ **Body parts not differentiated into roots, stem and leaves/ thalloid**

20. Explain why water logging of the soil may lead to death in plants. (2Mks)

❖ **When soil is water logged oxygen cannot diffuse into the root tissues hence no respiration**

21. A dog weighing 15.2kg requires 216kj while a mouse weighing 50g requires 2736kj per day.

Explain. (2Mks)

❖ **A mouse has high surface area to volume ratio and tends to lose heat faster. It requires more energy to replace.**

22. The equation below shows an oxidation reaction of food substance.



a) Determine respiratory quotient of the oxidation of food substance. (2Mks)

$$RQ = \frac{CO_2 \text{ produced}}{O_2 \text{ used up}} = \frac{102}{145}$$

$$RQ = 0.7$$

(b) Give two reasons why the above food substance is not the substrate. (2Mks)

❖ **Not very soluble in water**

❖ **Require more oxygen to oxidise**

23. a) plant organ. **Dicot root 1mk**

b) reason for the answer. 1mk **Presence of root hairs**

**xylem starshaped with phloem in between arms of xylem**

c) **K phloem L xylem 2mks**

24.. Below data was obtained in an ecosystem

Mango tree - 1

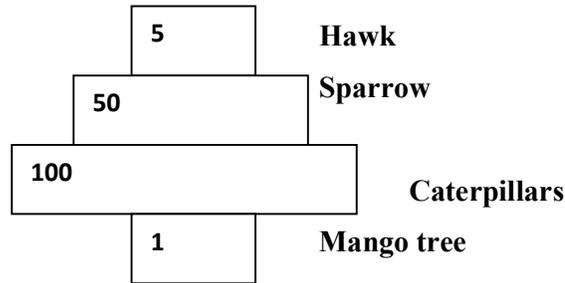
Caterpillars - 100

Sparrow - 50

Hawk – 5

a) Sketch a pyramid of numbers for this feeding relationship (2Mks)

b)



c) Identify the shape of the pyramid of number (1Mk)

❖ **Inverted pyramid of numbers**

25a) i) What are vestigial structure (1Mk)

❖ **Are structures that have ceased to be functional in some organisms and have over time reduce in size**

ii) Give two examples of vestigial structures in human (2Mks)

❖ **Appendix**

❖ **Coccyx**

❖ **Nictitating membrane**

**b) it is the emergence of complex life forms from preexisting simple life forms gradually over a long period of time.**

26 a) What are sex-linked genes.

**Genes located on sex chromosome and are transmitted along with those that determine sex.**

(1Mk)

b) Name two sex-linked traits in man (2Mks)

**colour blindness**

**Haemophilia**

**Hairy ears and nose**

**Premature baldness mark any two.**

27. The portion of nucleic acid molecule.

G-A-C-U-A-G-A-C-G

a) Type of nucleic acid shown above. 1mk

**RNA; b) reason : presence of Uracil; 1mk**

c) complimentary base sequence. **C-T-G-A-T-C-T-G-C 1mk**

28. State two roles of diffusion in human being.

(2Mkss)

- ❖ **Absorption of digested food materials into the blood stream**
- ❖ **Gaseous exchange.**
- ❖ **Excretion of nitrogenous waste**

29. Name two sites of gaseous exchange in frogs.

(2Mks)

- ❖ **Skin**
- ❖ **Mouth**

30. a )Carbon (iv)oxide fixation.

2mks

**Stroma**

b)Photolysis

**Granum**