NAME……..……..……ADM NO…….

CLASS……DATE……..…..SIGN…….

FORM FOUR EXAMINATIONS

BIOLOGY THEORY

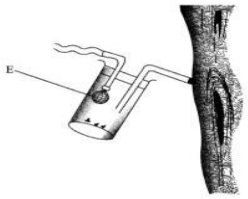
231/1

TIME: 2HRS

FORM FOUR END TERM 2, 2025

Biology pp1 marking scheme

1. Below is an illustration of a piece of apparatus strategically positioned to trap some organisms.



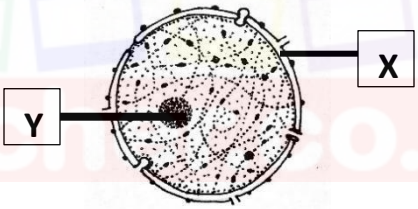
(a) Name the apparatus. (1mk)

- Pooter/Aspirator;

(b) State the function of the part labelled E. (1mk)

-To prevent dirt/insects from entering the suction tube/into the mouth.

2.The diagram shown below represents a common organelle



a)Name a Kingdom that: (2mks

i)Has structure X

ai) Animalia/Plantae/Protoctista/Fungi;

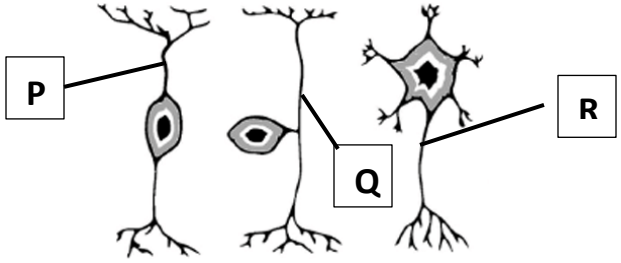
Lacks Structure X

ii) Monera

b)How is structure **Y** important in growth and development of organisms? (2mks

Forms Ribosomes; that undertake protein synthesis (to bring about growth and development of organisms);

3.Use the diagrams of nerve cells shown below to answer the questions that follow



a) Which letter represents a nerve cell that: (2mks

i) Has its cell body outside the grey matter of CNS

Q

ii) Transmits impulse to effector muscles

R;

b) Arrange the letters in sequence to show a reflex arc (1mk

Q, P, R;

4. How do sunken stomata reduce transpiration? (2 marks)

Water vapour accumulates in the depression of stomata; lowering water vapour concentration

gradient ;(leading to reduced rate of transpiration

5 .A dwarf garden pea plant was crossed with a tall garden pea plant and all the off springs were tall.

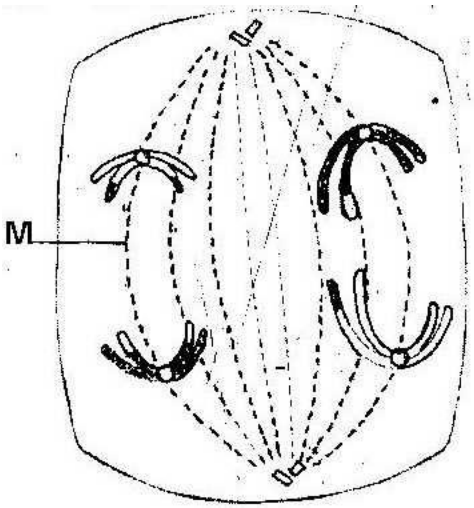
a)Why was there no dwarf offspring? (1mrk

Masked by the dominant gene/Gene for Tallness;

b)Write the genotype of the off-springs using letter d for the gene for dwarfness(1mrk

Dd

6. The diagram below represents a stage during cell division



(i) Identify the stage of cell division (1 mark)

Anaphase I

(ii) Give one reason for your answer (a) (i) above (1 marks)

- Homologous chromosomes separate at the equator.

- Chromosomes start migrating to opposite poles

- Sister chromatids attached at the centromere

(b) Name the structure labeled M (1 mark)

Spindle fibers.

7. Explain why all the energy produced by producers does not flow to the tertiary consumers. (2marks)

Because energy is lost between trophic levels; due to respiration; /excretion/urination; and defaecation

Some remains locked up indead bodies;

8. a) Name the part of chloroplast where light-independent reactions take place 1mk

Granum;

b)State the importance of light-dependent photosynthetic reactions to:

Animals (1mk

Supply Oxygen for Respiration;

ii)light-independent photosynthesis phase (2mks

Supply Hydrogen ions; Supply ATP/Adenosine Triphosphate/Energy;

9. Name the type of response shown by: (3mks)

a).Leaves of Mimosa pudica when they fold after being touched.

Nastic/ hyponasty / thigmonosty.

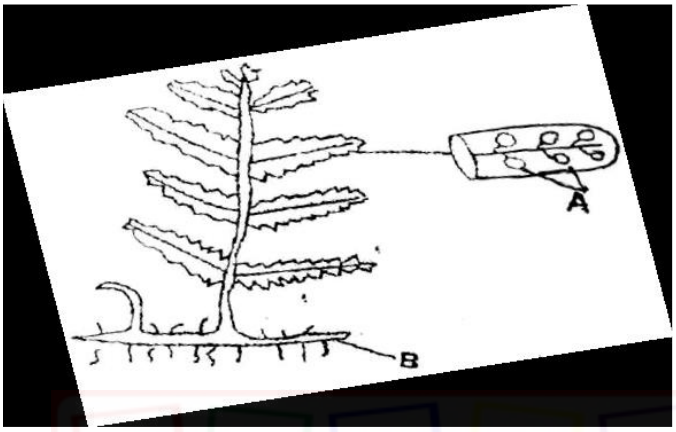
b) Sperms when they swim towards ovum.

Positive chemo taxis.

c) Euglena when they swim towards the source of light.

Positive photo taxis.

10. The diagram below represents a fern.



(a) Name parts labelled A and B. (2mks)

A – Sori

B – Rhizome

(b). In which division does the plant belong? (1mk)

- Pteridophyta

(c).State the function of the part labelled A. (1mk)

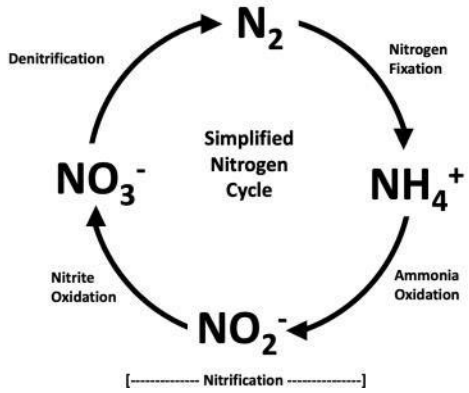
- Produce spores

11. Explain why some desert animals excrete uric acid rather than Water (2mks)

-Uric acid is less toxic than ammonia, hence elimination of uric acid requires less water than ammonia therefore more water conserved

-Uric acid being less toxic is safer to excrete where there is less water/desert.

12. The following is a simplified Nitrogen Cycle



a)Explain why denitrification is disadvantageous to plants (1mk

formation of nitrogen/nitrogen compounds that cannot be absorbed/utilized by plants;

b)Name the bacteria found at the following stages of the cycle (2mks

i) Nitrogen fixation

Azotobacter sp; Rhizobium sp; Clostridium Sp Mark 1st 1

ii) Nitrification

Nitrococcus sp; Nitrobacter sp; Nitrococcus sp Mark 1st 1

13. Identify the nucleic acid whose base sequence is shown below.

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

i) Identify the type of nucleic shown above (1mk)

RNA;

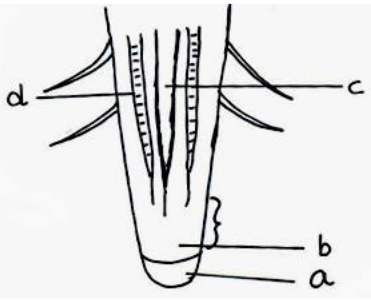
ii) Give reason for your answer in (i) above.(1mk)

Has the base Uraci;

ii) Write the base sequence of a DNA strand for the nucleic acid shown above (1mk)

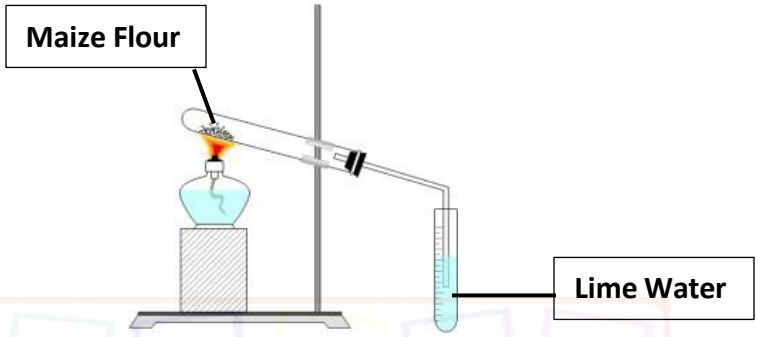
C-T-G-A-T-C-T-G-C ;

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



(i). Label parts: a, b and c (3 marks)

a -Root cap;
b - Apical meristem;
c - Xylem;
(ii) State function of part labelled **d**. (1mk)
Translocation;
15. Wanjiku placed little maize flour in a boiling tube and heat it for 6 minutes as shown below



a)What was the aim of the experiment? (1mk

Show that Carbon (IV) Oxide is released after oxidation of food substance/Investigate the gas formed when food substance is Oxidized;

b)State the expected observation in the lime water (1mk

White precipitate formed;

c)Explain the importance of the human body to continuously expel the investigated gas? (2mks

reacts with water leading to formation of carbonic acid/release of hydrogen ions; make body fluids acidic/low pH (which may denature enzymes/lower rate of physiological reactions)

16. Distinguish between diffusion and osmosis. (2 marks)

Diffusion	Osmosis
- Involves movement of particles of molecules of liquid or gas - It may be through a membrane or air. - Not affected by PH changes.	- Involves movement of solvent molecules - It takes place through a semi-permeable membrane. - Rate affected by pH changes.

17.(a) Name two types of light sensitive cells found in the human eye. (2mks)

Rods and cones;

(b) State ONE functional difference between the cells you have named in a) above. (1mk)

Rods: Cons

Perceives light of low intensity; - Perceives light of high intensity;
- Are not sensitive to color - Are sensitive to color;
- Have low visual acuity; - Have high visual acuity

18. . $5C_{51}\ H_{98}\ 0_6 + 145\ O_2 \rightarrow 102\ CO_2 + 98\ H_2O$.

The above equation shows an oxidation reaction of food substances.

i)What do you understand by the term respiratory quotient? (1mark)

RQ ratio of carbon dioxide produced to oxygen used during breakdown of a food substrate.

ii)Determine respiratory quotient of the oxidation of food substances. (1mark)

(b) R.Q = $\frac{CO_2 \text{ produced}}{O_2 \text{ used up}}$

RQ = $\frac{102}{145}$ = 0.7

iii)Identify the food substances. (1 mark)

(c) fat/lipid

19. Two populations of the same species of birds were separated over a long period of time by an ocean. Both populations initially fed on insects only but later it was observed that one population fed entirely on fruits and seeds although insects were available. Name;

(a) The type of isolation. (1mk)

Geographical.

(b) The type of evolutionary change. (1mk)

Adaptive radiation / Divergent evolution.

20. The diameter field of view of a light microscopic is 6.5mm. Plant cells lying across the diameter are 12. Determine the size of one cell in micrometers (2 marks)

Cell size = $\frac{\text{Diameter of field view x 1000}}{\text{No of cells}}$

= $\frac{6.5 \times 1000}{}$ = 540µm

21. The following is a dental formula of a dog and rabbit, state two differences between them. (2 marks)

Dog: I $\frac{3}{3}$ C $\frac{1}{1}$ PM $\frac{4}{4}$ M $\frac{2}{3}$

Rabbit: I $\frac{2}{1}$ C $\frac{0}{0}$ PM $\frac{3}{2}$ M $\frac{3}{3}$

Dog	**Rabbit**
- Presence of canine **- Has more teeth**	**- Absence of canines/presence of diastema** **- Has few teeth.**

22. State the function of the following parts of a light microscope (2 marks)

a)body-tube (b) Objective lens

(a)	**Holds the eyepiece and revolving nosepiece;**
(b)	**Brings image into focus and magnifies** **NB: *Must mention the 2 functions to earn a mark***

23. How do;

(a) White blood cells provide protection against pathogenic bacteria in blood (2 marks)

Engulfing bacteria;

Production of antibodies;

(b) The leucocytes pass from a blood vessel into a skin wound to provide protection (2 marks)

Pass between cells of capillary wall; by amoeboid movement and migrate into tissue fluid/affected tissue;

24. .a) State **two** functions of the blood other than transport. (2mks)

distribution of heat and hence plays a role in regulation of body temperature.

(b) Name **one** defect of the circulatory system in humans. (1mks)

Regulation of pH of fluids;

25. (a) Name the carbohydrate that is stored in Mammalian muscles. (1mk)

Glycogen

(b) List down **two** differences between polysaccharides and Monosaccharides. (2mks)

b)POLYSACCHARIDE **- Not sweet** **- Insoluble in water** **- Many monomers**	**MONOSACCHARIDE** **- Sweet** **- Soluble in water** **- One monomer**

26. a) Explain how the following factors control population.

i) Competition (1mk)

Better adaptated organisms survive and reproduce increasing in number/ poorly adapted organisms die hence reduce in number;

ii)Parasitism (1mk)

Some parasites transmit pathogens that kill host/ parasites weaken hosts that are killed by predators;

27. a) Suggest the significance of the following adaptations in bony fish.

(i) Flexible vertebral column (1mk)

a) i.Allow body to move from side to side/allow bending

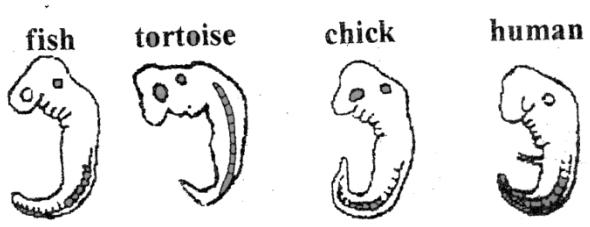
(ii) Presence of swim bladder (1mk)

Air filled to make fish buoyant/keep fish a float

b) State **two** features which reduce resistance in fish during swimming. (2mks)

Streamlined body,
scales overlapping pointing backwards/from anterior to posterior end; mucus on the skin;

28. The diagrams below show embryos of certain vertebrates animals. Study them and answer the question that follows.



a) Mention **two** observable structural features in these embryos that suggest that they have a common ancestral origin. (2mrks)

Have a tail
Notochord rej backbone

b) What phenomenon in organic evolution is exhibited by these diagrams of embryos? (1mrk)

b. Comparative embryology