**Name……………………………………………………… Index No………………………..**

231/1

BIOLOGY **Date……………………………**

(Theory)S

**Sign……………………………**

**2 hours**

**SUKELEMO JOINT EXAMINATIONS–2023**

(*Kenya Certificate of Secondary Education*)

***Instructions***

* Write your Name and Index Number in the spaces provided above.
* Write the date of the examination in the space provided above.
* Answer all the questions in the spaces provided.

***For Examiner’s use only***

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s Score** |
| 1-29 | 80 |  |

***This paper consists of 9 printed pages.***

***Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.***

1.Students at Ikumbi high school observed that when sodium chloride was poured onto grass ,the grass dried up. Explain this this observation. (2mks)

**The external environment becomes hypertonic compared to the internal tissues of the leaves ;the leaves looses water by osmosis making them unable to carry out vital biological processes such as photosynthesis(hence dry up)**

2.Explain why food is stored in an insoluble form in the cells of living things. (2mks)

**To prevent formation of solution ;which would interfere with osmotic osmotic pressure of tissues.**

3. (a)Name the blood vessel that connects arteries to vein. (1mk)

**Cappilaries**

(b) Explain three ways in which the vessel named in (a) above are adapted to carry out their functions. (3mks)

**Numerous to increase the surface area over which diffusion and active transport of substances occur**

**Thin walled/one cell thick to reduce distance over which exchange of substances occur**

**Narrow lumen to enhance ultra-filtration**

**Have small pores for the passage of materials**

**(TIED TO PART (a))**

4. How does hot water of about 350C act as a pollutant when it is discharged from industries into rivers? (2mks)

**It reduces the solubility of gases in water/reduces amount of dissolved gases.**

5. Explain how the following factors hinder self pollination in plants:

(i) Protogyny (1mk)

**Stigma matures earlier and is ready to receive pollen grains before the anthers ready .**

(ii) Dioecism (1mk)

**Male and female gametes occur in separate plants**

6. Name the causative agents of the following diseases in humans. (2mks)

(a). Amoebic dysentery.

***Entamoba histolitica;***

(b). Candidiasis.

***Candida albicans***

7. a) Define the term immunity. (1mk)

**Ability of the body to identify /recognize foreign antigens and develop mechanisms of destroying them/ability to resist infection;**

b) Distinguish between natural immunity and acquired immunity. (1mk)

**Natural immunity is inborn/inherited/passed from parents to offspring while acquired immunity is obtained in life**

c) Identify one immunizable disease in Kenya. (1mk)

**Tuberculosis;poliomyelitis;diphtheria;whooping cough;measles;**

8. What happens to glucose synthesized during photosynthesis. (2mks).

**Used in respiration /produce energy**

**Converted to starch/lipids/sucrose/proteins and stored**

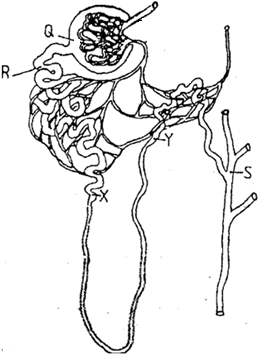
9. Give two advantages of polyploidy in plants. (2mks).

**Early maturity**

**High yields**

**Resistant to pests and diseases/drought**

10. The diagram below illustrates part of a nephron from a mammalian kidney.



a) Name the fluid found in the part labeled Q.(1mk)

**Glomerular filtrate;**

b) Identify the process responsible for the formation of the fluid named in (a) above. (1mk)

**Ultra- filtration/pressure filtration**

c) Which two hormones exert their effect in the nephron? (2mks)

**Antidiuretic hormone/vasopressin;**

**Aldosterone;**

11.Describe double fertilization in flowering plants. (4mks)

**One male nucleus fuse with an egg cell;to form a diploid zygote;while the other fuse with the two polar nuclei;to form a triploid endosperm nucleus;**

12. Explain how blood sugar level is maintained constant in human blood (3mks)

**When in excess, insulin,is produced to make liver cells convert the excess to glycogen**

**When less,glucagon,is produced to make liver cells convert stored glycogen to glucose**

13. State two unique characteristics of members of the class crustacea . (2mks)

**Two pairs of antennae**

**Body covered with carapace**

14. How is mammalian skin adapted for excretion (3mks)

**Has sweat glands which collects water and salts;**

**Has sweat pores through which water,salts and urea pass out;**

15.The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

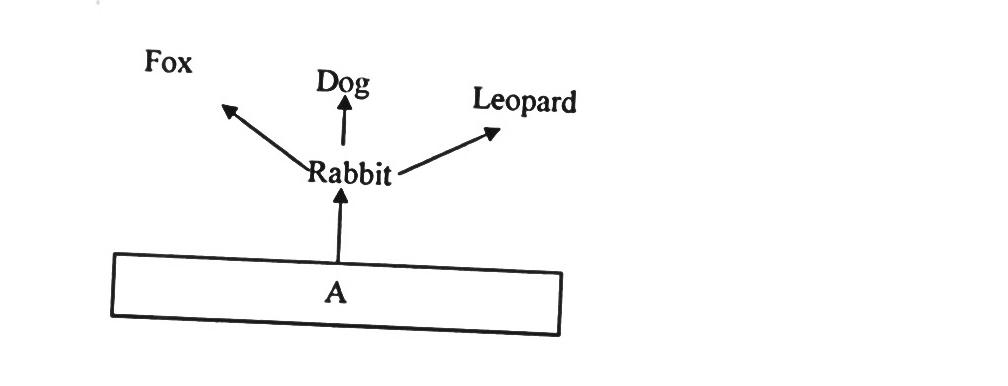
a) Name the evolutionary process that may have given rise to these structures. (1mk)

**Convergent evolution**

b) What is the name given to such structures? (1mk)

**Analogous structures**

16. The diagram below show part of a food relationship in an ecosystem



1. Name the food relationship shown in the diagram (1mk)

**Food chain**

1. Name the trophic level occupied by organism A (1mk)

**Primary consumer**

What is the main source of energy in the ecosystem shown in the diagram above (1mk)

**The sun/sunlight**

17.a) Name a protein and vitamin involved in blood clotting.

i) Protein. (1mk)

**Fibrinogen**

ii) Vitamin (1mk)

**Vitamin K**

( b ). Explain why blood from a donor whose blood group is A cannot be transfused into the recipient whose blood group is B. (2mks)

**Recipient has antibody a in the blood plasma and will correspond with antigen A in the donors;hence there will be antigen –antibody reaction/agglutination;**

18.(a). State two effects of Gibberellins on shoots of plants. (2mks)

**Promotes cell division;**

**Promotes cell elongation;**

**Promotes parthenocarpy**

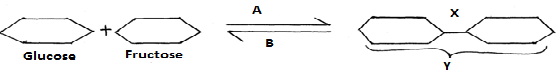
(b). Account for loss in dry weight of cotyledons in a germinating bean seed. (1mk).

**Food stored is used for respiration /growth;**

19. Explain why a pregnant woman excretes less urea compared to a woman who is non pregnant. (2mks)

**Amino acids are used in the formation of foetal tissues;thus has less excess to be eliminated;**

20.Study the reaction below and answer the questions that follow.



a) What biological processes are represented by A and B? (2mks)

A **Condensation**

B **Hydrolysis**

b) Identify the product Y. (1mk)

**Sucrose;**

c) State the bond represented by X. (1mk)

**Glycosidic;**

21.Explain what happens during the light stage of photosynthesis. (3mks)

**Light energy is absorbed by chlorophyll molecules ;used to split water molecules into oxygen and hydrogen atoms/ions ;light energy is converted into chemical energy(ATP) and stored;**

22. State two characteristics of aerenchyma tissue. (2mks).

**Has thin cell wall;**

**Has large air spaces;**

23. (a). Name the substance that accumulates in muscles when respiration occurs with insufficient oxygen. (1mk).

**Lactic acid;**

(b). Give the end products of anaerobic respiration in plants. (2mks).

**Ethanol; rej *Alcohol***

**Carbon (IV) Oxide;**

**Energy;**

24. What is the importance of carrying out the following procedures when preparing temporary slides in the laboratory? (3mks).

(a). Adding water to the specimen.

**To make the specimen turgid;/prevent dehydration**

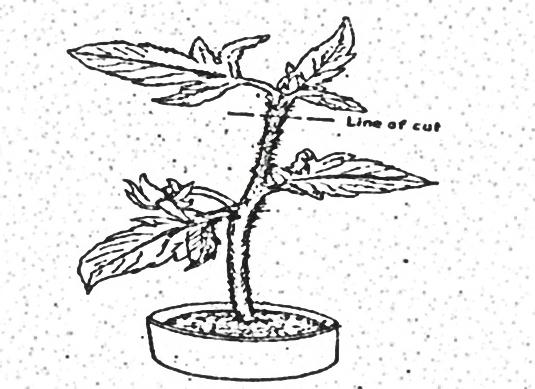
(b).Staining the specimen.

**To make cell dinstinct/more clearer**

(c ). Using a sharp blade to make sections.

**To prevent distortation of tissues**

25. In an experiment the shoot tip of a young tomato plant was decapitated as shown in the diagram below



1. State the expected results after 2 weeks (1mk)

**Auxillary/lateral buds sprot/branches will be formed**

1. Give a reason for your answer in (a) above (2mks)

**Decapitation removes the hormone /auxins/IAA which is produced in the terminal bud/the stem tip;remove of the auxin/hormone/IAA promote branch/development of auxillary lateral buds.**

26. Name two internal factors that necessary for seed germination. (2mks)

**Enzymes;**

**Hormones;**

**Viability**

27.Certain animals have the following dental formula

A; i 3/3, c 1/1, pm 4/4, m 2/3 B. i 0/3 , c 0/1 , pm 2/2 , m 3/3

1. What is the most likely mode of feeding for animals A and B. (2mks)

**A .Carnivorous; reject carnivore**

**B .Herbivorous;rej,herbivore**

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

**Absence of upper insisors**

28. Name the components of a DNA molecule. (3mks)

**A five carbon sugar/Deoxyribose sugar**

**A phosphate molecule**

**A nitrogenous base**

29. A horse has 64 chromosomes in its somatic cells while a donkey has 62.A mule is produced produced when a horse mates with a donkey.

a. Work out the number of chromosomes in a mule ,show your working. (2mks)

b. Why is a mule sterile (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………………………