1. Potato cells contain an enzyme which turns the tissues brown when a potato is peeled and left for some time. State why boiled potatoes do not turn brown. (2 marks)

.....

.....

2. By giving a reason, identify the most appropriate apparatus that can be used to collect a spider. (2 marks)

.....

.....

3. The table below shows the percentage composition of carbon (IV) oxide and oxygen in inhaled and exhaled air.

Gases	Inhaled air	Exhaled air
Oxygen	20%	17%
Carbon (IV) oxide	0.04%	4.0%

Explain the differences in percentage of the two gases in inhaled and exhaled air.

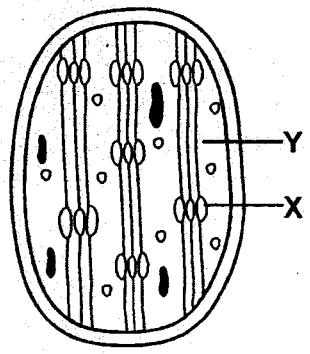
a) Oxygen (1 mark)

.....

b) Carbon (IV) oxide (1 mark)

.....

4. The diagram below represents a cell organelle.



a) State the function of the part labelled X. (1 mark)

.....

b) Outline two structural differences between the above organelle and the one involved in synthesis of energy in a cell. (2 marks)

.....

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.....

5. The cells of a certain herbaceous plant were found to have a diameter of 25μm. The cells were placed in varying concentrations of sugar solution. The average diameter of thecells in each solution was determined and the results obtained were as shown in the table below.

Concentration of sugar solution (%)	Diameter of cells (μm)
1	50
5	40
10	30
15	20

a) From the results determined the concentration of the cell sap. (1 mark)

.....

b) Give an explanation for the average diameter of the cells placed in 15% sugar solution. (2 marks)

.....

.....

.....

6. What advantages do the leaves with network venation have over those with parallel venation? (2 marks)

.....

.....

7. The equation below represents a process x which is controlled by enzymes.

$$\underset{\text{Glucose + Fructose}}{C_6H_{12}O_6 + C_6H_{12}O_6} \underset{R}{\overset{X}{\rightleftharpoons}} \underset{\text{Sucrose + water}}{C_{12}H_{22}O_{11} + H_2O}$$

Name;

i) Process X ..... (1 mark)

ii) Enzyme R ..... (1 mark)

8. Highlight the procedure used in an experiment to test for the presence of vitamin C. (3 marks)

.....

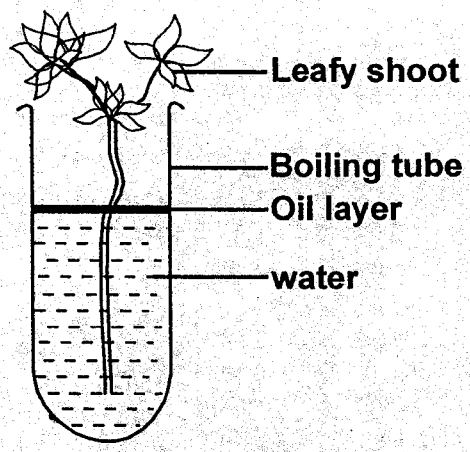
.....

.....

9. State the function of roughages in the diet. (1 mark)

.....

10. The experiment set up shown below was to investigate a certain physiological process in plants. After one hour they place cobalt chloride paper on leaf surface.



a) What process was being investigated? ..... (1 mark)

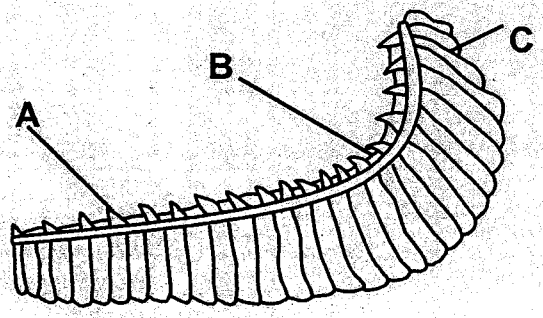
b) **State** the role of the oil layer in the experiment. (1 mark)

.....

c) **Suggest** the changes observed on the cobalt chloride paper after one hour. (1 mark)

.....

11. The diagram below represents an organ from a bony fish, **study** the diagram and answer the questions that follow.



a) **State** the function of A. (1 mark)

.....

b) **Justify** why the structure labelled B is bow shaped. (2 marks)

.....

.....

.....

12. Explain what would happen if a person slept in a poorly ventilated room with a burning jiko. (3 marks)

.....

.....

.....

13. Name two organs in man, which displays the counter flow. (2 marks)

.....

.....

14. State two characteristics of aerenchyma tissue. (2 marks)

.....

.....

15. Explain why individuals with smaller sizes require more energy per kg of body weight than those with larger sizes? (3 marks)

.....

.....

.....

16. What would be the fate of pyruvic acid formed during anaerobic respiration if oxygen supply is availed in the mitochondria of the animal cell? (2 marks)

.....

.....

17. The table below shows description of sizes of glomeruli and renal tubules of two animals, which are living in different environments.

	Animal x	Animal y
Glomeruli	Large and few	small and many
Renal tubules	short	Long

a) **Name** the likely environment in which each animal lives. (2 marks)

.....

.....

b) **Suggest** the main nitrogenous waste produced by animal y. (1 mark)

.....

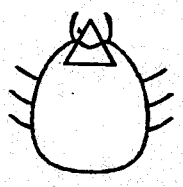
18. Explain why a person discharges urine more frequently when environmental temperatures are low than when they are high. (2 marks)

.....

.....

.....

19. The diagram below represents a certain organism.



a) **Name** the class to which the organism belongs. (1 mark)

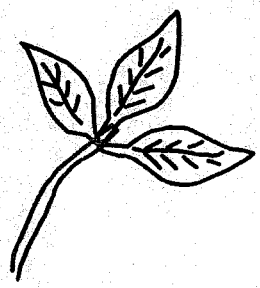
.....

b) **Name two** other organisms which belong to the class named in (a) above. (2 marks)

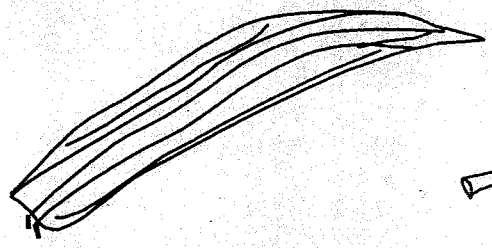
.....

.....

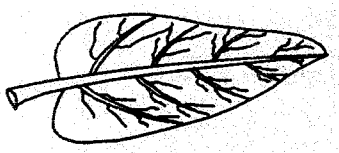
20. Below are diagrams of three leaves, A, B and C. Construct a two-step dichotomous key which can be used to identify them. (2 marks)



A



B



C

.....

.....

.....

.....

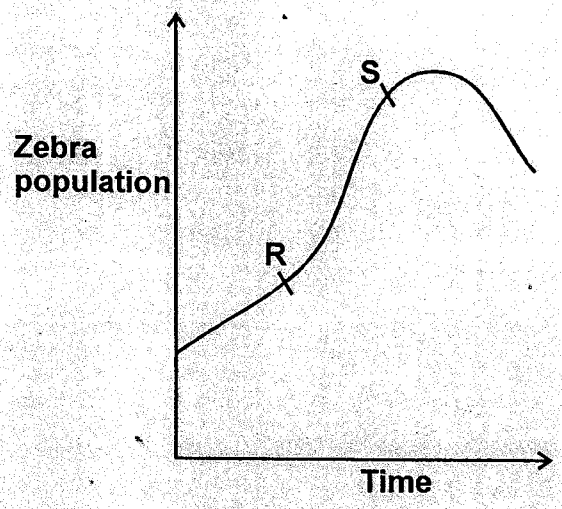
.....

21. Determine the importance of the label "CFC FREE" on modern refrigerators. (2 marks)

.....

.....

22. The graph below represents a population growth curve of zebras in a grassland ecosystem over period of time.



a) Account for the change in zebra population between points R and S on the growth curve above. (3 marks)

.....

.....

.....

.....

23. The numbers of chromosomes in a Gorilla cheek cell is 48. State the number of chromosomes in a Gorilla's ovum. (1 mark)

.....

.....

24. Justify why the cell wall is made up of cellulose. (2 marks)

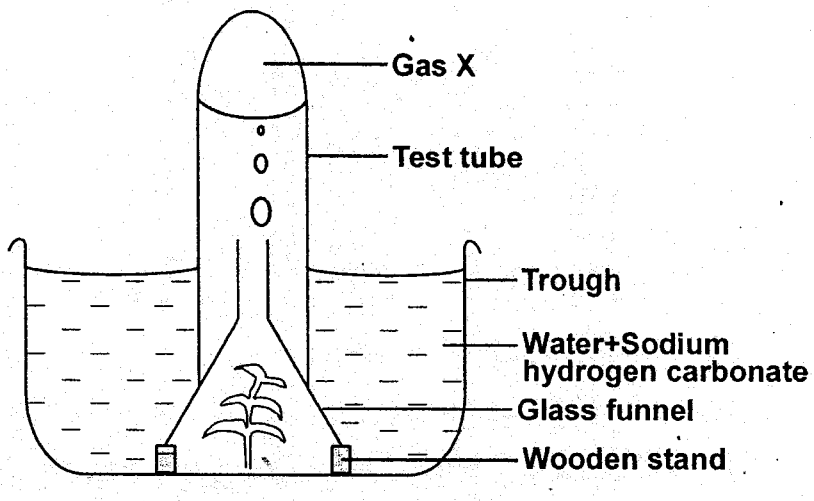
.....

.....

25. Name the causative agent candidiasis. (1 mark)

.....

26. An experiment was set up to investigate a certain process as shown in the diagram below.



The set up was left in bright sunlight for 4 hours.

a) Name gas X and state how it's identity could be confirmed. (2 marks)

.....

.....

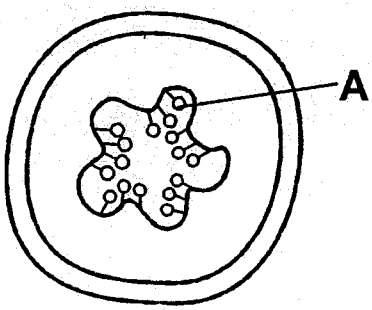
.....

c) Explain why only submerged water plants are used in this experiment. (1 mark)

.....

.....

27. The diagram below represents a transverse section of an ovary from a certain flower.



a) Name the type of placentation illustrated in this diagram. (1 mark)

.....

b) Give a reason for the answer stated in (a) above. (1 mark)

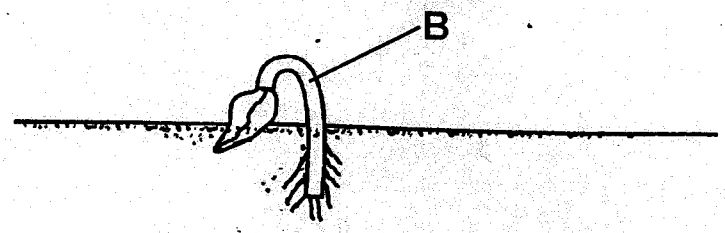
.....

c) Identify the part that develops from structure A after complete growth and development. (1 mark)

.....

.....

28. The diagram below shows a germinating seedling.



a) Name the part of the seedling labelled B ..... (1 mark)

b) Start the type of germination exhibited above..... (1 mark)

c) Name the type of response exhibited..... (1 mark)

29. The equation below represents a metabolic process that occurs in the mammalian liver.

$$\text{Amino acids} \xrightarrow[\text{Enzyme x}]{} \text{Organic compound + Urea}$$

i) Name the process that represents the above equation. (1 mark)

.....

ii) Identify the enzyme represented by x. (1 mark)

.....

iii) What is the importance of the process to the mammal? (1 mark)

.....

30. Explain how the following adaptations minimizes rate of transpiration.

a) Leaf dropping (1 mark)

.....

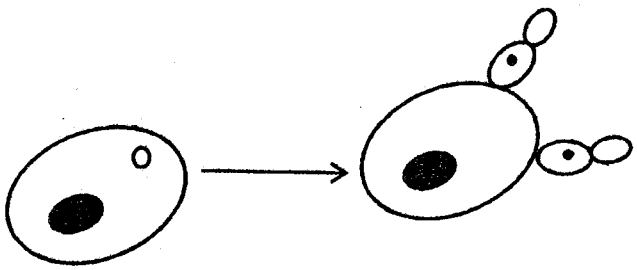
b) Sunken stomata (1 mark)

.....

c) Thick waxy cuticle (1 mark)

.....

31. The diagram below shows reproduction occurring in an organism.



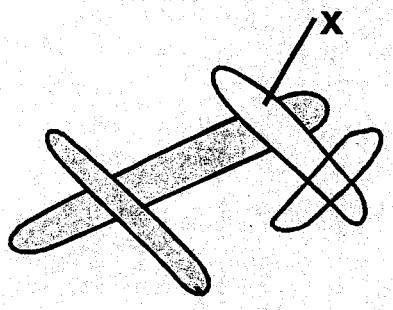
a) Name the type of a sexual reproduction shown. (1 mark)

.....

b) Name an organism that shows this type of reproduction. (1 mark)

.....

32. The diagrams below shows a pair of homologous chromosomes. Study them and answer the questions that follow.



i) Name the region marked X. (1 mark)

.....

ii) What is the genetic significance of the phenomenon above? (1 mark)

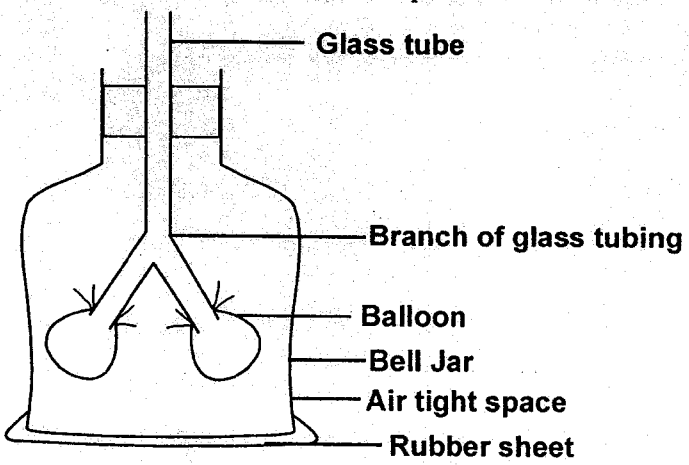
.....

33. Give two reasons why mitosis is important in living organisms. (2 marks)

.....

.....

34. Study the diagram below and use it to answer the questions that follow.



a) Mention the equivalent of the following in the mammalian breathing mechanisms;

i) Bell jar (1 mark)

.....

ii) Balloons (1 mark)

.....

iii) Rubber sheet (1 mark)

.....

KANDARA SUB-COUNTY SECONDARY SCHOOLS FORM 3 2015 JOINT EXAMINATION

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

BIOLOGY (231/1)

October/November 2015

MARKING SCHEME

1. Boiling denatures enzymes (in the potato cells); hence hindering the enzymatic activity which would have caused browning;

2. A pair of forceps; since spider stings;

3. Oxygen used for respiration;
   Carbon (IV) oxide released from respiration;

4. a) Contain chlorophyll that trap light energy;

   b) Inner membrane not folded/inner membrane folded; egg shaped/sausage shaped;

5. a) (10 - 15)%
   b) The concentration of the sugar is hypertonic to the cell sap; cell losses water by osmosis to the solution and shrinks (become flaccid);

6. To enhance support; Network veins are well spread in the entire leaf to enhance faster transport of substance;

7. i) Condensation;
   ii) Sucrase;

8. Use of DCPIP reagent;

   To the DCPIP; add drops of food substances; if it turns colourless; then vitamin C is present;

9. Provides bulk to food as it moves along the canal;/to prevent constipation;

10. a) Transpiration/water uptake;
    b) To prevent water from vaporizing from the beaker;
    c) Cobalt chloride is blue when dry and later it turns pink to show presence of water.

11. a) Trap solid particles reaching the delicate gill filaments;
    b) Supports the filaments and rakers; increases surface area for attachment of gill filaments and gill raker;

12. The production of CO that combines with haemoglobin to form a stable compound - carboxyhaemoglobin which reduces the capacity of haemoglobin to transport O_2 leading to death.

13. Kidney; placenta;

14. i) Large air space for buoyancy;
    ii) Cells are thin walled for faster gaseous exchange;

15. Have a large surface area to volume ration hence expose large area, lose more heat to take more energy to replenish the lost energy.

16. It would be oxidised; it is oxidised to energy, water and CO_2;

17. a) X - Fresh water;
    Y - Desert;

    b) Uric acid;

18. -Increased metabolism; (to generate heat) - release water;
    - Reduced sweating; hence water loss through urination;
    - Less water is lost through sweating and hence more urine.

19. a) arachnida;
    b) Tick;/ spider;/mite;

20. 1. a) leaf compound .....c;
        b) leaf simple ..... go to 2;

    2. a) leaf with parallel veins ..... B;
        b) leaf with net veins ..... A;

21. Non toxic emissions produced; non flammable; non carcinogenic;

22. High birth rate with few or no deaths; presence of enough food and other resources; adequate space; limited competition of resources;

23. 24 chromosomes;

24. Protect against mechanical damage; Give cell definite shape; provide mechanical support;

25. Candida vaginalis;/ Candida albicans;

26. a) Oxygen gas; Rekindles a glowing splint;
b) Adapted to aquatic life; and (O_2 is collected under water since its insoluble in water)

27. a) Parietal;
b) Placenta located on the ovary wall;/ has a single loculus;
c) Seed;

28. a) hypocotyl;
b) epigeal;
c)Phototropism;/Geotropism;

29. i) deamination;
ii) orginase;
iii) Breaks down excess amino acid to harmless substances;

30. a) Reduce total surface area for water loss;
b) Water vapour/moisture accumulates in the pores hence reduce the saturation deficit;
c) Increases the distance to be covered by diffusing water vapour;

31. a) Budding;
b) Yeast;

32. i) Chiasmata;
ii) Crossing over/mixing of genes; hence causing variation;

33. i) Enables growth and development;
ii) Formation of new cells for repair of worn out tissue;

34. i) Ribs /Acc - Intercostal muscles;
ii) Lungs;
iii) Diaphragm;