

KCSE BIOLOGY ASSIGNMENTS
Kenya Certificate of Secondary Education (K.C.S.E.)

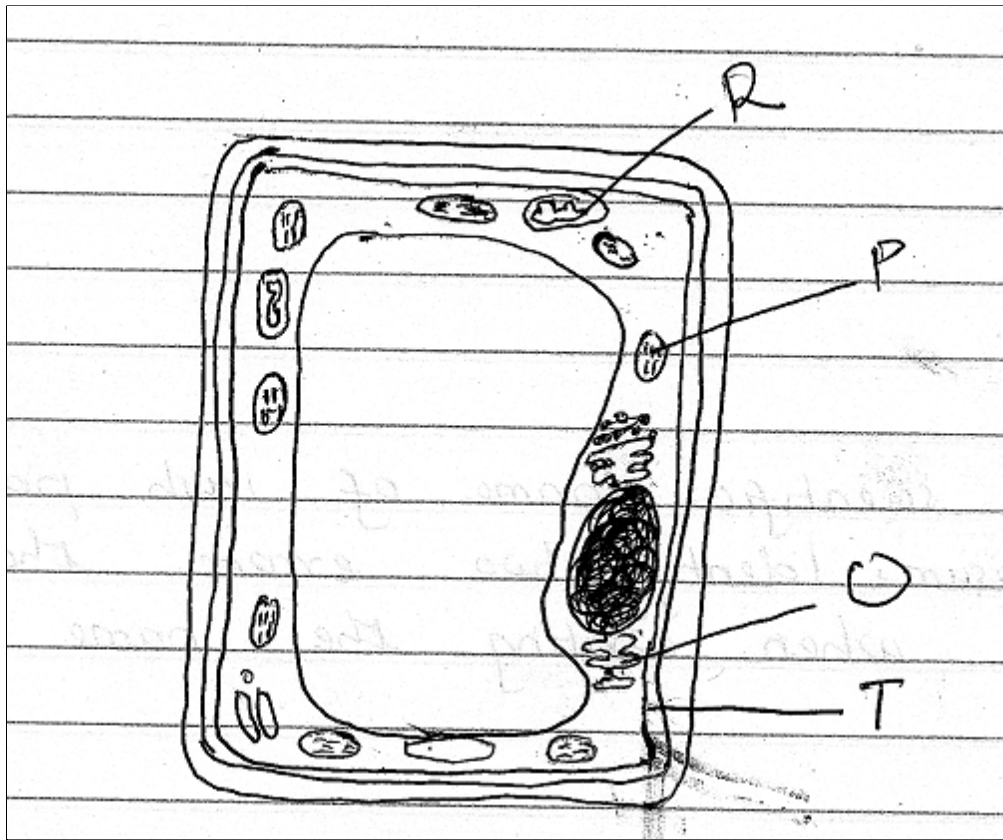
FORM 2

BIOLOGY

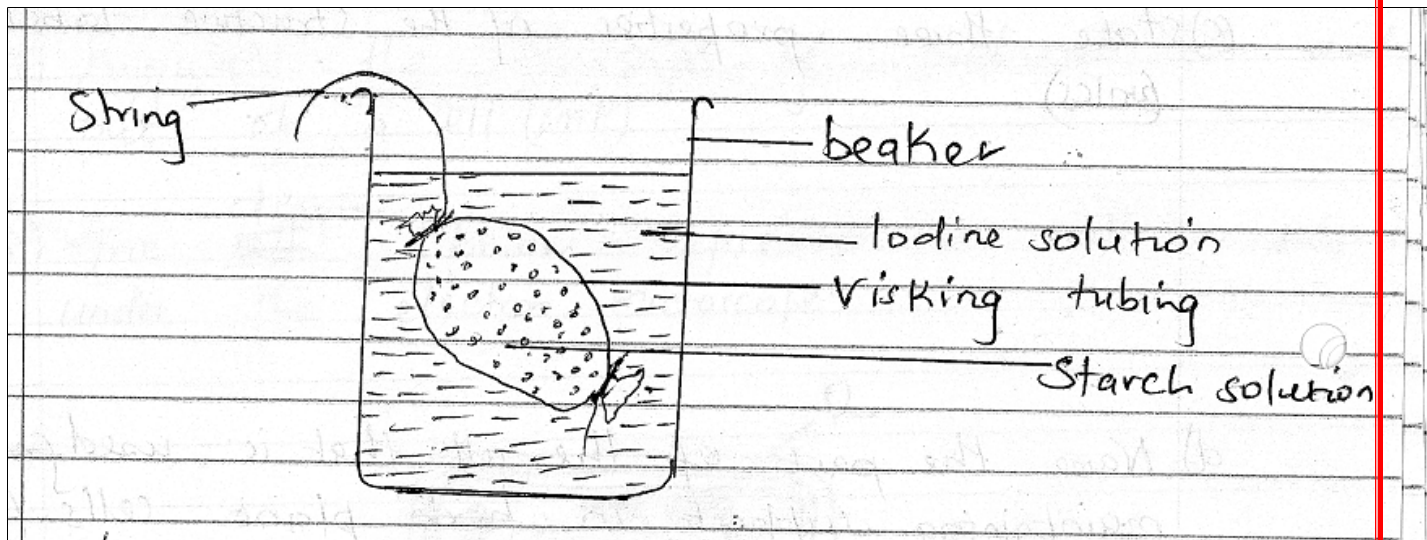
THEORY

ASSIGNMENT ONE

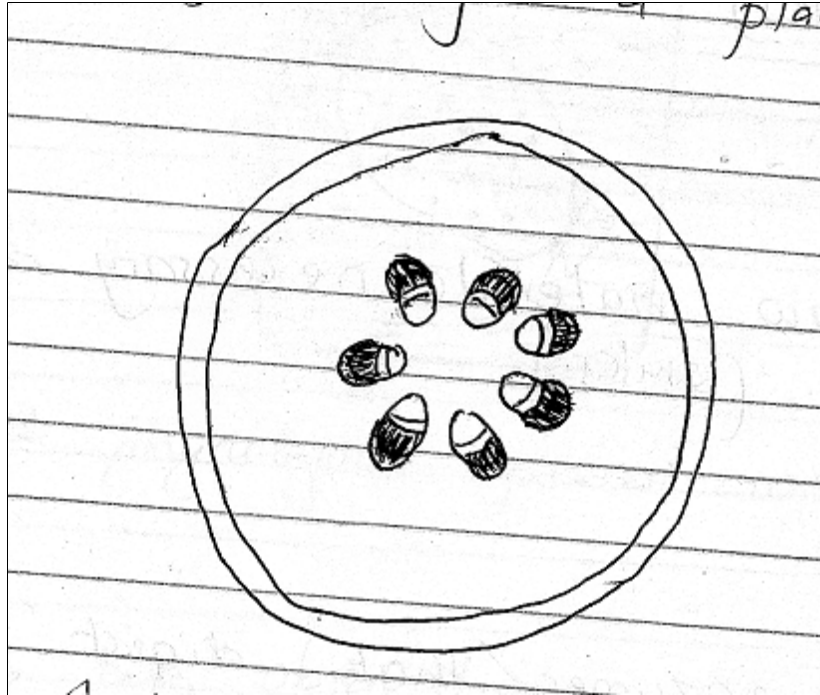
- 1(a) Name the three main branches of biology. (3mks)
b) List two other branches of biology(sub-branches) and for each give a definition. (4mks)
- 2 Biological knowledge can be used to solve environmental problems and enables one to pursue various careers.
(a) list three environmental problems that can be solved using biological knowledge; (3mks)
b) Which three careers require the knowledge of biology. (3mks)
- 3 (a) The scientific name of irish potato is Solanum Tuberosum. Identify two errors that have been made when writing the name. (2mks)
b) Which taxonomic group does the name solanum refer to? (2mks)
- 4 Which organelles perform the following functions:
a) Transports proteins within the cells (1mk)
b) Contains lytic enzymes (1mk)
c) Processing and transportation of glycoprotein (1mk)
d) Regulate the passage of materials into and out of a cell. (1mk)
- 5 The diagram below represents a cell as seen under the electron microscope.



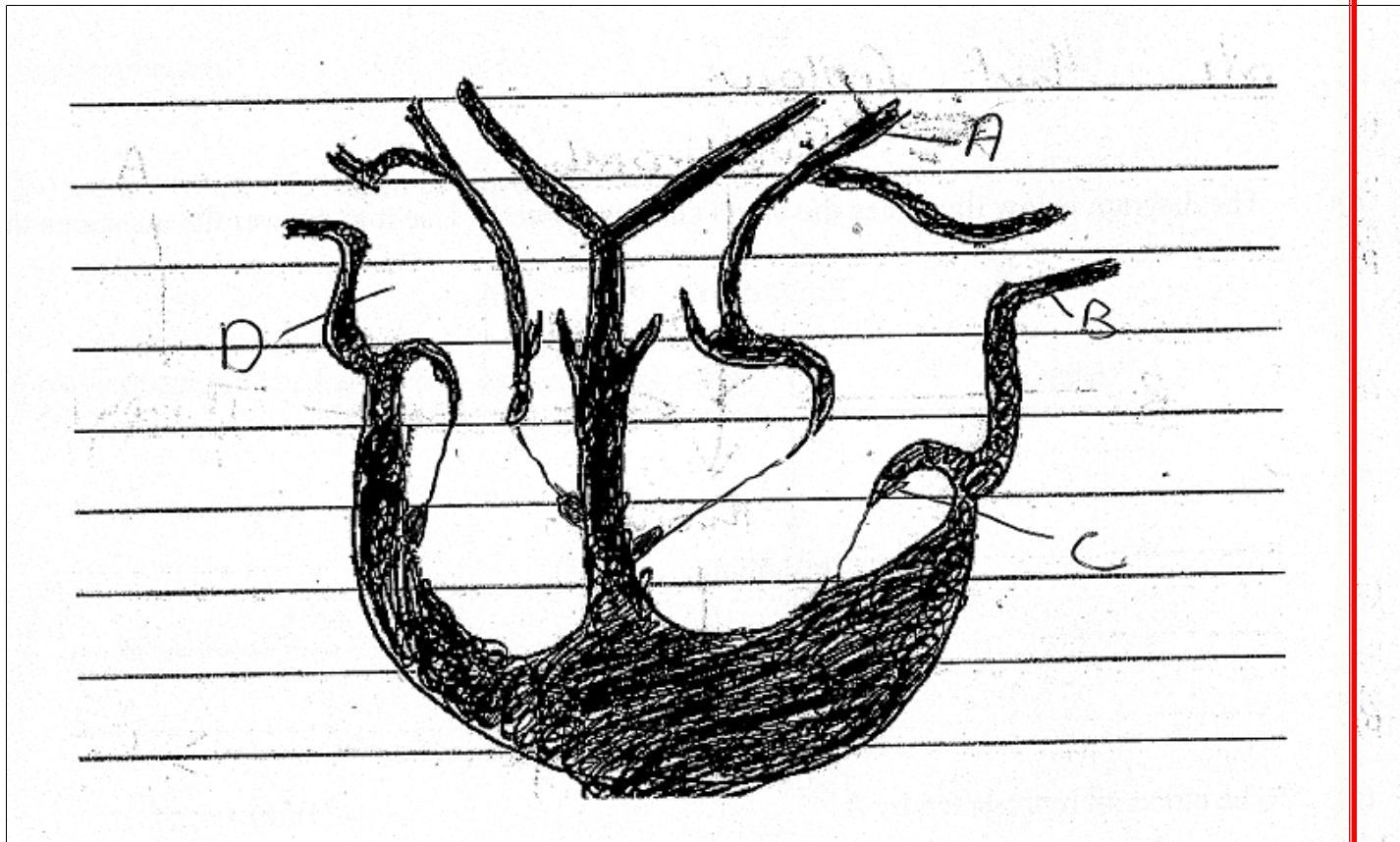
- a)(i) Based on the diagram state whether it represents an animal cell or a plant cell. (1mks)
(ii) Give two reasons for your answer in 5(a)(i) above. (2mks)
- b) State the functions of the structure labeled P, Q and R. (3mks)
- c) State three properties of the structure labeled T. (3mks)
- d) Name the part of the cell that is used in maintaining support in plant cells. (1mk)
- 6(a) State the function of the following parts of a light microscope.
- (i) Mirror (1mk)
(ii) Condenser (1mk)
(iii) Eye piece (1mk)
- (b) Which part of a microscope enable one to change from medium to high power objective lens. (1mk)
- (c) Explain why it is not advisable to use the coarse adjustment knob when viewing objects with the high power objective lens. (2mks)
- 7 Study the diagram below and answer the questions below.



- (a) Which physiological process was being investigated? (1mk)
- (b) State two observations made after 30 minute. (2mks)
- (c) Give an explanation for the observation made in 7(b) above. (3mks)
- (d) State two factors that affect the process you named in 7(a) above. (2mks)
- 8(a) Photosynthesis take place in two stages. Name the two stages and state where in the chloroplast each takes place. (4mks)
- Stage II -
- Stage II -
- (b) State the role of light in the process of photosynthesis. (1mk)
- (c) Which cells in a leaf that contains chloroplasts. (3mks)
- (d) List two raw materials necessary during photosynthesis. (2mks)
- 9(a) Name two enzymes that digest proteins in the human alimentary canal. (2mks)
- b) Explain why the enzymes you have named in
- (a) above secreted in inactive form. (1mk)
- 10(a) Name two features that increase the surface area of the small intestines. (2mks)
- b) During a practical investigation students were provided with the following:
Food substance, 10% sodium hydroxide solution, 1% copper sulphate solution and iodine solution.
- (i) Identify two food substances that the students were expected to test. (2mks)
11. The diagram below represents a transverse section through a plant organ.



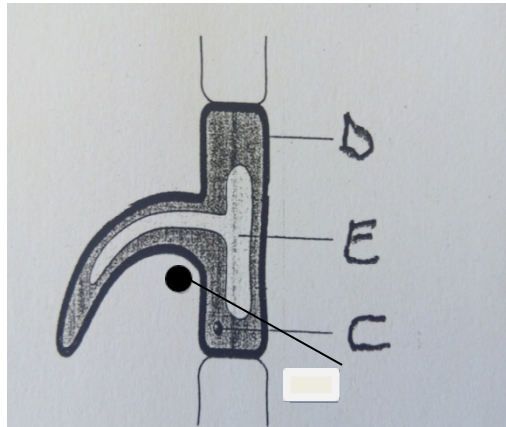
- (a)(i) From which plant organ was the section obtained? (2mks)
- (ii) Give two reasons for your answer in (a)(i) above (2mks)
- b) On the diagram identify and name the part that
- (i) Transports water and mineral salts. (1mk)
- (ii) Trans-locates synthesized food materials. (1mk)
- 12) State two structural differences between arteries and veins. (2mks)
- 13) The diagram below shows a vertical section through a mammalian heart.



- (a) Name the parts labeled A and D. (2mks)
- (b) Use arrows to show the direction in which blood flows out of the heart. (2mks)
- (c) Name the muscle that makes up the heart chambers. (1mk)
- (d) Which part of the heart is referred to as the pacemaker. (1mk)
- 14(a) Give two reasons why blood clotting is important. (2mks)
- 15(a) State three structures used for gaseous exchange in terrestrial plants. (2mks)
- (b) How are guard cells structurally adapted for gaseous exchange. (4mks)
- (c) Name three structures used for gaseous exchange in frogs. (3mks)
- 16(a) Define respiration. (1mk)
- (b) Name the site of aerobic respiration in a cell. (1mk)
- (c) List two substances needed for respiration to take place. (2mks)
- 17 a) How are the respiratory surfaces in mammals adapted to their functions (3mks)
- b) State the functions of the following parts of a gill. (3mks)
- i) Gill rakers
 - ii) Gill bar
 - iii) Gill filaments

ASSGNMENT TWO

1. State the importance of each of the following in living organisms
 - a) Nutrition (1mk)
 - b) Excretion (1mk)
2. State two functions of cell sap (2mks)
3. Which organelle would be abundant in: (2mks)
 - a) Skeletal muscle cell
 - b) Palisade cell
4. The diagram below shows a specified plant cell



- i. Name the cell (1mk)
- ii. Name the parts labelled D and E (2mks)

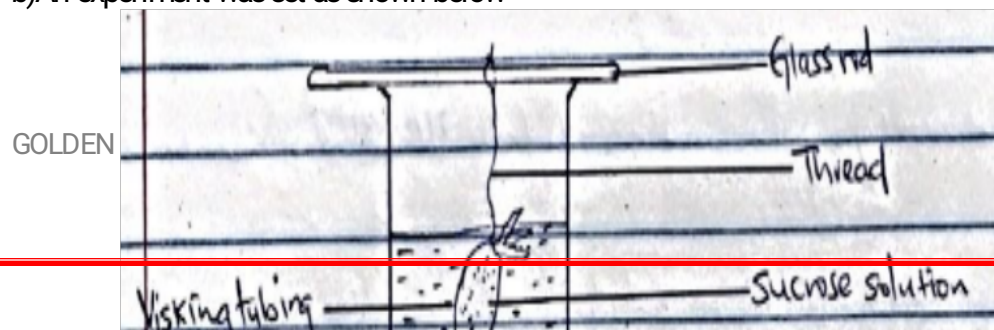
D

E

5. State the functions of the following parts of a light microscope. (2mks)
 - a) Objective lens
 - b) Diaphragm

6. Using a microscope, a student counted 55 cells across a field of view whose diameter was 6000µm. Calculate the average length of cells. Show your working. (2mks)

- 7(a) Distinguish between diffusion and osmosis (2mks)
- b) An experiment was set as shown below



The set up was left for 30 minutes.

- (i) State the expected results (1mk)
- (ii) Explain your answer in b(i) above (3mks)

8.State four factors that increase the rate of diffusion (4mks)

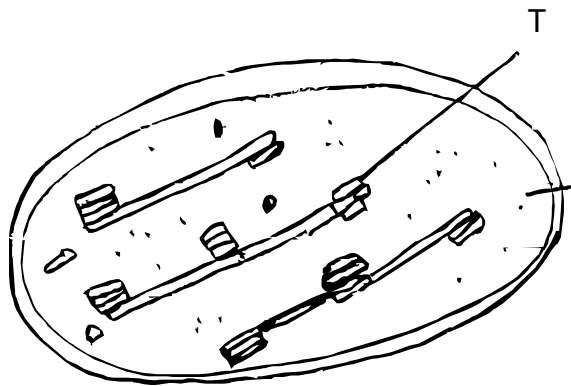
9.What is meant by the following terms?

- (i) Crenated cell (1mk)

- (ii) Flaccid cell (1mk)

10. Distinguish between heterotrophism and autotrophism (2mks)

11. Study the diagram below



- a) Name the process which takes place in the organelle (1mk)

- b) Name the pigment in the structure labelled T and state its function (2mks)

Pigment.....

Function.....

- c) Name three cells of a leaf where the above structure is found (3mks)

12. State four external factors that affect the rate of photosynthesis (4mks)

13. State three properties of monosaccharide (3mks)

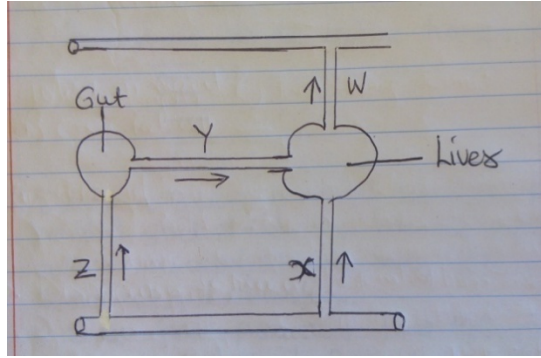
14. Discuss four adaptations of the carnivores to their mode of feeding (4mks)

15

- a) What is the importance of mastication during digestion? (1mk)

- b) State three roles of saliva during digestion (3mks)

16. The diagram below shows part of a mammalian circulatory system



a. Name the blood vessels marked Y and Z (2mks)

b. A student took a meal rich in proteins and carbohydrates. It was found that the glucose level in blood vessel W was lower than blood vessel Y. Explain (1mk)

17.

a) What is active transport? (1mk)

b) Give four roles of active transport (4mks)

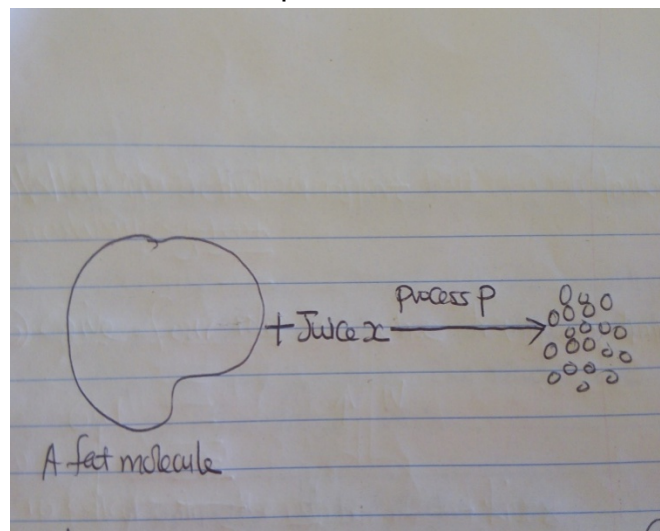
18. During a Biology practical lesson, the teacher provided students with the following apparatus; a porter, a scalpel, specimen bottle, a pair of forceps, sweep net and chloroform.

a) Give four precaution that a biology teacher gave the students before the practical when collection of specimen began (4mks)

b) What was the function of the following apparatus (4mks)

- i. Pooter
- ii. Sweep net
- iii. Chloroform
- iv. A pair of forceps

19. The following is an illustration of a certain process that occurs in mammals.



a) Name process P (1mk)

b) Name the juice involved in process P (1mk)

c) Give a reason why liver damage leads to impaired digestion of fats (1mk)

d) What would be likely effect on digestion if the small intestine of a human being is reduced in an operation (1mk)

20. Name two specialized tissue in mammals (2mks)

21. An experiment was carried out to investigate the effect of temperature on the rate of reaction catalyzed by an enzyme. The results are shown in the table below.

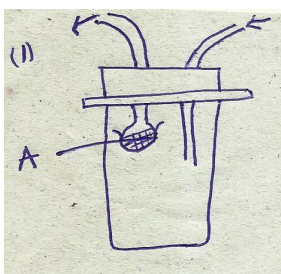
TEMPERATURE ($^{\circ}$ C)	RATE OF REACTION IN MG OF PRODUCTS PER UNIT TIME
5	0.2
10	0.5
15	0.8
20	1.1
25	1.5
30	2.1
35	3.0
40	3.7
45	3.4
50	2.8

55	2.1
60	1.1

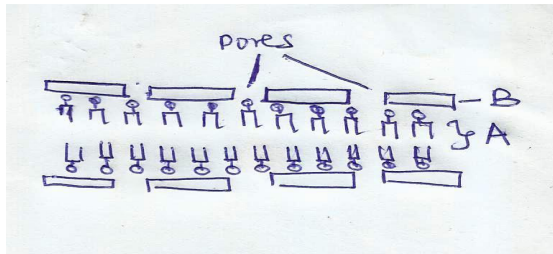
- a. On the grid provided draw a graph of rate of reaction against temperature. 6mk
- b. When was the rate of reaction 2.6 mg of product per unit time? 2mks
- c. Account for the shape of the graph between
 (i) 5°C and 40°C 2mks
 (ii) 45°C and 60°C 3mks
- d. Other than temperature name two ways in which the rate of reaction between 5°C and 40°C could be increased. 2mks
- e.
 (i) Name one digestive enzyme in the human body which works best in acidic condition. 1mk
 (ii) How is the acidic condition for the enzyme named in (e) (i) above attained? 2mks
- f. The acidic conditions (e) (ii) above are later neutralized.
 i. Where does the neutralization take place? (1mk)
 ii. Name the substance responsible for neutralization. (1mk)
22. Describe how water moves from the soil to the leaves of a tree (10mks)
23.
 i. Explain how the mammalian intestines are adapted to perform their function (5 mks)
 ii. Describe how environmental factors increase the rate of transpiration in terrestrial plants (5 mks)

ASSIGNMENT THREE

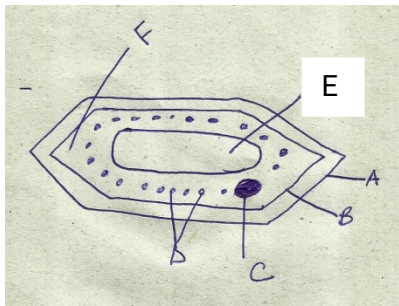
1. Study the diagram below



- a) Name the apparatus (1mk)
 - b) Suggest the use of the apparatus. (1mk)
 - c) Name the part labeled A and state its function. (2mks)
2. Name the field of biology that specializes in the study of the following; (3mks)
- i. Insects
 - ii. Interrelationships between organism and their environment.
 - iii. Heredity and variations.
3. The structure below was observed under the light microscope.



- a) Identify the cell structure. (1mk)
 - b) Name the parts labeled A and B (2mks)
 - c) State two functions of the above structure. (2mks)
4. The diagram below shows a certain cell in living organisms.

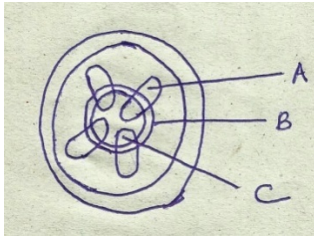


- a)
 - i. Identify the cell (1mk)
 - ii. Give two reasons for your answer (2mks)
- b) Name the parts labeled; (3mks)

A	D.....
B	E.....
C	F.....

- c) State the functions of the parts labeled C, D and E. (3mks)
5. Name the organelles in a cell which perform the following functions. (3mks)
- Excretion in Amoeba
 - Secretion of synthesized proteins and carbohydrates.
 - Formation of cilia and flagella

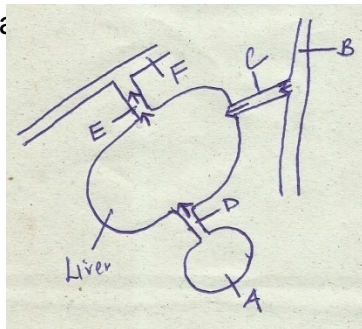
6. The diagram below represents a cross section of a plant part.



- From which part of the plant was the section obtained? (1mk)
 - Name the parts labeled A, B and C. (3mks)
A..... B..... C.....
 - What is the function of the part labeled C? (2mks)
- 7.
- What is transpiration? (1mk)
 - Give two importance of transpiration in plants (2mks)
 - Name two sites for transpiration (2mks)

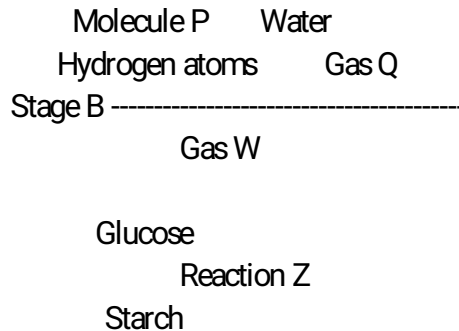
- Name the instrument which is used to determine transpiration rate. (1mk)
8. Name the: (2mks)
- Material that strengthens the xylem tissue
 - Tissue that is removed when the bark of a dicotyledonous plant is ringed.
9. Name the blood vessel that transports blood from (2mks)
- Lungs to the heart
 - The aorta to the liver

10. The diagram below shows the circulation in certain organs in humans.

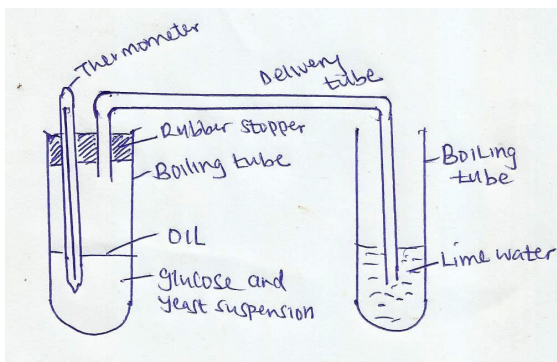


- Name the part labeled A (1mk)

- b) Name the blood vessels labeled B,D, E and F. (4mks)
- c) State how the composition of blood in vessel E differs from that in vessel D. (3mks).
- E D
- d) Explain the role of bile in the process of digestion (2mks)
11. Below is a diagrammatic summary of the main biochemical events in photosynthesis. Study it carefully and answer the questions that follow.
- Stage A ----- Chlorophyll



- a.
- i. Define photosynthesis (1mk)
- ii. Name the stages A and B (2mks)
- A..... B
- iii. Name the gases represented by the letters (2mks)
- Q W.....
- b. Name the specific site for the reactions in stage A and B (2mks)
- A B.....
- c. Name reaction Z (1mk)
- d. What name is given in splitting water molecule into hydrogen atom and gas Q? (1mk)
- e. Name one factor that affect the rate of photosynthesis (1mk)
12. An experiment was set up as shown in the figure below.



The glucose solution was boiled and cooled before adding yeast. The set up was left in stand for about

30 minutes.

- a. What changes occurred in the
- i) lime water (1mk)
 - ii) glucose and yeast? (2mks)
 - iii) Explain your answer in (a) above (3mks)
 - iv) Name the process that was being investigated. (1mk)
 - v) What was the role of oil in the boiling tube? (1mk)
 - vi) Suggest control experiments for the above experiment. (2mks)
 - vii) Suggest the reason for boiling and cooling glucose before adding yeast. (2mks)

13.

- a) Distinguish between heterodonts and homodonts. (2mks)
- b) What is the significance of diastema in herbivorous mammals? (1mk)
- c) State the role of carnassial teeth in a lion? (1mk)

d) An organism was found to have the dental formula:

$$i \quad \frac{1}{1} \frac{0}{0} C \quad \frac{1}{0} P \quad \frac{4}{2} M_4$$

- i. Calculate the total number of teeth in the organism (1mk)
- ii. With a reason suggest the mode of feeding of the organism from which dental formula was obtained. (2mks)

e) State one adaptation of the animals that uses the mode of feeding above. (1mk)

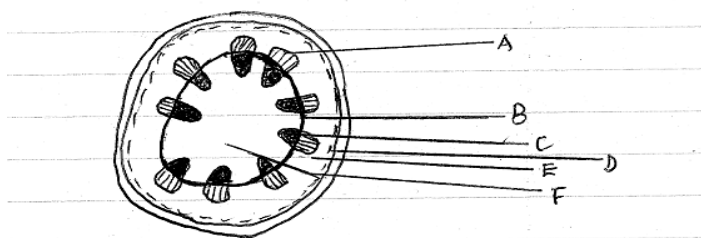
14. Briefly describe the role of Osmosis in living organisms (10 mks)

15. Explain 5 factors affecting the rate of breathing in human beings. (10 mks)

ASSIGNMENT FOUR

1. Name the branches of biology that deal with study of
- (a) Inheritance and variations (1mk)
 - (b) Chemical changes inside living organisms (1mk)
 - (c) The relationship between organisms and their environment (1mk)
 - (d) Insects (1mk)
2. (a) State two functions of cell membrane (2mk)
- (b) Name the cell organelles that would be abundant in

- (i) Skeletal muscles (1mk)
 - (ii) Palisade cells (1mk)
 - (iii) Fat cells (1mk)
3. Explain the importance of each of the following during the process of digestion in human beings
- (a) Teeth (1mk)
 - (b) Saliva (2mks)
4. State two ways in which active transports differs from diffusion (2mks)
5. Name two important stages of photosynthesis and state where in the chloroplasts, each takes places. (4mks)
- (b) Explain how the following factors affect the rate of photosynthesis
- (i) Concentration of carbon (1v) Oxide (1mk)
 - (ii) Light intensity (1mk)
6. The diagram below shows the transverse section of a young stem



- (a) What are the functions of the structures labeled A, B, C and D (4MKS)
- A
 - B
 - C
 - D
- (b) What type of cell are found in the part labeled E and F (1MK)
- (c) If the shoot from which this section was obtained had been immersed in red coloured water for one hour, what part on the diagram would be stained (1mk)
- (i) Give a reason for your answer in c (i) above (1mk)

- (d) Is this a monocot or a dicot stem? Give at least three reasons to support your answer (4mks)

7 The table below shows the percentage composition by volume of inhaled and exhaled air.

Gas	Inhaled air (%)	Exhaled air(%)
Oxygen	21	16
Carbon(IV) oxide	0.04	4.0

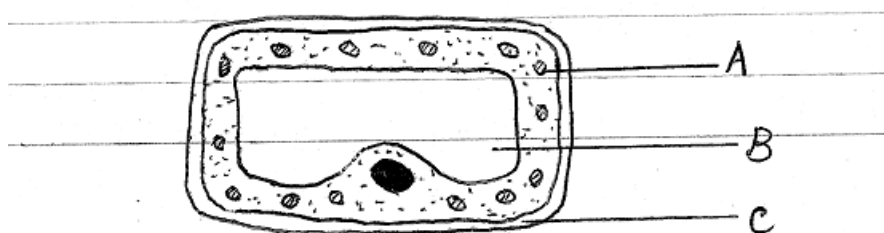
Nitrogen	78	78
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- (a) By what percentage is
 (i) Carbon dioxide concentration in exhaled air higher than inhaled air? (1mk)
 (ii) Oxygen concentration in the exhaled air lower than the inhaled air. (1mk)
- (b) Explain the difference in the composition of the gases between inhaled and exhaled air. (3mks)

8 In an investigation, a student extracted three pieces of pawpaw cylinders using a cork borer. The cylinders were cut back top 50mm length and placed in a beaker containing a solution. The results after 40 minutes were as shown in the table below.

Feature	Result
Average length of cylinders(mm)	56mm
Stiffness of cylinders	Stiff

- (a) Account for the results in the table above (3mks)
 (b) What would be a suitable control set up for the investigation? (2mks)
- 9 The figure below is a diagram of a cell as seen under the light microscope.

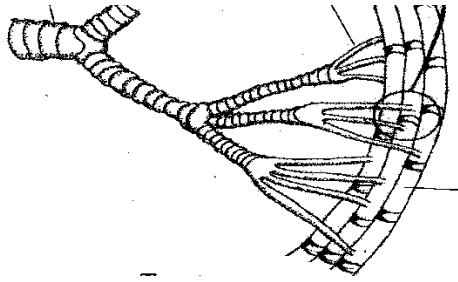


- (a) Name three structures that shows this is a plant cell and not an animal cell. (3mks)
 b) Name one chemical compound that is only found in the structure labeled A and state its function (2mks)
 c) Name the fluid in the part labeled B and state its functions. (3mks)
 d) What is the main chemical compound found in the structure labeled C? (1mk)
 e) Suggest why the structures labeled A would more on one side than the other side. (2mks)
- 10(a) Name the structural units of lipids. (1mk)
 b) State three important functions of lipids in living organisms. (2mks)
 c) Other than through enzymatic action, how else can a disaccharide be hydrolyzed to its constituent monosaccharides. (1mk)

11. The diagram below represents part of a geasous system in a grasshopper.

P

Q



a) Name the structures labeled P and Q

P.....

(1 mark)

Q.....

(1 mark)

b) State the function of the structure labeled P

(1 mark)

c) Describe the path taken by carbon (IV) oxide from the tissues of the insect to the atmosphere (3 marks)

d) How is the structure labeled Q adapted to its functions

(2 marks)

12. State five differences between aerobic and anaerobic respiration. (5mks)

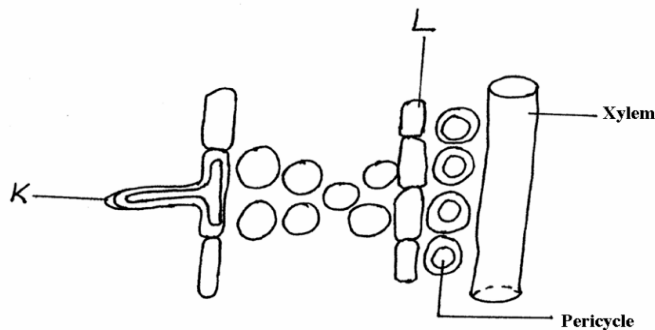
13.(a) State four characteristics of gaseous exchange or respiratory surfaces. (4mks)

(b) Describe the mechanism of breathing in a mammal under the following subheadings. (16mks)

Inhalation

Exhalation

14. The diagram below shows part of a longitudinal section of a root: -



(a) Identify cells K and L :-

(2 mks)

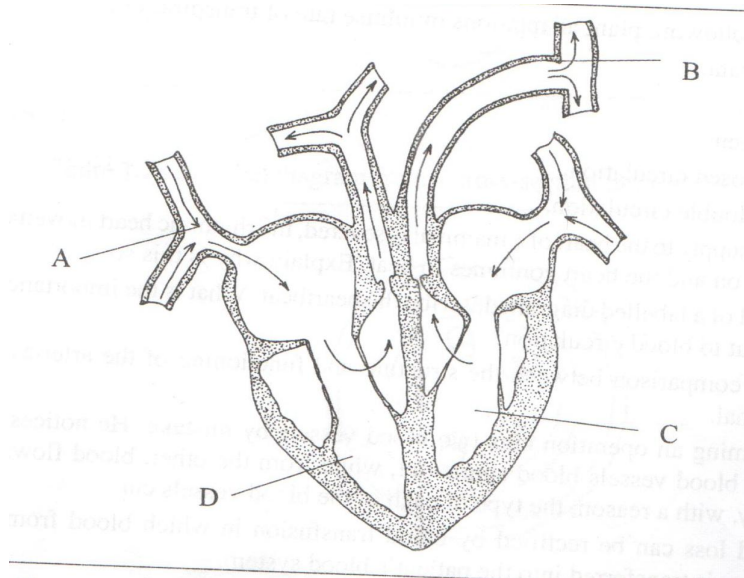
K

L

(b) State two adaptations of Cell K to its functions :-

(2 mks)

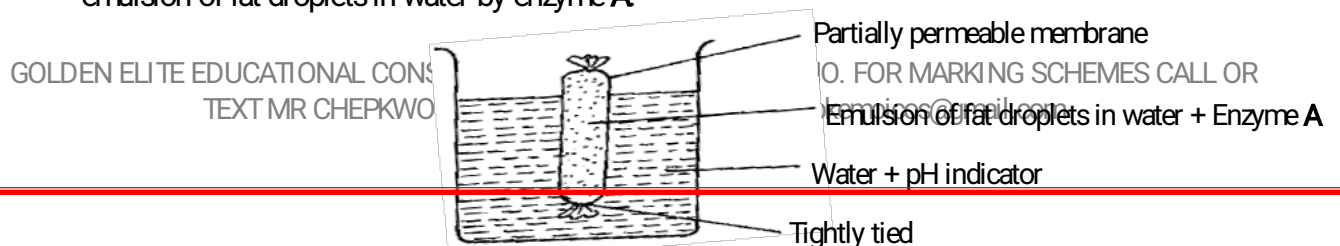
15. The diagram below represents a section through a mammalian heart.



- Label the parts marked A ,B and C. (2 mks)
- State the structural differences between blood vessels labeled A and B. (3 mks)
- Explain why chamber C has thicker walls than the chamber labeled D. (2 mks)

ASSIGNMENT FIVE

- Define the following branches of Biology. (2mks)
 - Genetic
 - Entomology
- (a) Define the term species. (2mks)
 (b) Which taxonomic group has the largest number of members? (1mk)
- (a) Name the laboratory apparatus used for the following; (2mks)
 - Catching small flying insects
 - Sucking small animals from rock surfaces or barks of trees
- State the functions of each of the following organelles.
 - Nucleolus.....(1mk)
 - Golgi apparatus.(2mks)
- Name any **three** specialized plant cells. (3mks)
- The figure below shows apparatus at the start of an experiment to investigate the digestion of an emulsion of fat droplets in water by enzyme **A**.

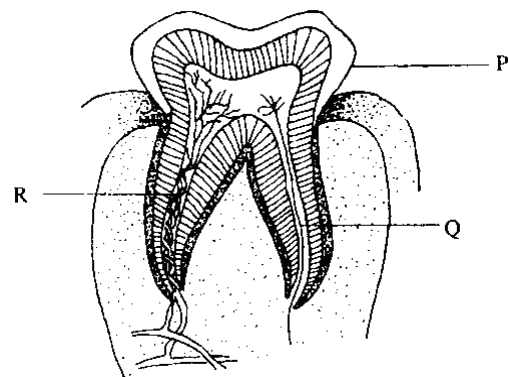


The pH indicator is green in a pH of 7, blue when the pH is above 7 and red when it is below 7. The apparatus is kept at 40°C for 20 minutes during which time the indicator changes from green to red.

- (a) Describe how the products of fat digestion enter a person's blood. (1mk)
- (b) i) State the identity of enzyme A. (1mk)
 ii) Explain why the apparatus was kept at 40°C (1mk)
- (c) Name the products of digestion of the emulsion by enzyme A. (2mks)
- (d) Describe the process which led to the change in pH (3mks)

- 7. i) State the product of photolysis in photosynthesis. (3mks)
 ii) Give **two** adaptation of a leaf for photosynthesis. (2mks)
- 8. a) State **two** roles of bile juice. (2mks)
 b) Name two salts in bile that aid in emulsification of fats. (2mks)

9. The diagram below represents a longitudinal section of a human tooth.



- a) Identify the type of tooth.(1mk)
- b) Give one reason for your answer in (a) above. (1mk)

.....(1mk)

- c) State one function of the tooth. (1mk)

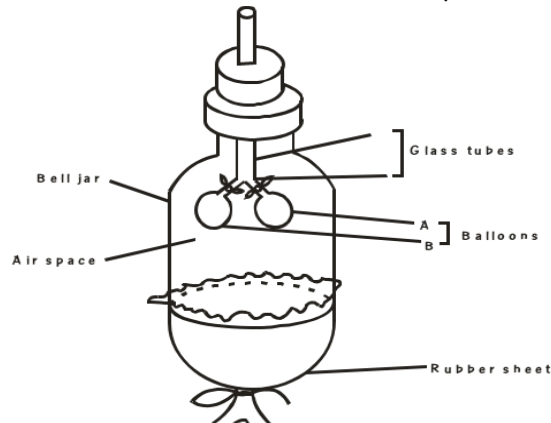
.....

- d) State the function of the part labeled Q (1mk)

- 10 a) Name **three** forces that maintain transpiration stream. (3mks)
 b) Explain **two** adaptations of xylem tissue to its function. (2mks)
- 11. a) State the advantages of having the following blood types.
 i) Blood type AB:
 ii) Blood type O: (1mk)
 b) State **four** ways in which the red blood cells are adapted to their function (4mks)
 c) Name the antigens that determine human blood groups. (2mks)

13. State **three** theories that explains the mechanism of opening and closing of the stomata: (3mks)

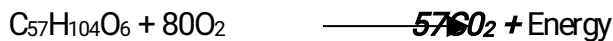
14. The diagram below represents a model of lungs and thorax. When rubber sheet is pulled downwards the balloons inflate; and when it is raised the balloons deflate.



- a) What parts of the mammalian body are represented by;
- i) Glass tubes.....(1mk)
 - ii) Bell jar.(1mk)
 - iii) Rubber sheet.(1mk)
 - iv) Balloons.(1mk)

b) State the importance of breathing through the nose than through the mouth (2mks)

15. The oxidation of a certain substrate is represented by the chemical equation shown below.

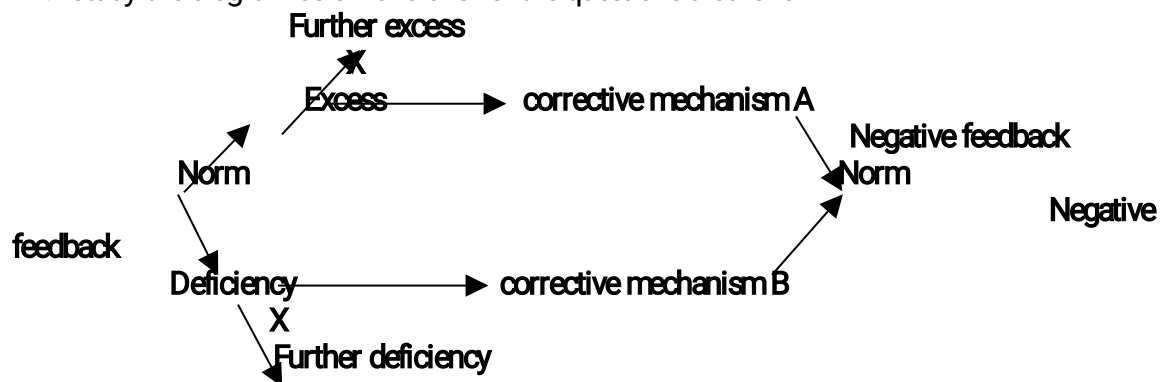


- a) Calculate the respiratory quotient (RQ) of the substrate. (2mks)
- b) Identify the above substrate. (1mk)

16. An animal is found to have large glomeruli and short loop of Henles. Account for the presence of

- i) Large glomerul (1mk)
- ii) Short loop of Henle.
- iii) State the possible aquatic habitat (1mk)

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



a) Name the principle labeled X (1mk)

b) If the above diagram represented blood sugar regulation

- i) State the corrective mechanisms carried out at A (2mks)
- ii) The condition that may result from the further excess (1mk)
- iii) The hormone that would be responsible for correcting the deficiency (1mk)

18. a) The skin as an organ plays a role in Homeostasis. Name **two** roles of the human skin in homeostasis. (2mks)

b) Melanocytes are cells of the skin responsible for production of a skin pigment.

- (i) Name the pigment produced by melanocytes (1mk)
- (ii) In which layer of the epidermis of the skin are melanocytes found? (1mk)
- (iii) State the primary function of the pigment named in (b)(i) above. (1mk)

19. List down two economic importance anaerobic respiration agriculture

(2mks)

ASSIGNMENT 6

TRANSPORT IN PLANTS

1. In an experiment, a leafy shoot was set up in a photometer and kept in a dark room for 2 hours. The set up was then transferred to a well-lit room for 2 hours.

- a) What was the aim of this experiment? (1mk)
- b) Explain the results which would be expected in each of the two experiments conditions. (3mks)

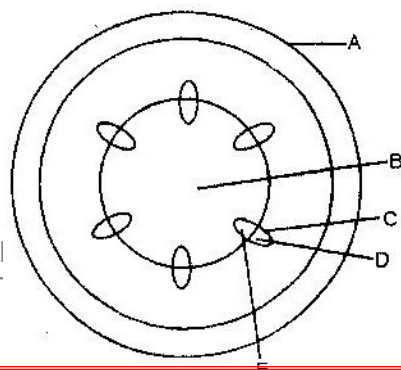
2. Explain how drooping of leaves on a hot sunny day is advantageous to plant.

(2mks)

3. Explain how environmental factors affect the rate of transpiration in flowering plants.

(20mks)

4. The diagram below represents a transverse section of a young stem.



a) Name the parts labeled A and B (2mks)

A_____

B_____

b) State the functions of the parts labeled C, D and E

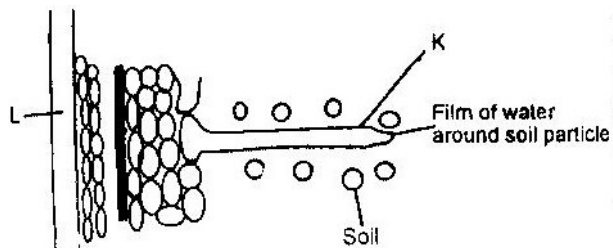
C_____

D_____

E_____

c) List three differences between the section shown above and one that would be obtained from the root of the same plant (3mks)

5. The diagram below represents the pathway of water from soil into the plant.



a) Name the structures labeled K and L

K_____

_____ (2mks)

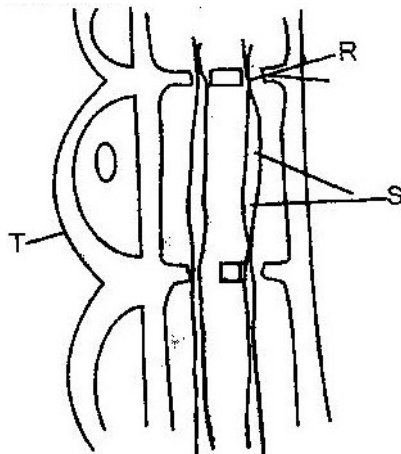
b) Explain how water from the soil reaches the structure labeled L. (5mks)

c) Name the process by which mineral salts enter into the plant. (1mk)

6. State two ways in which xylem are adapted to their function. (2mks)

7. What makes young herbaceous plant remain upright? (2mks)

8. The diagram below represents part of phloem tissue



a) Name the structures labeled R and S and a cell labeled T.

R _____

S _____

Cell T _____ (3mks)

b) State the function of the structure labeled S. (1mk)

c) Explain why xylem is a mechanical tissue (2mks)

9. Name the

- a) Material that strengthens xylem tissue. (1mk)
- b) Tissue that is removed when the bark of a dicotyledonous plant is ringed.

(1mk)

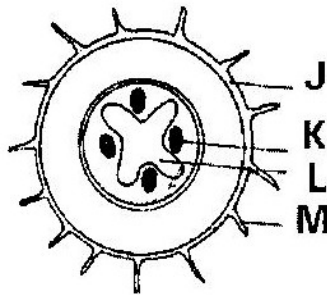
10. How are xylem vessels adapted for support? (1mk)

11. What is the role of vascular bundles in plant nutrition? (3mks)

12. a) Name two tissues which are thickened with lignin. (2mks)

b) How is support attained in herbaceous plant? (1mk)

13. The diagram below represents a transverse section through a plant organ.



a) From which plant organ was the section obtained? (1mk)

b) Give two reasons for your answer in (a) above. (2mks)

c) Name the parts labeled J, K and L (3mks)

J _____

K _____

L _____

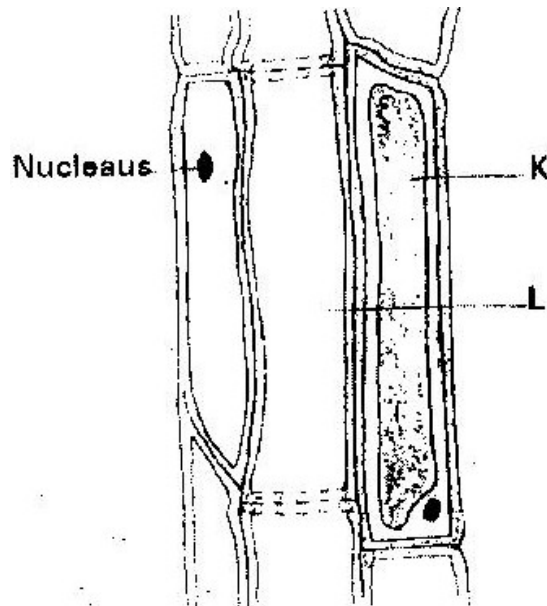
d) State two functions of the part labeled M. (2mks)

14. Describe how water moves from the soil to the leaves in a tree. (20mks)

15. State two ways in which the root hairs are adapted to their function.

(2mks)

16. The diagram below represents a plant tissue.



17. In an experiment to determine the effect of ringing on the concentration of sugar in phloem, a ring of bark from the stem of a tree was cut and removed. The amount of sugar in grammes per 16cm^3 piece of bark above the ring was measured over a 24 hour period. Sugar was also measure in the bark of a similar stem of a tree which was not ringed. The results are shown in the table below

Time of the day	Among of sugar in grammes per 16 cm ³ piece of bark	
	Normal stem	Ringed stem
06 45	0.78	0.78
09 45	0.80	0.91
12 45	0.81	1.01
15 45	0.80	1.04
18 45	0.77	1.00
21 45	0.73	0.95
00 45	0.65	0.88

- a) Using the same axes, plot a graph of the amount of sugar against time
(6mks)
- b) At what time was the amount of sugar highest in the;
- Ringed stem (1mk)
 - Normal stem (1mk)
- c) How much sugar would be in the rigged stem if it was measured at 03 45 hours.
(2mks)
- d) Give reasons why there was sugar in the stems of both trees at 06 45 hours.
(2mks)
- e) Account for the shape of the graph for the tree with ringed stem between:
- 06 45 hours and 15 45 hours (3mks)
 - 15 45 hours and 00 45 hours (2mks)
- f) Other than sugars name two compounds that are translocated in phloem.

(2mks)

18. Explain why plants shed off their leaves. (2mks)
19. a) What is the importance of transpiration to plants?
b) Give adaptive features which enable a plant to reduce the loss of water.

ASSIGNMENT SEVEN TRANSPORT IN ANIMALS

1. People can die when they inhale gases from burning charcoal in poorly ventilated rooms. What compound is formed in the human body that leads to such deaths?
(1mk)
2. Explain why blood from a donor whose blood group is A cannot be transfused into a recipient whose blood group is B. (2mks)
3. State one difference between closed and open circulatory systems. (1mk)
4. a) Give an example of a phylum where all members have
i) Open circulatory system
ii) Closed circulatory system (2mks)
b) What are the advantages of the closed circulatory system over the open circulatory system? (5mks)
5. Explain two ways in which mammalian erythrocytes (red blood cells) are adapted to their function (2mks)
6. a) i) Name the blood vessels that link arterioles with venules. (1mk)
ii) Explain four ways in which the vessels you named in (a)

above are suited to carrying out their functions. (4mks)

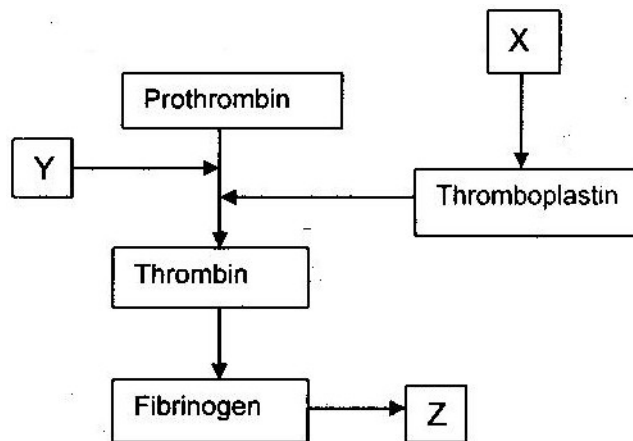
b) State two ways in which the composition of blood in the pulmonary arterioles differ from that in the pulmonary venules.

(2mks)

7. Why would carboxyhaemoglobin lead to death? (2mks)

8. Explain how the red blood cells of mammals are adapted for efficient transport of oxygen. (2mks)

9. The chart below is a summary of the blood clotting mechanism in man.



Name

- i) The blood cells represented by X
- ii) Metal ion represented by Y
- iii) The end product of the mechanism represented Z

10. a) How can excess bleeding result in death? (2mks)

b) Name the process by which the human body naturally stops bleeding. (1mk)

- c) How can low blood volume be brought back to normal? (2mks)
11. a) Name one defect of the circulatory system in humans. (1mk)
- b) State three functions of blood other than transport. (3mks)
12. a) What prevents blood in veins from flowing backwards? (1mk)
- b) State two ways in which the red blood cells are adapted to their function. (2mks)
13. State one way by which HIV/AIDS is transmitted from mother to child. (1mk)
14. Explain how the various components of blood are adapted for their function. (20mks)
15. Distinguish between blood, plasma, serum, tissue fluid and lymph. (10mks)
16. a) A patient whose blood group is A died shortly after receiving blood from a person of blood group B. Explain the possible cause of death of the patient. (2mks)
- b) A person of blood group AB requires a transfusion.
- i) Name the blood groups of the possible donors (2mks)
- ii) Give reasons for your answer in (i) above. (2mks)
17. Differentiate between active immunity and passive immunity. (2mks)
18. Explain why a person can catch a cold several times in a year but only catches measles once in his or her lifetime. (2mks)
19. Most carbon dioxide is transported from tissues to the lungs within the red blood cells and not in the blood plasma. Give two advantages of this mode of transport.

(2mks)

20. What is the importance of tissue fluid? (2mks)

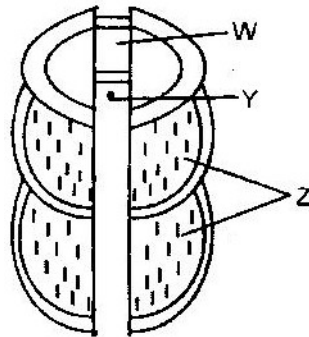
**ASSIGNMENT 8
GASEOUS EXCHANGE**

1. Discuss how gaseous exchange occurs in
 - a) Terrestrial Insects (9mks)
 - b) Bony fish (11mks)
2. a) Explain how mammalian lungs are adapted for gaseous exchange. (8mks)

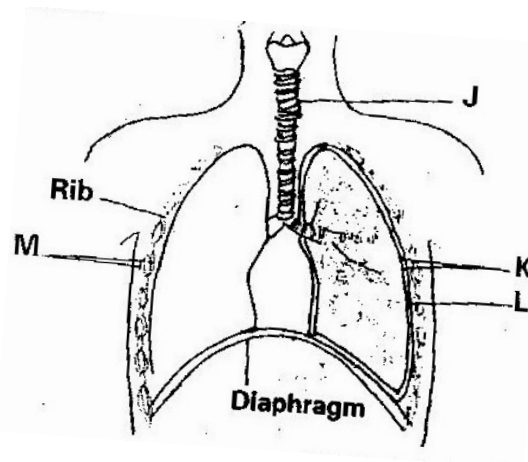
b) Describe how carbon dioxide is produced by
 - i) Respiring muscle cells reaches the alveolar cavities in mammalian lungs.
 - ii) Respiring mesophyll cells of flowering plants reaches the atmosphere. (12 mks)
3. a) Describe the path taken by carbon dioxide released from the tissues of an insect to the atmosphere.

b) Name two structures used for gaseous exchange in plants. (2mks)
4. Why are gills in fish highly vascularized? (1mk)
5. Describe the
 - a) Process of inhalation in mammals. (10 mks)
 - b) Mechanism of opening and closing of stomata (10 mks)
6. Name three sites where gaseous exchange takes place in terrestrial plants. (3mks)
7. How is aerenchyma tissue adapted to its function? (2mks)

8. The diagram below represents a part of the rib cage.



- a) Name parts labeled W, Y and Z
- b) How does the part labeled Z facilitates breathing in? (1mk)
9. State two ways in which floating leaves of aquatic plants are adapted to gaseous exchange. (2mks)
10. a) Name two structures for gaseous exchange in aquatic plants. (2mks)
- b) What is the effect of contraction of the diaphragm muscles during breathing in mammals? (3mks)
11. The diagram below represents some gaseous exchange structures in humans.



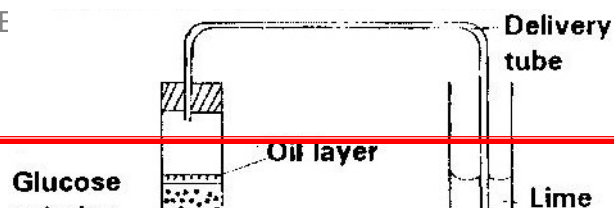
- a) Name the structure labeled K, L and M (3mks)

- b) How is the structure labeled J suited to its functions? (3mks)
- c) Name the process by which inhaled air moves from the structure labeled L into blood capillaries. (1mk)
- d) Give the scientific name of the organism that causes tuberculosis in humans. (1mk)
12. State three factors that make alveolus adapted to its function. (3mks)
13. Explain how the alveoli are ventilated.
14. Explain why water logging of the soil may lead to death in plants. (2mks)
15. Write three advantages of breathing through nose than through mouth. (3mks)
16. State and explain ways the leaves are adapted for gaseous exchange (4mks)
17. Name three gaseous constituents involved in gaseous exchange in plants. (3mks)
18. Name three sites of gaseous exchange in frogs. (3mks)
19. Name the main site of gaseous exchange in
- Mammals
 - Fish
 - Leaves
 - Amoeba (4mks)
20. Name the physiological process by which gas exchange takes place at the respiratory surface in animals and plants (1mk)

ASSIGNMENT 9 RESPIRATION

1. The diagram below shows a set up that was used to demonstrate fermentation.

GOLDEN ELITE E



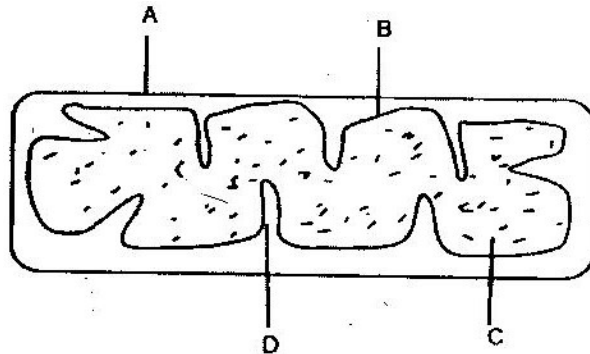
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Glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before adding the yeast suspension.

- a) Why was the glucose solution boiled before adding the yeast suspension? (1mk)
 - b) What was the importance of cooling the glucose solution before adding the yeast suspension? (1mk)
 - c) What was the use of the oil in the experiment? (1mk)
 - d) What observation would be made in test tube B at the end of the experiment (1mk)
 - e) Suggest a control for this experiment (1mk)
2. Give two reasons why accumulation of lactic acid during vigorous exercise lead to an increase in heart beat. (2mks)
3. A process that occurs in plants is represented by the equation below.
- | | |
|----------------|--------------------------------|
| $C_6H_{12}O_6$ | $2C_2H_5OH + (2CO_2) + Energy$ |
| Glucose | Ethanol Carbon Dioxide |
- a) Name the process (1mk)
 - b) State the economic importance of process name in (a) above. (1mk)

4. Other than carbon dioxide, name the other products of anaerobic respiration in plants.
(2mks)
5. Name the substance which accumulates in muscles when respiration occurs with insufficient oxygen.
(1mk)
6. a) In what form is energy stored in muscles? (1mk)
b) State the economic importance of anaerobic respiration in plants.
(2mks)
7. State four ways in which respiratory surfaces are suited to their function.
(4mks)
8. a) A dog weighing 15.2kg requires 216kJ while a mouse weighing 50g requires 2736kJ per day. Explain. (2mks)
b) What is the end product of respiration in animals when there is insufficient oxygen supply? (1mk)
9. a) Name the products of anaerobic respiration in:
i) Plants (1mk)
ii) Animals (1mk)
b) What is oxygen debt? (1mk)
10. $5C_{51}H_{98}O_6 + 145O_2 \rightarrow 1 O_2CO_2 + 98 H_2O + \text{energy}$
The above equation shows an oxidation reaction of food substances.
- a) What do you understand by the term respiratory quotient? (1mk)
b) Determine respiratory quotient of the oxidation of food substance.
(2mks)
c) Identify the food substances. (1mk)

- 11 Write differences between aerobic respiration and photosynthesis. (4mks)
12. Below is a diagram of an organelle that is involved in aerobic respiration.



- a) Name the organelle (1mk)
- b) Name the parts labeled A, B, and C. (3mks)
- c) What is the purpose of the folding labeled D? (1mk)
- d) Give the chemical compound which is formed in the organelle and forms the immediate source of energy.

ASSIGNMENT 10 EXCRETION AND HOMEOSTASIS

1. In an investigation the pancreatic duct of a mammal was blocked. It was found that the blood sugar regulation remained normal while food digestion was impaired. Explain these observations. (2 marks)
2. (a) Explain why the body temperature of a healthy human being must rise up to 39^oc on a humid day. (2 marks)
- (b) In an experiment a piece of brain was removed from rat. It was found that the rat had large fluctuations of body temperatures suggest the part of the brain that had been removed. (1 mark)
3. (a) Explain why sweat accumulates on a person's skin in a hot humid

Environment. (2 marks)

(b) Name the specific part of the brain that triggers sweating.

(1 marks)

4. Explain why some desert animals excrete uric acid rather than ammonia.

(2 marks)

5. State the role of the following hormones in the body

(a) Insulin (3 marks)

(b) Antidiuretic Hormone (3 marks)

6. What osmoregulatory changes would take place in a marine amoeba if it was transferred to a fresh water environment?

7. Name two components of blood that are not present in glomerular filtrate.

(2 marks)

8. How would one find out from a sample of urine whether a person is suffering from diabetes mellitus? (2 marks)

9. When is glycogen, which is stored in the liver, converted into glucose and released into the blood? (2 marks)

10. A person was found to pass out large volumes of dilute urine frequently. Name the

(a) Diseases the person was suffering from (1 marks)

(b) Hormone that was deficient (1 mark)

11. State the importance of osmoregulation in organisms (2 marks)

12. What happens to excess fatty acids and glycerol in the body? (2 marks)

13. Give reasons for each of the following

(a) Constant body temperature is maintained in mammals (1 mark)

(b) Low blood sugar level is harmful to the body (2 marks)

14. The temperature of a person taken before during and after taking a cold bath. The results are shown in the graph

(a) Explain why the temperature fell during the bath (2 marks)

(b) What changes appeared in the skin that enabled the body temperature to return to normal. (2 marks)

15. (a) Name the fluid that is produced by sebaceous glands (1 mark)

(b) What is the role of sweat on the human skin? (2 marks)

16. State the role of insulin in the human body? (1 mark)

17. Describe how the human kidney functions. (20 marks)

18. (a) What is the meaning of the following terms:

(i) Homeostasis (1 mark)

(ii) Osmoregulation (1 mark)

19. (a) Explain what happens to excess amino acids in the liver of humans. (3 marks)

(b) Which portions of the human nephrons are only found in the cortex?

(3 marks)

(c) (i) What would happen if a person produced less antidiuretic hormone?

(1 mark)

(ii) What term is given to the condition described in (c) (i) above?

(1 mark)

20. Define the following terms

(a) Excretion

(b) Secretion

(c) Egestion

(3 marks)

21. Name the components of blood that do not enter the renal tubule in mammals

(2 marks)

22. The table below shows the approximate percent concentration of various components in blood plasma entering the kidney glomerular filtrate and urine of a healthy human being.

Component	Plasma	Glomerular	Urine Filtrate
Water	90	90	94
Glucose	0.1	0.1	0
Amino Acids	0.05	0.05	0
Plasma proteins	8.0	0	0
Urea	0.03	0.03	2.0
In organic ions	0.72	0.72	1.5

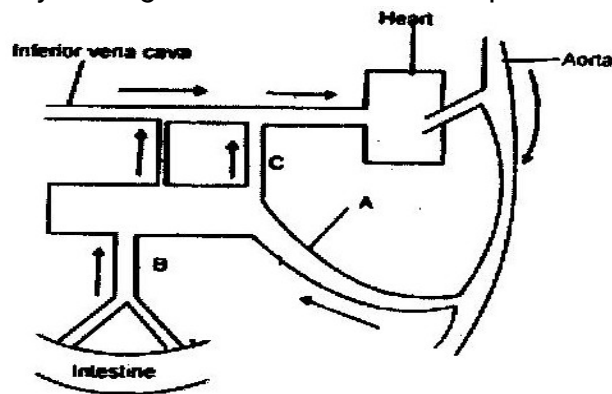
- (b) Name the process responsible for the formation of glomerular filtrate.
- (c) What process is responsible for the absence of glucose and amino acids in urine?
- (d) Explain why there are no plasma proteins in the glomerular filtrate
- (e) Besides plasma proteins what other major component of blood is absent in the glomerular filtrate.
- (f) Why is the concentration of urea in urine much higher than its concentration in the glomerular filtrate?

23. When the environmental temperature is very high, some animals urinate on their legs or lick the sides of their body. How does this help in temperature regulation?

24. Fish are able to use more of their food intake for growth than mammals. Suggest an explanation for this.

25. Explain the term negative feedback

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



- (a) Name the blood vessels labeled A, B and C.
- (b) If the animal has recently fed on a diet which is rich in proteins and

carbohydrates in which of the vessels labeled A, B, and C would you expect to find the highest concentration of:

- (i) Glucose
 - (ii) Amino acids
 - (iii) Carbon (IV) oxide
 - (iv) Oxygen
 - (v) Urea
- (c) During fasting, the level of blood glucose in vessels C may be higher than the level in vessel B
explain

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- 8) Business
- 9) Agriculture
- 10) Home science
- 11) Physics
geography