

TOPICS HIGHLIGHTED

1. Classification I &	
II.....	4
2. The cell – structure & functions of	
organelles.....	5
3. Cell physiology – osmosis, diffusion and active	
transport.....	9
4. Nutrition in (a) plants (b)	
animals.....	13
5. Transport in (a) plants (b)	
animals.....	24
6. Gaseous exchange in (a) plants (b)	
animals.....	30

7. Respiration.....	34
8. Excretion and homeostasis.....	37
9. Ecology.....	45
10. Reproduction in (a) plants (b) animals.....	53
11. Growth and development in (a) plants (b) animal.....	61
12. Genetics.....	68
13. Evolution.....	75
14. Irritability and sensitivity in (a) plants (b) animals.....	77
15. Support and movement in (a) plants (b) animals.....	82
16. Human health.....	85.

FORM 1 BIOLOGY.

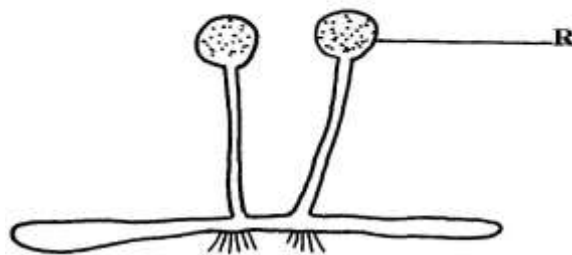
SECTION I & II QUESTIONS

- *This section deals with paper one and two questions. In paper one you will find simple questions requiring simple answers, single answer and/or a sentence.*
- *In paper two structured data based questions and essay questions.*

1. Classification I &II

1. Name **two** classes of phylum arthropoda with cephalothorax.
2. List any **three** distinguishing features of class mammalia.
3. Give **two** characteristics that distinguish scientific names of organisms from the ordinary names
4. (a) In which kingdom do bacteria belong?
(b) Give any **two** benefits of bacteria to man
5. Name the phylum whose members possess notochord
6. The diagram below represents a bread

mould:-



- (a) Identify the kingdom to which the organism belongs:-
7. Give a reason why no moulting occurs during the adult stages of insects
8. Name the branch of Biology that deals with the study of animals

9. State **four** ways in which some Fungi are beneficial to human

10. During a class practical four students came across a plant whose flower floral parts were in

multiples of fours and fives. To which sub-division and class does the plant belong?

11. A student caught an animal which had the following characteristics:-

- Body divided into two parts
- Simple eyes
- Eight legs



- The animal belongs to the class

12. The diagram below represents a bread mould.

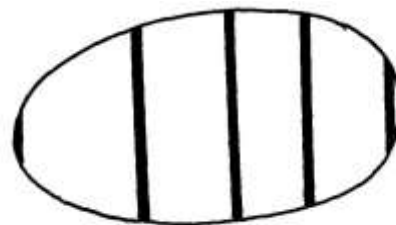
- (a) (i) Name the Kingdom to which bread mould belongs.
(ii) Give **two** distinguishing characteristics of the Kingdom named in (a)(i) above.

- (b) State the function of the part labelled **R**
13. (a) What is meant by the term taxonomy?
- (b) The scientific name of a rat is *Rattus norvegicus*
- (i) Write the name correctly
- (ii) Identify the genus and species names
14. List **three** features that distinguish arthropods from other organisms

2. The cell – structure & functions of organelles

1. Name the organelles that perform each of the following functions:
- a) Digestion and destruction of worn out organelles.
b) Osmoregulation
2. Explain why the following processes are important during the preparation of temporary slides :-
- (a) Staining
(b) Use of a sharp cutting blade

3. In a class experiment to establish the size of an onion cell, a learner observed the following on the microscope field of view.



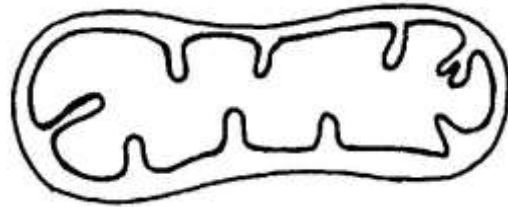
If the student counted 20 cells across the diameter of this field of view, calculate the size of one cell in micrometers.

4. State the functions of the following cell organelles: (a) Nucleolus.
(b) Plasma membrane
5. What is the of nucleus of a cell made up of?

6. (a) In a laboratory exercise a student observing a drop of pond water under a microscope saw
 and drew a spirogyra. If the magnification of the eye-piece was x5 and that of the objective
 lens was x100, what was the magnification of the spirogyra?

(b) If the spirogyra has a length of 5cm at the above magnification, calculate the actual length
 in micrometers

7. (a) Identify the organelle shown below:-

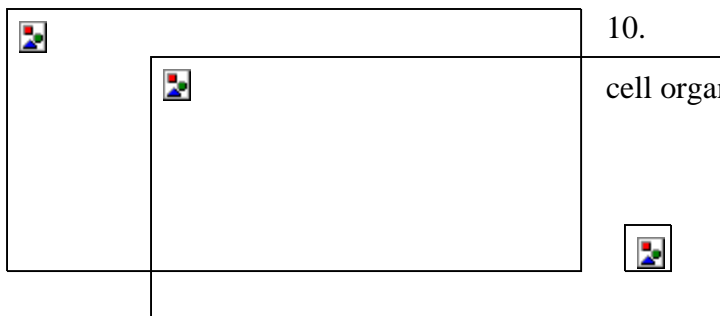


(b) How is the organelle you have identified in (a) above suited to its function

8. Identify the structures of the cells that perform the following functions:-

- (a) Synthesize ribosomes
- (c) Regulate exchange of substances in and out of the nucleus

9. (a) State the roles of enzyme catalase in living cells
 (b) Which factor inactivates enzyme?



10. The figure below represents a certain cell organelle:-

- (a) (i) Identify the cell organelle
- (ii) What is the function of the part labelled A
- (b) Name the organelles that perform each of the following functions;
 - (i) Osmoregulation in amoeba

(ii) Carries out digestion and destruction of worn out cell organelles

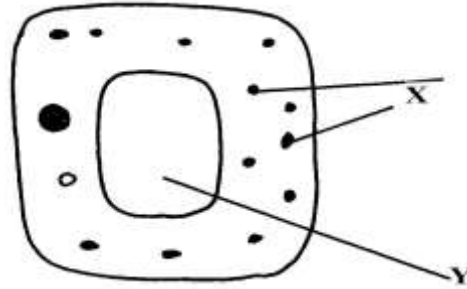
		<p>11. State three properties of the cell membrane</p> <p>12. The diagram below represents a plant cell</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------

- (a) Name a carbohydrate which forms part of the structure labelled **S**
 (b) State **two** functions of the part labelled **R**
 (c) Name **two** structures present in the diagram but absent in the animal cell
13. What do you understand by the following terms
- Anatomy
 - Biochemistry
14. State the function of the following parts of a cell
- Ribosome
 - Chloroplasts
15. a) What is the formula for calculating linear magnification of a specimen when using a hand lens
16. State the function of the following cell structures:-
- Ribosome ;
 - Centrioles ;
17. What is the main structural component of:-
- Cell wall
 - Cell membrane

18. State **two** characteristics of the kingdom monera which are prokaryotes

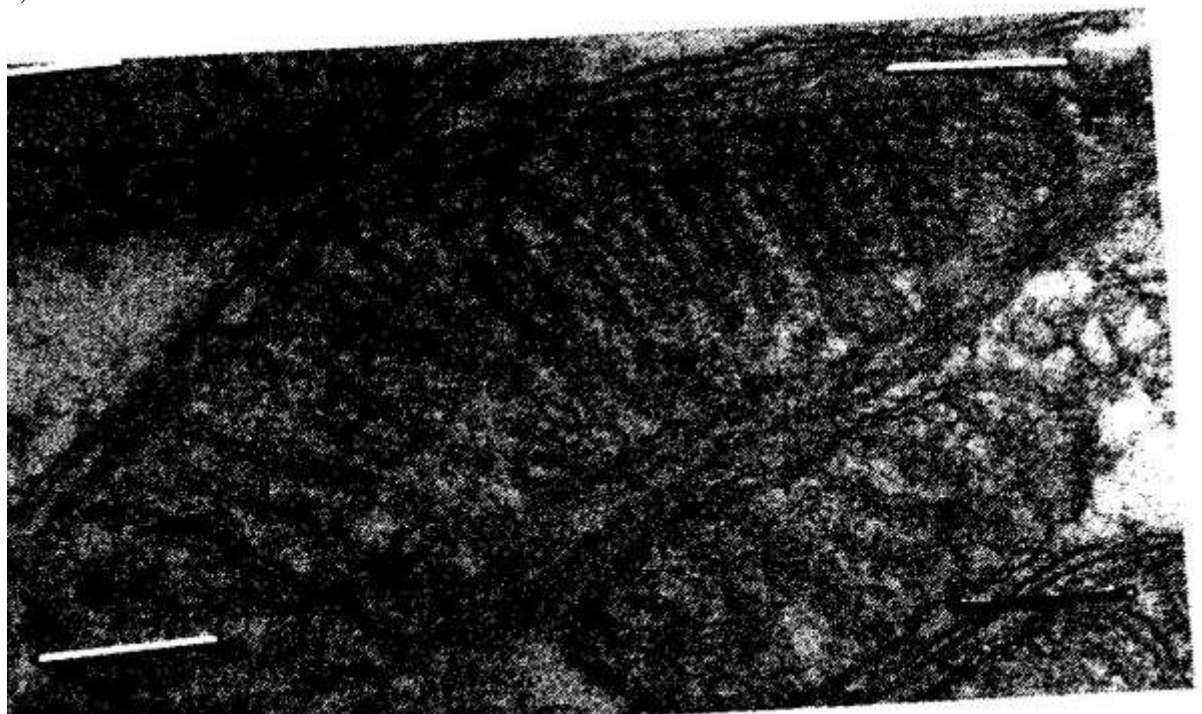
19. The diagram below represents a

cell



- (a) Name parts labelled **X** and **Y**
b) Suggest why the structures labelled **X** would be more on one side than the other
20. During a practical class, four estimated the field of view to be 3.5mm. Using the low power objective, they observed spirogyra cells across the same field of view and counted 8 cells.
Calculate the size of each cell and give your answer in micrometer
21. A student caught an animal which had the following characteristics:-
- Body divided into two parts
 - Simple eyes
 - Eight legs
- a) To what class does the animal belong?
b) State **two** distinctive characteristics of members of the phylum from which the animal in this question (15) belongs
22. Distinguish between the following terms :-
- a) Magnification and resolution of a microscope
b) Mounting and staining of a specimen
23. Name the organelle that performs **each** of the following functions in a cell.
- (a) Transport of packaged glycoproteins
(b) Destruction of worn out cell organelles
(c) Synthesis of proteins
24. Why are the following procedures done when preparing sections to be observed under a light microscope?
- (a) Making of thin sections
(b) Using a sharp blade to make the sections
(c) Staining
25. What are the functions of the following parts of a light microscope?
- (a) Eye piece lens
(b) Condenser

- (c) Diaphragm
26. Given that the diameter of the field of view of a light microscope is 2000 μ m. Calculate the size of a cell in mm if 10 cells occupy the diameter of the field of view
27. State the importance of the following processes in microscopy:
- (a) staining
 - (b) sectioning
28. A cell was found to have the following under a light microscope; cell membrane, irregular in shape, and small vacuoles. Identify the type of the cell above
29. State the functions of the following organelles;
- (a) Lysosomes
 - (b) Golgi apparatus
30. Name the class in phylum arthropoda which has the largest number of individuals
31. State the functions of each of the following parts in a microscope.
- (a) The eye piece lens
 - (b) The objective lens
32. The figure below represents an electron micrograph of an organelle that is found in many cells;



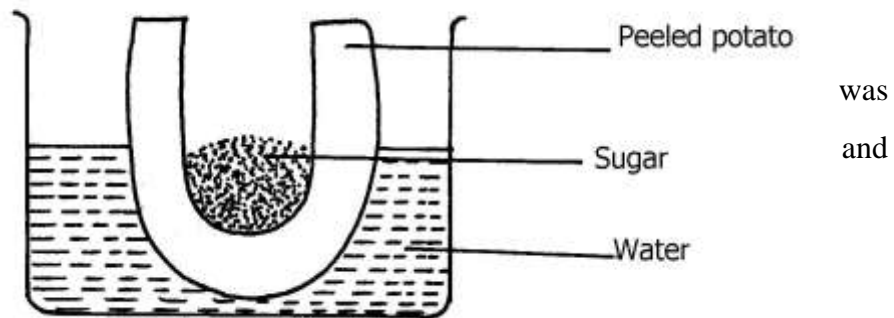
- (a) Identify the organelle
- (b) State the function of the organelle
- (c) What is the importance of infoldings in the inner membrane.
- (d) Give **two** examples of tissues where you would expect many such organelles in animal body.

3. Cell Physiology – Osmosis, Diffusion and Active transport

1. Two equal strips **A** and **B** were from a potato whose cell was 30% of sugar. The strip **A** was placed in a solution of 10% sugar concentration while **B** was placed in 50% sugar concentration

- a) What change was expected in strip **A** and **B**
- b) Account for the change in strip **A**

2. An experiment set-up as shown below left for one hour

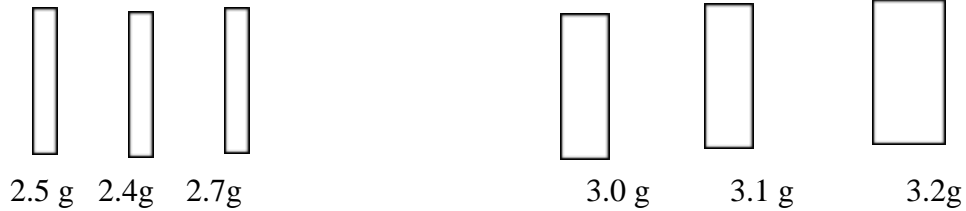


- (a) State the expected result at the end of one hour
 - (b) Explain the observations made in this experiment
3. State what would happen in each of the following:-
 - (a) A plant cell placed in: -
 - (i) Strong salt solution
 - (ii) Distilled water

4. State **three** physiological processes that are involved in movement of substances across the cell membrane

membrane

5. Potato cylinders were weighed and kept in distilled water overnight. They were then reweighed.

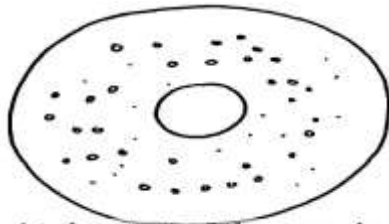


At the beginning of the Experiment.

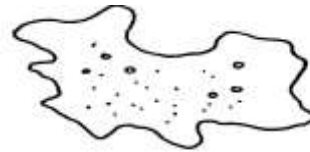
At the end of the experiment

- a) Calculate the average mass of a potato cylinders after reweighing. Show your working.
- b) Explain why mass of the cylinders had increased.

6. The diagrams below show a red blood cell that was subjected to a certain treatment.



At the start of the experiment



At the end of the experiment

- a) Account for the shape of the cell at the end of the experiment.
- b) Draw a diagram to illustrate how a plant cell would appear if subjected to the same treatment

treatment

7. The

shows the

when red

placed in

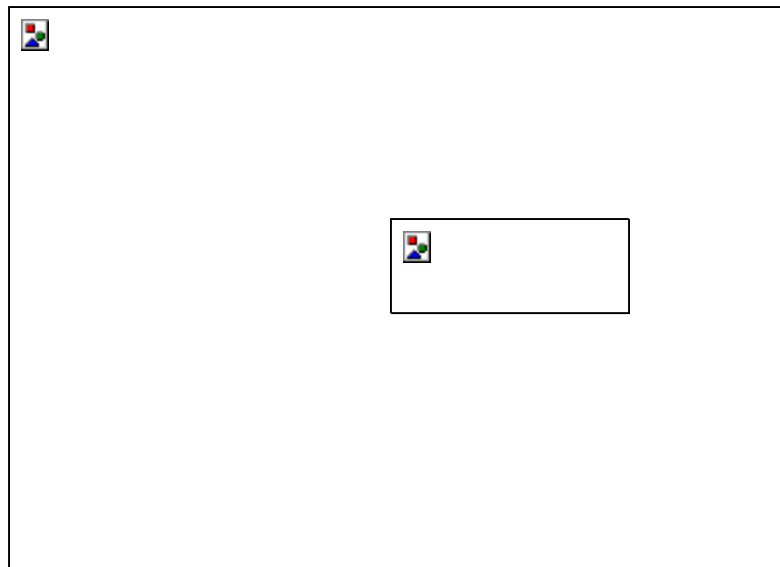


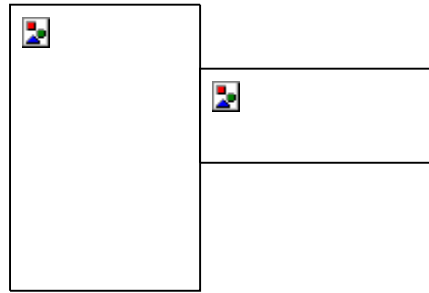
diagram below

results obtained

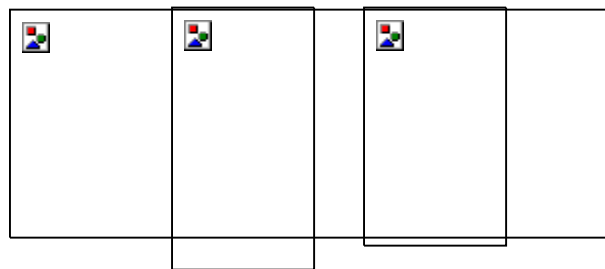
blood cells are

different

solution:



- (a) What name is given to the process that occurs when the cell is placed in solution **Y**?
- (b) Describe the process that would occur in a plant cell when placed in a similar solution as that of solution **X**
8. The figure below shows the results obtained when red blood cells are put in different solutions:-



- (a) What is the name given to the process that occurs when the cell is put into solution **B**?
- (b) Compare the results obtained when the cell is put in solution **B** to the results that would be obtained if a plant cell was put in the same solution
9. Briefly state **two** adaptation for each of the following cells to their functions
- (i) Spermatozoon
- (ii) Palisade mesophlly cell
10. The diagram below represents a cell at a certain stage in meiotic cell division

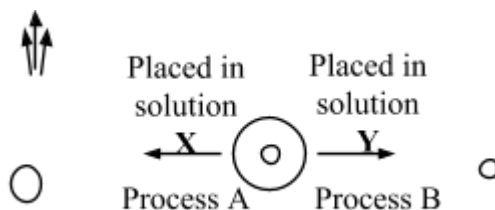


- a) Name the stage at which the cell drawn above represents
- b) Give a distinguishing reason for your answer in **21(a)** above

- c) State any **two** differences between mitosis and meiosis
11. What are **two** differences between tropisms and tactic movement
12. An experiment was carried out to investigate the effect of different concentrations of sodium chloride on human red blood cells. Equal amounts of blood were added to equal volumes of the salt solution but of different concentrations. The results are shown in the table below:

Set -up	Sodium chloride concentration	Number of red blood cells	
		At start of experiment	At the end of the experiment
A	0.9%	Normal	No change in number
B	0.3%	Normal	Fewer in number

- (a) Account for the results in the set-up
- (b) If the experiment was repeated using 1.4% sodium chloride solution, state the expected results with reference to:
- the number of red blood cells
 - the appearance of red blood cells if viewed under the microscope
13. Name support tissues in plants characterized by the following
- Cells being turgid
 - Cells being thickened by cellulose
 - Cells being thickened by lignin
14. The diagram below illustrates the behaviour of red blood cells when placed into two different solutions **X** and **Y**.

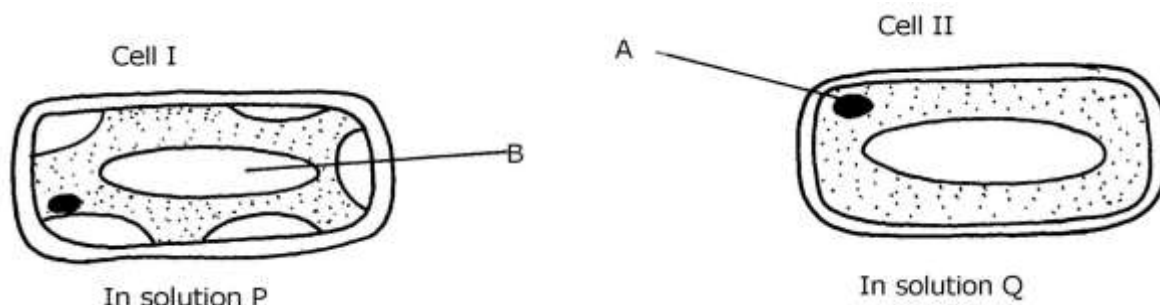


- Suggest the nature of solutions **X** and **Y**.
- Name the process **A** and **B**.
- What would happen to normal blood cell if it were placed in a solution isotonic.

15. Name **two** plant processes in which diffusion plays an important role
16. Two fresh potato cylinders of equal length were placed one in distilled water and the other in concentrated sucrose solution:

- (a) Account for the change in length of the cylinder in:
- (i) Distilled water
 - (ii) Sucrose solution
- (b) (i) What would be the result in terms of length if a boiled potato was used?
 (ii) Explain your answer in **(b)(i)** Above
- (c) State **two** uses of the physiological process being demonstrated in the experiment

17. The two cells shown below are obtained from two different potato cylinders which were



immersed in two different solutions **P** and **Q**.

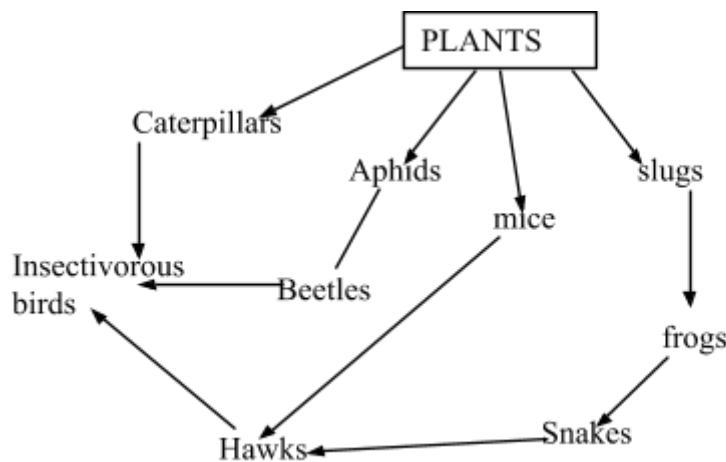
- a) i) Name the structure labelled **A**.
 - ii) State the function of structure **B**.
- b) If eight of cell I were observed across the diameter of the field of view of 0.5 mm. Work out the actual diameters of each cell in micrometers.
- c) Suggest the identity of the solution **Q**.
- d) Account for the change in cell I above.
- e) State any **one** importance of the physiological process being demonstrated above in animals.

18. An experiment shown below was set-up to investigate a certain physiological process

in plants:-

- (a) What process was being investigated?
- (b) Give the role of the oil layer in this experiment
- (c) (i) What observation did the students make after leaving the set-up in bright sunlight for two hours?
- (ii) Explain the observation in (c)(i) above
- (d) What effect will the following have on the observation made?:-
- (i) Fanning the shoot
 - (ii) Removing all the leaves from the shoot
 - (iii) Placing the set-up in the dark
- (e) Suggest a suitable control for this experiment

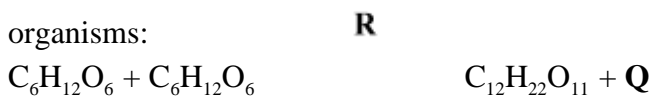
19. Study the following food web and answer questions that follow:



- (a) (i) Name the organisms that occupy the second trophic level
- (ii) What is the other name for the second trophic level
- (b) Write down **two** food chains from the food web that:
 - (i) End with hawks as tertiary consumer
 - (ii) End with hawks as quaternary consumer
- (c) Giving reasons state;
 - (i) the organism with largest biomass
 - (ii) the organism with least biomass

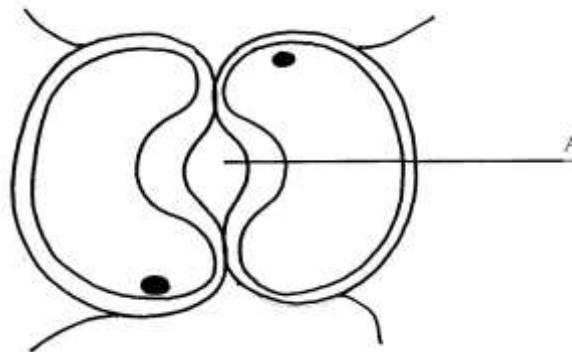
4. Nutrition in (a) plants (b) animals

1. The chemical equation below represents a physiological process that takes place in living organisms:



- (a) Name the process **R**
- (b) Name the substance **Q**

2. The diagram below shows cells in plants:-

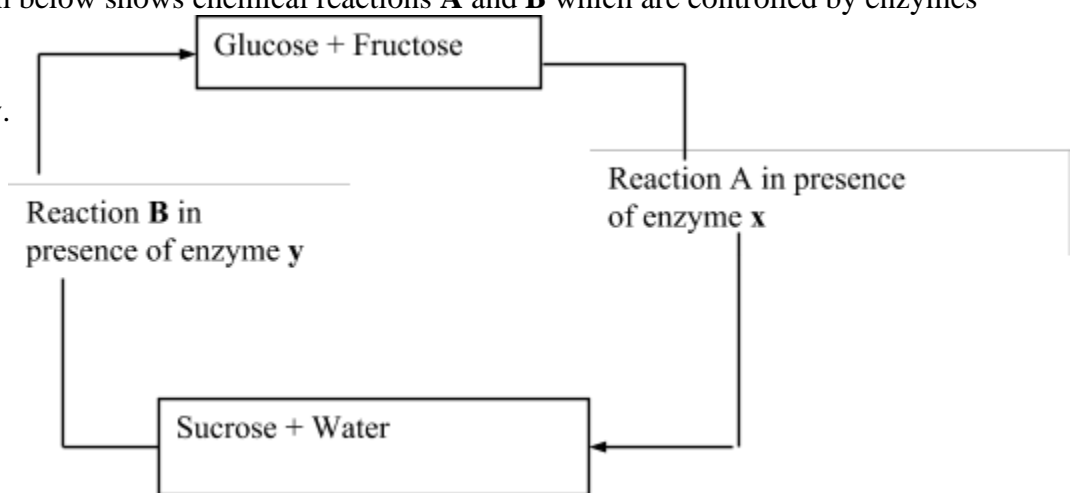


- (a) Identify the cells shown above
- (b) Explain how the cells are adapted to their function
- (c) Explain how accumulation of carbon (IV) Oxide in the cells above would lead to the closure of structure **A**

3. (a) A leaf of a potted plant kept in darkness for 48hours was smeared with Vaseline jelly then exposed to sunlight for 8hours. Explain why the test for starch in the leaf was negative

- (b) Name **two** other processes that were interfered with in the plant
4. List **two** functional differences between plants and animals.
5. Explain how the guard cells are adapted to perform their function.

6. The diagram below shows chemical reactions **A** and **B** which are controlled by enzymes **x** and **y** respectively.



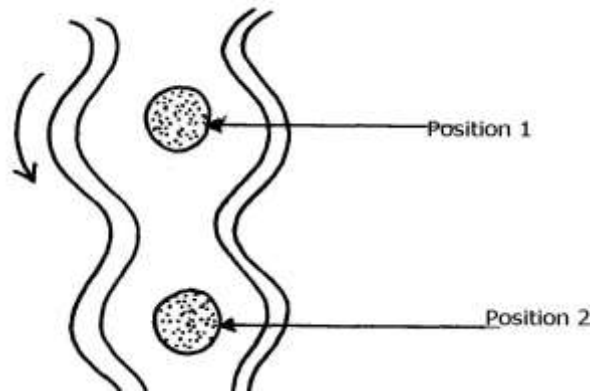
- (a) Name: (i) Reaction **A**.
- (ii) Enzyme **y**

- 7. What are the **two** functions of bile salts during the process of digestion?
- 8. State **three** adaptations of aquatic plants to photosynthesis
- 9. A biological washing detergent contains enzymes which remove stains like mucus and oils

from clothes which are soaked in water with the detergent:-

- (a) Name **two** groups of enzymes that are present in detergent
- (b) Explain why stains would be removed faster with the detergent in water at 35°C rather than at 15°C

- 10. Name the diseases caused by deficiency of : (a) Iodine
(b) Vitamin C
- 11. Name **two** enzymes and **one** metal ion that are needed in the blood clotting process
- 12. The diagram below shows how food boles move along the human oesophogus and the



Intestine

- (a) Identify the process illustrated in the diagram
- (b) Briefly **state** how the movement of food boles from position 1 to position 2 is achieved
- (c) Name **one** component of a persons diet that assists in the movement of food described in (b) above
- 13. State **two** adaptations of herbivores which enable them to digest cellulose
- 14. State **two** factors that affect the rate of osmosis
- 15. A certain organ **K** was surgically removed from a rat, later drastic increase in glucose level in the blood was reported but when substance **Q** was injected into the animal the whole process was reversed.

Identify: (i) Organ **K**

(ii) Substance Q

16. a) Name the component of a persons diet that is essential for peristalsis
b) Give **two** groups of food which are reabsorbed along the mammalian digestive system without undergoing digestion
17. State **three** roles of light in photosynthesis
18. State **two** ways in which the guard cells differ their adjacent epidermal cells
19. One of the components of bile is a chemical left over from destruction of red blood cells
i) Identify the chemical substance
ii) What is the role of bile in digestion
20. (a) What is peristalsis?
(b) Explain how the process above is brought about.
21. The following reaction may occur in a forward and backward direction.
Water + Carbon (IV) Oxide \rightleftharpoons Glucose + Oxygen + Energy
(a) Name the organelle where the reaction occurs in:
(i) Forward direction
(ii) Backward direction
(b) Give **one difference** and **one similarity** for the two organelles named in (a) above
22. A solution of sugar cane was boiled with hydrochloric acid and sodium hydrogen carbonate was added to the solution, which was then boiled with benedicts solution. An orange precipitate was formed.
(a) Why was the solution boiled with hydrochloric acid and then sodium hydrogen carbonate added in it
(b) To which class of carbohydrates does sugar cane belong?
(c) State the form in which carbohydrates are:
(i) Transported in animals
(ii) Transported in plants

23.
The

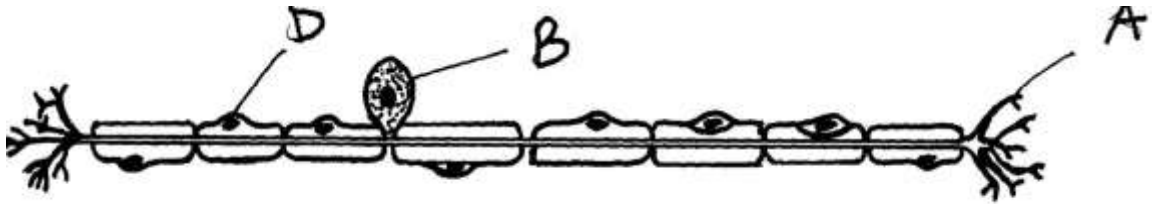
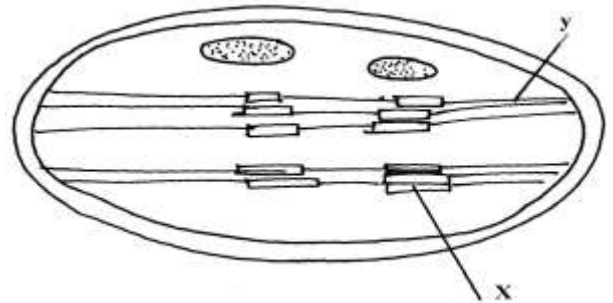


diagram below is of a certain type of neurons

- (a) Identify the type of neuron
- (b) Give a reason for your answer in (a) above
- (c) Give the functions of the parts labeled **A**, **B**, and **D**

24. a) The mitochondria organelle has cristae structure on the inner membrane. State the function of the cristae

b) The diagram below represents a cell organelle

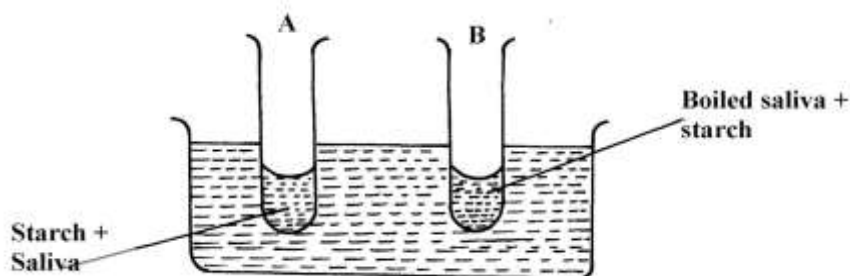


- i) Name the part labeled **Y**
 - ii) State the function of the part labeled **X**
25. a) State the role of emulsification in the digestion of fats in the alimentary canal
- b) What is the function of hydrochloric acid in the alimentary canal
26. Briefly explain the effect of poisoning the roots hair on the uptake of nitrate by plants

27. Briefly explain the symbiotic relationship in the root nodule of a leguminous plant
28. Explain how saliva is important in digestion
29. What is the fate of excess glucose in plants?
30. State **two** ways in which guard cells differ from other epidermal cells
31. Briefly explain the fate of the following products from the light stage of the process of Photosynthesis:
 - (a) Oxygen
 - (b) Hydrogen
 - (c) ATP

32. In an experiment to investigate on aspect of digestion, two test tubes A and B were set-up as

shown in the diagram below;



The test tubes were left in the bath for 30minutes. The content of each test tube was then tested for

starch using iodine solution:-

- (a) What was the aim of the experiment?
 - (b) What results were expected in test-tube **A** and **B**
 - (c) Account of the results you have given in (b) above in test tube **A** and **B**
33. Below is a process that takes place along the mammalian digestive system:

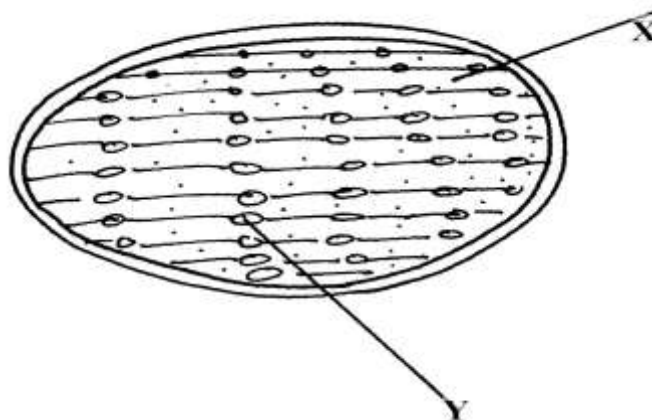
A

Lipids

Fatty acids + glycerol

B

- (a) Name the processes represented by **A** and **B**
- (b) Name part of the alimentary canal where tl
34. The diagram below represents a cell organelle

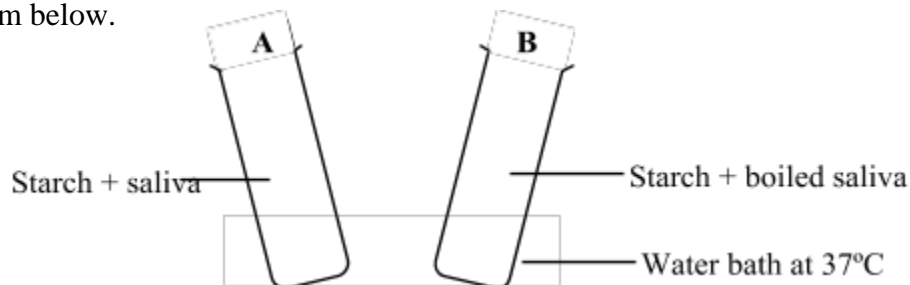


- (i) Name the part labeled **y**
- (ii) State the function of the part labeled **X**
- (ii) State the function of the vitamin named in (i) above
36. (a) Name the disease caused by **schistosoma** parasites in man.
 (b) How is **schistosome** adapted to its parasitic mode of life?
37. The table below shows **three** enzymes **A, B** and **C** and their respective optimum pH.

Enzyme	Optimum pH
A	6.8
B	2.0
C	8.0

- (a) (i) Name the most likely region of the alimentary canal of a mammal where enzyme **B** would be found.
 (ii) Give a reason for your answer in (a) (i) above
38. In an experiment to investigate an aspect of digestion, two tubes A and B were set up as shown

in the diagram below.



The test tubes were left in the water bath for 30 minutes. The content of each tube was then tested

for starch using iodine solution.

(a) What was the aim of the experiment?

(b) Explain the expected in the tube.

39. (a) Name the specific part of the chloroplast where the following processes occur.

(i) Carbon IV oxide fixation

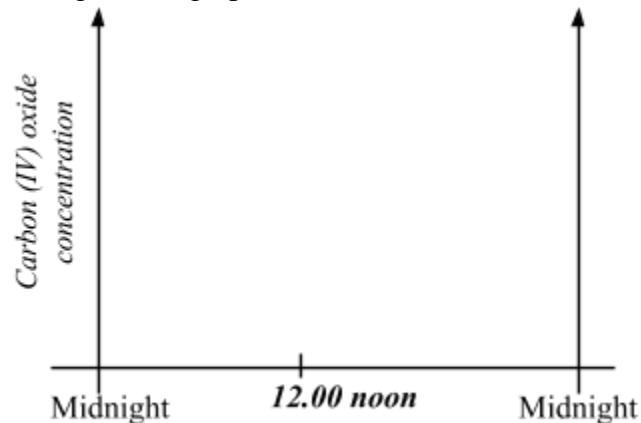
(ii) Photolysis

(b) State **one** way in which the dark reactions of photosynthesis depends on light

reaction.

40. The concentration of carbon IV oxide in a tropical forest was measured during the course of 24

hour period from mid-night. The graph below shows the results obtained.



Account for the results obtained at: (i) Midnight.

(ii) At 12.00 noon.

41. State **three** ways by which the rate of enzyme controlled reactions can be increased.

42. Study the dental formula given below:

$$\begin{array}{cccc} \mathbf{I} & \mathbf{0} & \mathbf{C} & \mathbf{0} \\ \mathbf{4} & \mathbf{0} & \mathbf{3} & \mathbf{3} \end{array} ; \text{PM } \underline{\mathbf{3}}; \text{M } \underline{\mathbf{2}}$$

(a) Identify with reasons the mode of feeding of the animals whose dental formula is given above

(b) Calculate the total number of teeth in the mouth of the above animal

43. Explain why small mammals such as moles feed more frequently than larger ones such as elephants

44. State **three** ways by which plants compensate for lack of the ability to move from one place to another

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

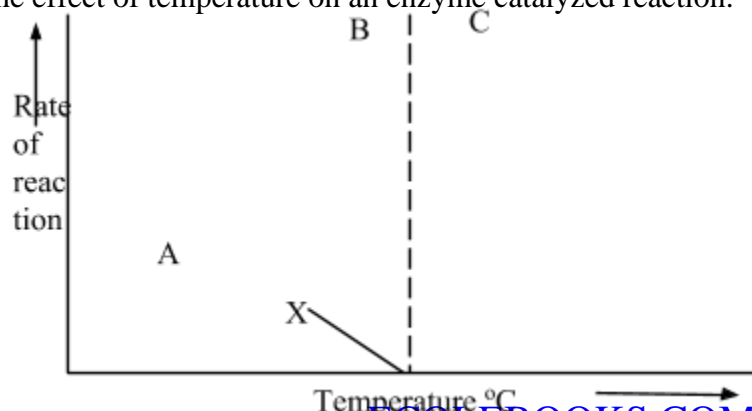
- (a) Label the parts **A** and **B**
- (b) State **one** observable difference between the structure above and the liverwort
- 46. What is glycolysis?
- 47. (a) State **two** difference between monosaccharide and polysaccharides
(b) Name the bond found in proteins
- 48. Name **two** products of light reaction used in the dark reaction
- 49. State **two** functions of the large intestine in humans.
- 50. The diagram below shows a leaf of a growing plant partly covered with aluminium foil.



The plant was placed in the sun from

morning to midday and then tested for starch.

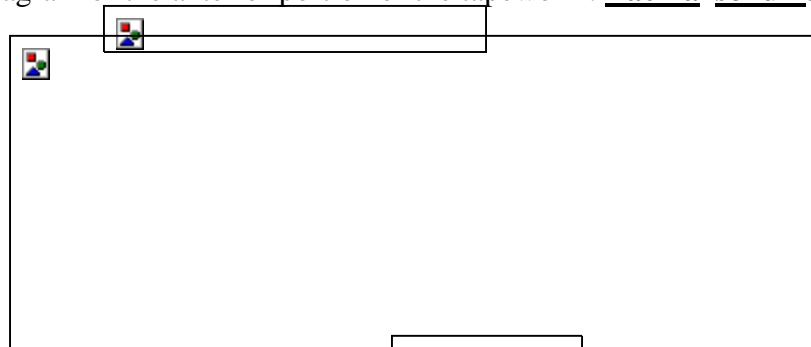
- (a) What was the aim of the experiment?
- (b) State the observation made when the leaf was tested for starch
- 51. The figure shows the effect of temperature on an enzyme catalyzed reaction.



- (a) Explain what happens between **A** and **B**
- (b) What is **X**?

52. Name **two** mineral elements that are necessary in the synthesis of chlorophyll.

53. The figure below is a diagram of the anterior portion of the tapeworm. **Taenia solium**.



- (a) Name the parts labeled **A**, **B**, and **C**
- (b) What is the intermediate host of *Taenia Solium*?

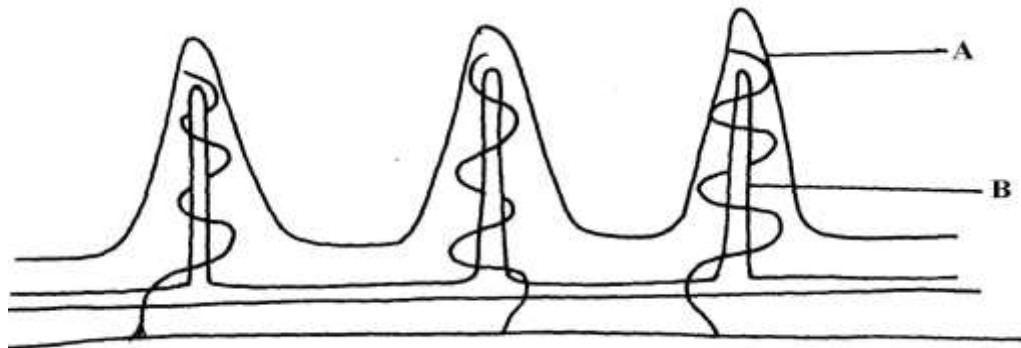
54.

The

diagram

below

represents

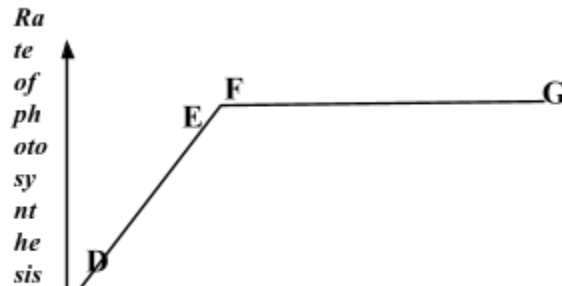


longitudinal section through the ileum wall

- a) Identify the structure labeled **A** and **B**

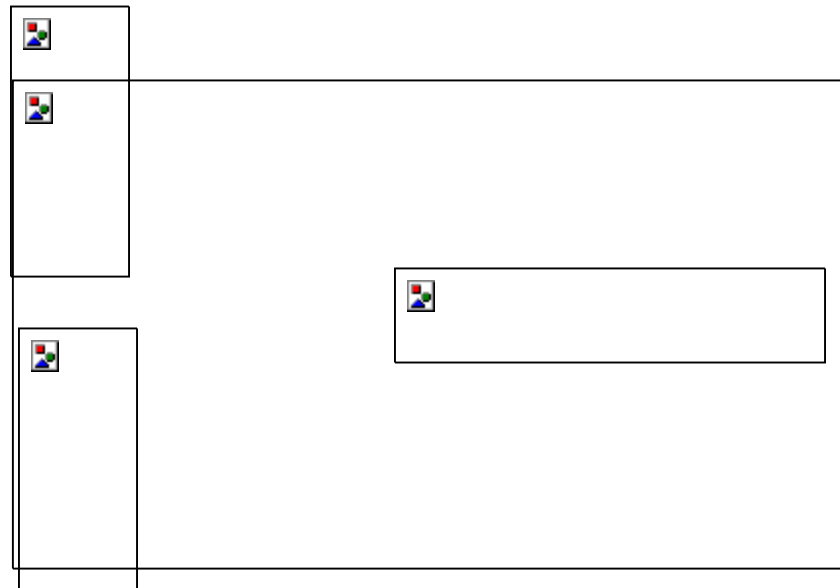
- b) State **one** function of **A** and **B**
- c) State **two** functions of the ileum
- d) Explain the role of the liver in digestion
- e) State the endocrine role of the pancreas in a mammal

55. The chart below shows the relationship between concentration of CO₂ around the plant and the rate of photosynthesis



- (a) Account for the rate of photosynthesis between **D-E**
- (b) Account for the rate of photosynthesis between **F-G**
- (c) Briefly describe the reactions during the light stage of photosynthesis

56. The diagram below shows the effect of varying light intensity on the exchange of carbon IV oxide between the leaves of a green plant and the atmosphere.



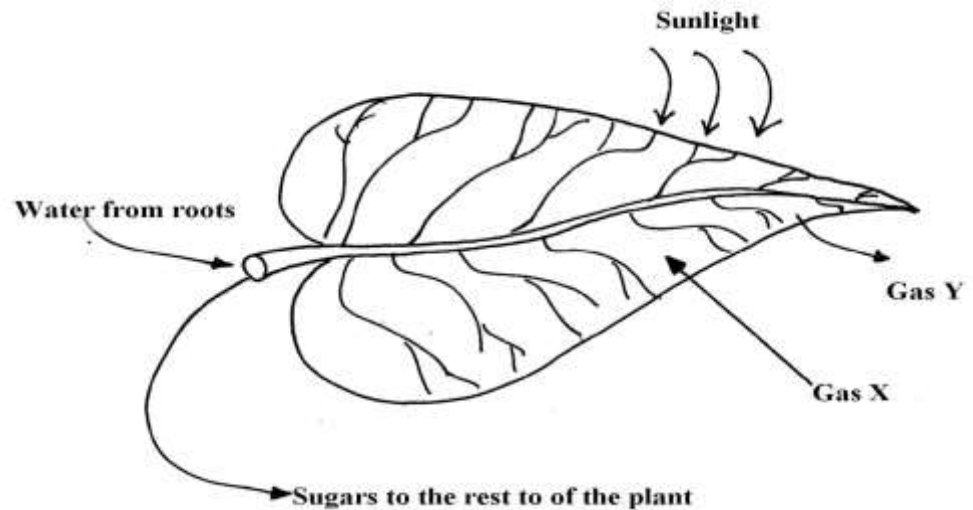
- a) What is the name given to the point marked **x**?
- b) i) With reference to carbon IV oxide exchange state what happens at point **x**.
ii) Explain how the effect observed at point **x** occurs.

- c) Explain why there is a net uptake of carbon IV oxide at light intensity above **x**.
- d) What would happen to the plant if light intensity falling on it were maintained at **x** throughout?
- e) What can you say about the exchange of oxygen between the plant and the surrounding

air at

intensities below **x**?

57. The following diagram of a leaf shows what happens in a plant leaf during photosynthesis:-



- (a) Give **two** ways in which leaves are adapted to absorb light
 - (b) Name the gases labelled **X** and **Y**
 - (c) Name the tissue that transports water into the leaf and sugars out of the leaf
 - (d) Explain why it's an advantage for the plant to store carbohydrates as starch rather than as sugars
58. (a) What is meant by digestion?
- (b) Describe how mammalian small intestine is adapted to its function



59. Form one students from Inungo school arranged their apparatus as shown below, to investigate a certain phenomenon. The set up was placed in light.

- (a) State the likely aim of the set up
- (b) State the role of the syringe in the set-up above
- (c) (i) Name gas **X**
(ii) Write an equation to show how gas **X** was formed in the set-up
- (d) State **three** factors that increase the rate of enzyme activity
- (e) Give a reason why the test tube is immersed in a beaker of water

60. A student was culturing E. coli (a bacterium) in a Petri-dish. He placed the Petri-dish in an incubator at 30°C. He removed it from the incubator the following day and found that five colonies of bacteria had grown. He decided to return it into the incubator to give it more time. When he removed it fourteen days later, he could not observe any colony.

- a) Why was there no colony on the fourteenth day?
- b) Explain how bacteria cause spoilage of stored food in warm moist conditions.
- c) Name other organisms which also cause food spoilage.
- d) State their economic importance to nature.

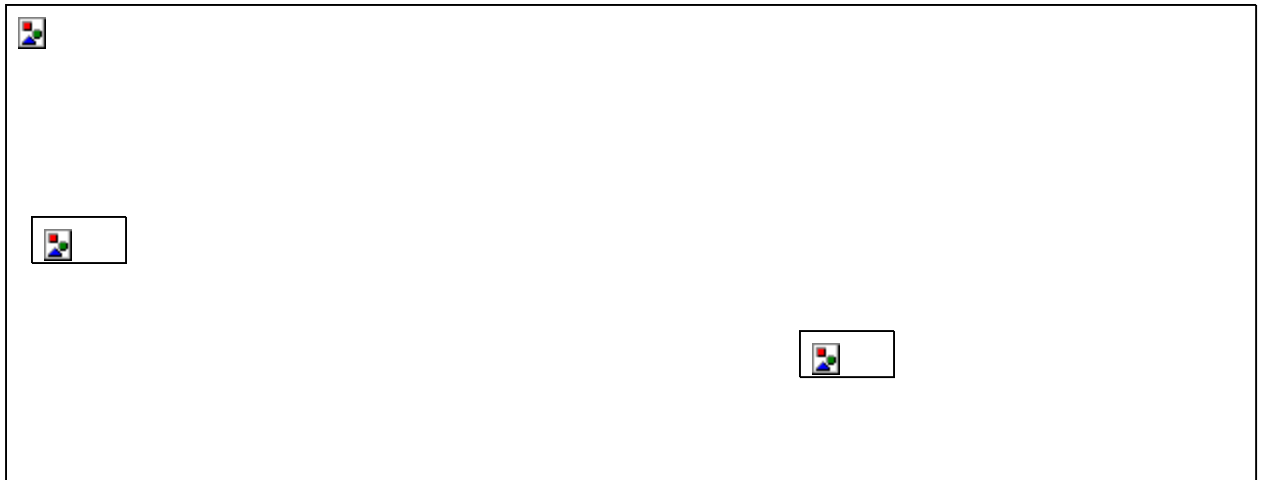
61. The table below shows the results of an experiment carried out to determine the rate of photosynthesis at different light intensities and varying Carbon (IV) oxide concentrations. The rate was determined by counting the number of bubbles per minute. The temperature was kept constant

Light intensity in lux	% carbon(IV)oxide concentration						
	0.0 %	0.3 %	0.6 %	0.9 %	1.2 %	1.5 %	1.8 %
1500	0	16	30	38	40	40	40
6000	0	52	80	96	100	98	100
10000	0	80	100	115	120	122	120

- a) On a graph paper provided, draw a graph for each of the light intensities. All the three graphs should be plotted on the same axis (rate of photosynthesis on vertical axis and carbon (IV) oxide concentration on horizontal axis)
- b) What is the effect of an increase in carbon (IV) oxide concentrations and light intensities
- c) Briefly explain how aquatic green plants meet light intensities and carbon (IV) oxide requirement
- d) Using the data provided in the table state **two** factors required by the green plants for food production

62. Explain how the mammalian intestines are adapted to perform their function.

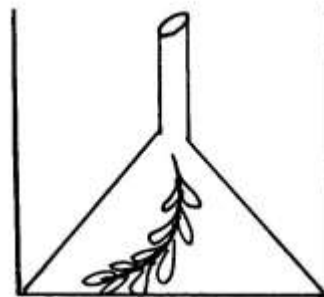
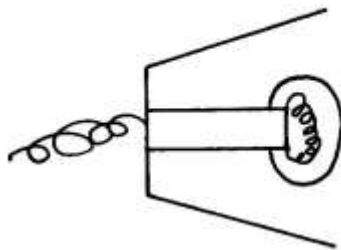
63. A healthy plant was kept in the dark for 24 hours following which two of its leaves were enclosed in glass flasks as shown below. The set up was the exposed to sunlight for a number of hours.



- (a) Why was it necessary to keep the plant in the dark for 24 hours?
- (b) Give the function of each of the following in the experiment
 - (i) Sodium hydroxide
 - (ii) Sodium hydrogen carbonate
- (c) Explain the expected results in leaf.
 - (i) M when tested for starch
 - (ii) N when tested for starch?
- (d) Suggest a suitable control for this experiment

64. The diagram below shows an experiment that was carried out to measure how fast a were plant such as

Elodea



photosynthesizes

The shoot was exposed to different light intensities and the rate of photosynthesis estimated by counting the number of bubbles of gas leaving the shoot in a given time. The results are given below;

Number of bubbles per minute	7	14	20	24	26	27	27	27
Light intensity (Arbitrary units)	1	2	3	4	5	6	7	8

- a) Plot these data on a piece of graph paper provided
 - b) At what light intensity did the shoot produce ;
 - i) 18 bubbles per minute
 - ii) 25 bubbles per minute
 - c) Give **two** better ways of measuring the rate of photosynthesis than counting bubbles
 - d) What is the role of light intensity in photosynthesis
 - e) Account for the expected results of doing this experiment at the following temperature;
 - i) 4°C
 - ii) 34°C
 - iii) 60°C
 - f) Other than light intensity and temperature, name other factors that affect the rate of photosynthesis
65. In an experiment, a leaf from a plant which had been kept in the dark overnight was boiled in water for a minute. It was then boiled in alcohol and washed in warm water. Iodine solution was then added onto the leaf:
- (a) Why was the leaf boiled in;-
 - (i) Water
 - (ii) alcohol
 - (b) (i) What observation was made on the leaf after adding iodine solution
(ii) Give a reason for your answer in (b) above
 - (c) What was the aim of the experiment
 - (d) Why was it necessary to wash the leaf in warm water
 - (e) What is a variegated leaf?
 - (f) Write a word equation for the process of photosynthesis