REPUBLIC OF SOMALILAND

Preface

Administration of Somaliland national examination and certification board (SLNECB) authorized the compilation, production and publication of Somaliland national chemistry examination books with simplified answers and solutions for secondary students. The production of these books came after a success through great and selfless effort, made by SLNECB and the teacher who compiled it. This was necessitated by the tremendous needs of the whole Somaliland secondary students in order that they get equal rights and experience in performing national examinations in particular and the international exanimations in general.

I hope all Somaliland students and teachers will enjoy using these valuable books.

Daud Ahmed Farah

Chairman of Somaliland national
examination and certification board

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Republic of Somaliland

SLNECB

Biology Examinations
With simplified answers

First edition 2013

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Contents

Unit 1. Cells, tissues and organs 7
1.1. Multiple choice questions 7
1.2. Structured questions 11
Unit 2. Characteristics of living organism 14
2.1 Multiple choice questions 14
2.1. Structured questions 15
Unit 3. Classification (taxonomy) 19
3.1. Multiple choice questions 19
3.2. Structured questions 21
Unit 4. Diffusion, osmosis and active transport 23
4.1. Multiple choice questions 23
4.2. Structured questions 25
Unit 5. Biological molecules 29
5.1. Multiple choice questions 29
5.2. Structured questions 31
Unit 6. Enzymes 37
6.1. Multiple choice questions 37
6.2. Structured questions 38
Unit 7. Nutrition in plants and animals 42
7.1. Multiple choice questions 42
7.2. Structured questions 44
Unit 8. Respiration 52
8.1. Multiple choice questions 52
8.2. Structured questions 53
Unit 9. Plants 55
9.1. Multiple choice questions 55
9.2. Structured questions 61
Unit 10. Circulatory system 70
10.1. Multiple choice questions 70
10.2. Structured questions 72
Unit 11. Breathing system 79

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11.1. Multiple choice questions....79
11.2. Structured questions....80
Unit 12. Digestive system....83
12.1. Multiple choice questions....83
12.2. Structured questions....85
Unit 13. Skeletal and muscular system....88
13.1. Multiple choice questions....88
13.2. Structured questions....89
Unit 14. Excretory system....92
14.1. Multiple choice questions....92
14.2. Structured questions....93
Unit 15. Reproductive system....97
15.1. Multiple choice questions....97
15.2. Structured questions....99
Unit 16. Sense organs....100
16.1. Multiple choice questions....100
16.2. Structured questions....101
Unit 17. Endocrine glands....104
17.1. Multiple choice questions....104
17.2. Structured questions....105
Unit 18. Homeostasis....110
18.1. Multiple choice questions....110
18.2. Structured questions....111
Unit 19. Nervous system....113
19.1. Multiple choice questions....113
19.2. Structured questions....116
Unit 20. Ecology....119
20.1. Multiple choice questions....119
20.1. Structured questions....122
Unit 21. Genetics....135
21.1. Multiple choice questions....135
21.2. Structured questions....142

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Unit 22. Biotechnology 154
22.1. Multiple choice questions 154
Unit 23. Diseases and immunity 155
23.1. Multiple choice questions 155
23.2. Structured questions 160
Unit 24. Answers 164
The End 200

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Unit 1. Cells, tissues and organs

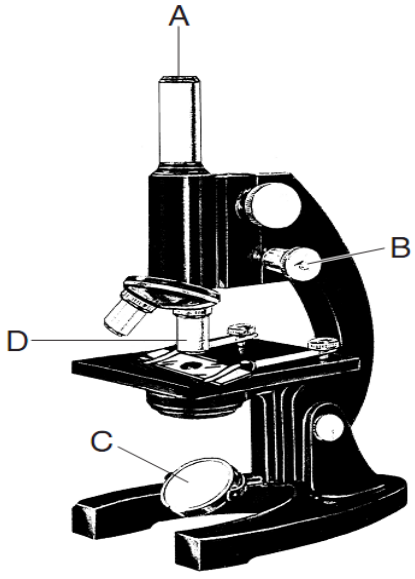
1.1. Multiple choice questions

1. The tissue which covers external and internal lining of animals is called 2005
   A. epithelial tissue
   B. epidermis
   C. connective tissue
   D. nerve tissue

1. Structure commonly found in animal cells, but rarely in plant cells, is the 2008
   A. Golgi apparatus
   B. Nucleus
   C. Centriole
   D. Mitochondrion

2. Which organelle is responsible for the control of cell reproduction? 2008
   A. Nucleus
   B. Ribosomes
   C. Mitochondria
   D. Golgi apparatus

3. The diagram below shows a simple microscope. Four parts of the microscope are labelled A, B, C, and D. 2010



Which part of the microscope is used to bring the image of the object on the slide into focus?

A

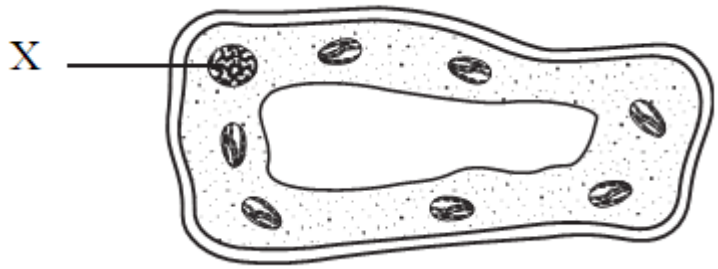
B

C

D

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4. The diagram below shows a cell. 2010



The function of structure **X** is to

A. control cell activities
B. keep the cell turgid
C. control entry and exit of material
D. release energy from glucose

5. Which of the following is not surrounded by a membrane? 2011

A. Nucleus
B. Ribosome
C. Chloroplast
D. Mitochondrion

From 7 up to 16 are additional questions

6. The smallest structural and functional unit of an organism is called

A. organelle
B. organ
C. cell
D. system

7. Which of the following organelles synthesizes proteins?

A. Mitochondria
B. Golgi body
C. Ribosome
D. Lysosomes

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8. A group of similar cells combined together to do the same function is called
   A. tissue
   B. system
   C. cell
   D. organs

9. Which of the following is not a plant organ?
   A. root
   B. Flower
   C. Stem
   D. Ear

10. The reproductive organ of the plant is known as
   A. flower
   B. root
   C. stem
   D. leaf

11. Which of the following organelles is the site where most chemical reactions take place?
   A. nucleus
   B. ribosome
   C. cytoplasm
   D. nucleolus

12. The instrument used to magnified objects is called
   A. microorganism
   B. mitochondria
   C. microscope
   D. micronutrient

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13. Plant cell walls are made up of
    A. cellulose
    B. glycogen
    C. starch
    D. protein
14. blood tissue consists of
    A. blood cells and proteins only
    B. Blood cells and sugar only
    C. blood cells and plasma only
    D. blood cells and water only
15. which of the following functions is not a function of a root
    A. photosynthesis
    B. storage
    C. anchorage
    D. absorption

17. Apart from eggs and sperm, different cells in your body are different because they have different 2009
    A. Proteins
    B. Vitamins
    C. Starch
    D. Energy

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1.2. Structured questions

1. With reference to plant cells, complete the table below by writing the name of the structure in column B that corresponds to the description in column A. 2004

Column A	Column B
1. Contains the enzyme responsible for synthesis of energy for the cell	
2. Contains the pigment that traps solar energy	
3. Contains structures that are responsible for transmitting hereditary information	
4. Only found in plant cell not in animal cell	
5. Acts as a selective barrier between the cell and its surrounding	

2. Complete the table below which compares the structure of typical plant, animal and prokaryotic cells. 2006

   Use a tick (√) if the feature is present and cross (×) if it is absent.

	Plant cell	Animal cell	Prokaryotic cell
Nucleus			
Plasmid			
Mitochondria			

3. In the table below column 1 gives description of organelles found in eukaryotic cells. Complete the table by writing the name of the organelle in column 2

   2007

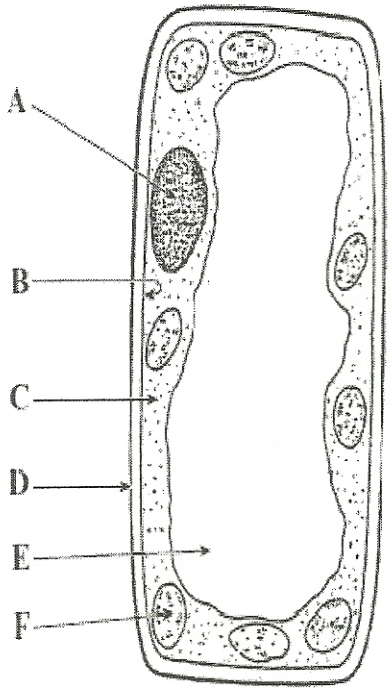
Column 1- Descriptions	Column 2- Name of organelles
1. Usually rod-shaped have double membrane. The inner layer form	A-

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cristae	
2. Disk-shaped structure contains a system of thylakoids	B-
3. Hollow, cylindrical structure consisting of nine triplets of microtubules	C-
4. Rounded organelle found in cytoplasm which assembles the amino acid transferred by tRNA	D-
5. Genetic material contained in it and surrounded by double membrane	E-

4. The diagram shows a plant cell. Some structures in the diagram are also found in animal cells. 2011

a) Complete the table.

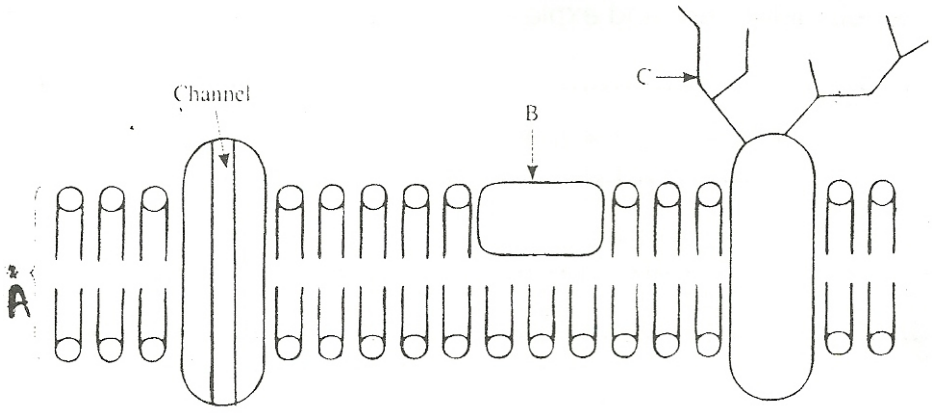


Structure also in animal cell	**Letter**
	A
Cell membrane	
Cytoplasm	

b) Photosynthesis occurs in structure F.
Name this structure.
.....

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5. The figure below shows a model of a section of a cell surface membrane.



a) i) State the name usually given to this model.

……

ii) Give reason why it is called so.

……

Name the structures labelled A, B and C.

A) ……..……

B)……

C)……

c) The channel labeled in the diagram transport polar molecules across membrane by facilitated diffusion. State three features of a substance which influences its ability to pass through a cell membrane and explain each of them.

i) ……

……

ii) ……

……

iii) ……

……..

d) Explain how proteins are held in the membrane.

……

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Unit 2. Characteristics of living organism

2.1 Multiple choice questions

1. Which of the following characteristics of the living things ensures the continual existence of a species? 2009
   A. Excretion
   B. Digestion
   C. Reproduction
   D. Respiration

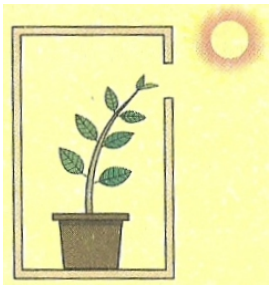
2. Which one of the following characteristics of life is correct to the diagram?

   A. Respiration and reproduction
   B. Excretion and sensitivity
   C. Movement and feeding
   D. Reproduction and feeding



3. Which one of the following characteristics of life is correct to the diagram?

   A. Respirations
   B. Excretion
   C. Feeding
   D. Sensitivity



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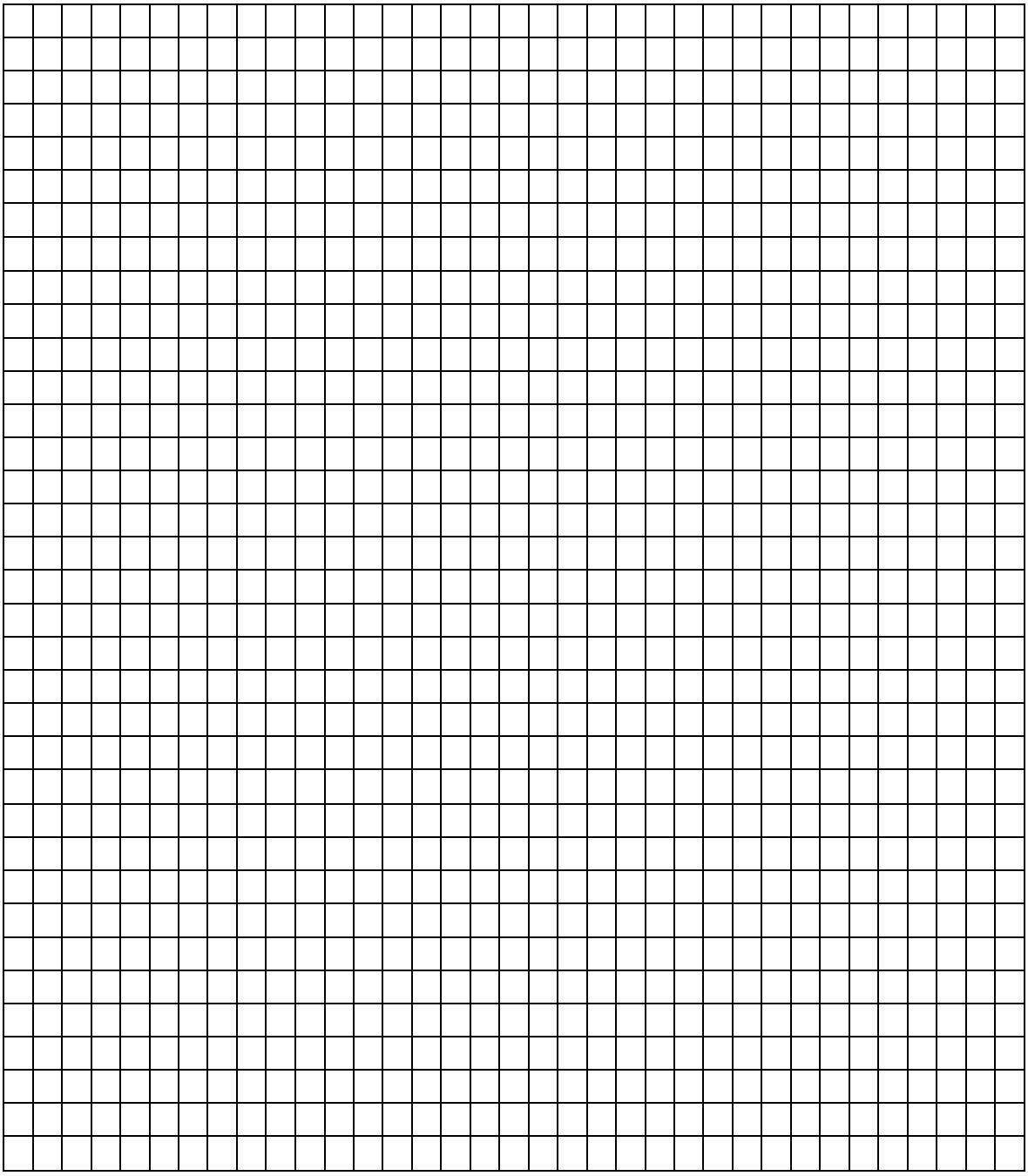
2.1. Structured questions

1. Research was carried out to determine the trend of growth boys and girls. Their average mass in kilograms was taken separately for a period of 20 years and tabulated as shown in the table below. 2008

Age	Average mass of boys (kg)	Average mass of girls (kg)
0	2.5	2.5
2	11.1	11.5
4	15.0	16.0
6	18.5	19.3
8	22.1	27.1
10	25.1	27.1
12	27.5	30.5
14	37.0	35.5
16	44.0	44.0
18	46.9	52.5
20	48.5	55.0

a) On the same axis, draw a graph of the average mass of the girls and of boys against the age.

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b) From the graph, determine the mass for boys at the age of 11 years.

……

c) Account for the change in the mass of girls during the ages of 13 – 15.

……

……

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d) Explain the trend observed in the curves for both boys and girls.

……

……

e) Why do girls above 10 years require an intake of food that is richer in iron than boys of the same age?

……

……

f) Describe two other factors, apart from the diet, that affect the rate of growth in boys and girls.

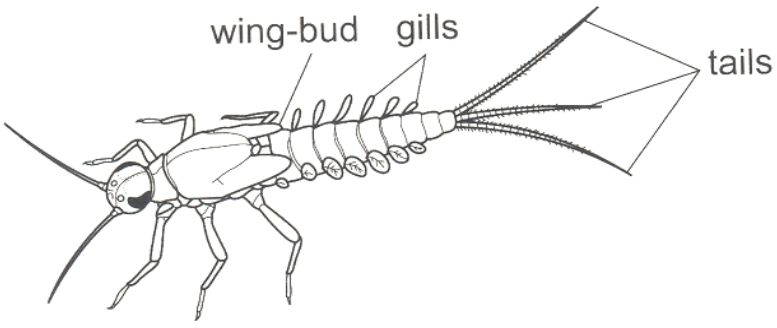
……

……

2. a) Different organisms have different respiratory surfaces and medium of gaseous exchange. Fill in the gaps below; 2009

Organism	**Respiratory surface**
Fish	
Reptiles	
Paramecium	

b) The figure below shows a mayfly nymph (a larva) that lives in water.



i. List two features, visible in the figure, that show this is an insect.

……..

……

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ii. What special adaptation does the insect show allows it to live in water?

……

3. Respiration is characteristic of living organisms. State three other characteristics of living organisms. 2011

……

……

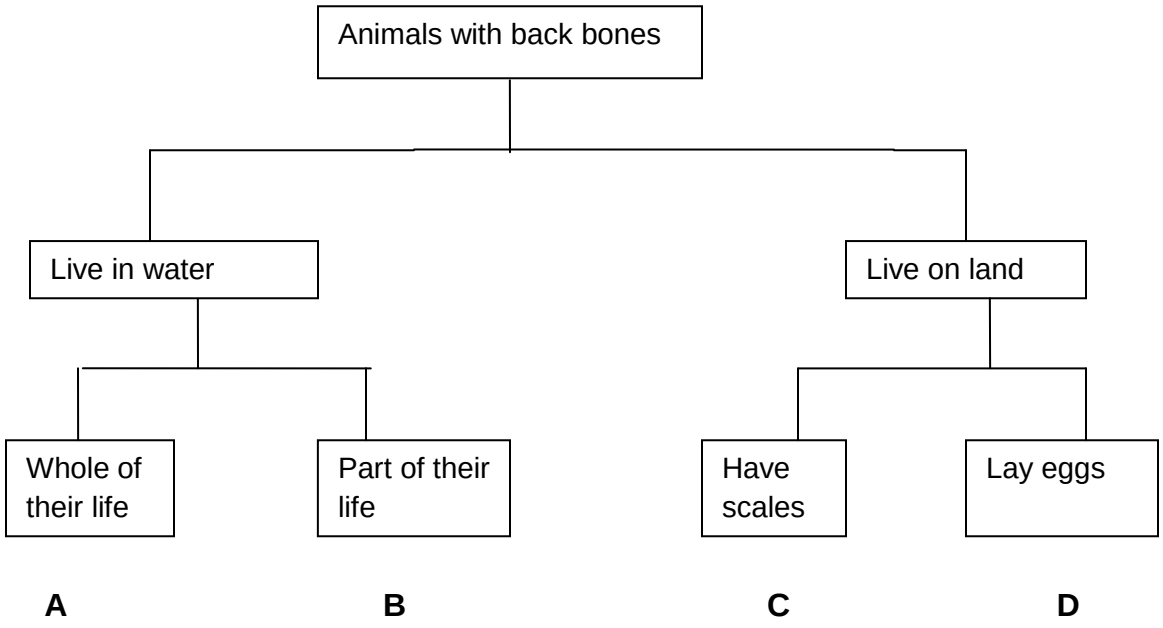
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Unit 3. Classification (taxonomy)

3.1. Multiple choice questions

1. Which of the following animals belongs to the phylum mollusc 2003
   A. cockroach
   B. earthworm
   C. mosquito
   D. snail
2. In the scientific name Juniperus procera, the word Juniperus stands for the 2007
   A. Specific name
   B. Species name
   C. Family name
   D. Generic name
3. The classification chart below was used by some students to classify animals they had observed. In which groups should they classify a frog? 2008.



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4. Which of the following is thought to be the earliest human ancestor? 2008

   A. Homo sapiens

   B. Australopithecus afarensis

   C. Homo neanderthalensis

   D. Homo heidelbergensis

5. The domestic cat is biologically known as *Felis domestica*. What does *domestica* represent in this name? 2009

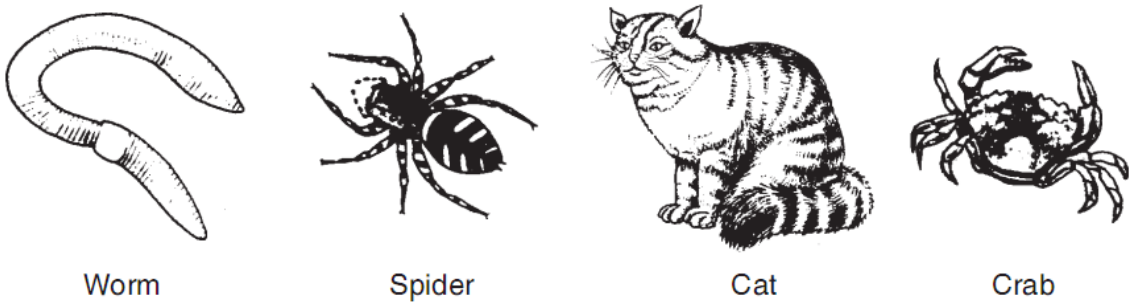
   A. Kingdom

   B. Species

   C. Generic

   D. Family

6. The drawings below show four animals. 2010



Worm Spider Cat Crab

What do all four animals have in common? They

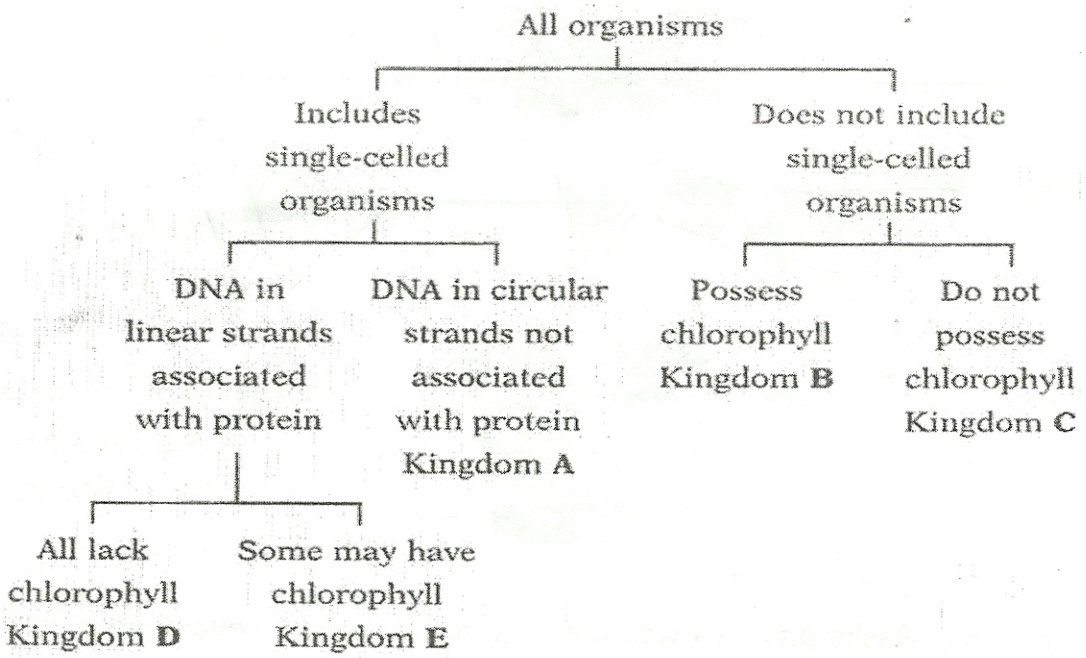
A. reproduce asexually
B. are composed of cells
C. have similar means of locomotion
D. have the same internal structures

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3.2. Structured questions

1. The diagram below shows how organisms may be separated into five kingdoms.

2006.



a) Name kingdom B.

.....

b) Give one characteristic, other than the possession of chloroplast, which could be used to distinguish cells of organisms in kingdom B from those of organisms in Kingdom C.

.....

c) Which of the five kingdoms (A, B, C, D, and E) represents the fungi?

.....

d) Micro-actinium is a single-celled eukaryotic organism. It's an autotroph. Which of kingdoms A, B, C, D or E includes micro-actinium?

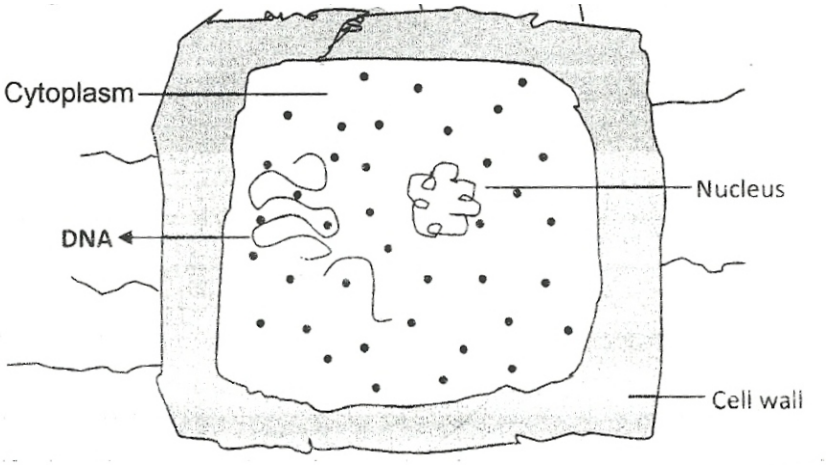
.....

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2. Explain why the donkey and the horse are placed in different species but the same genus yet they can interbreed. 2008

……

3. Study the figure below: 2012



a) Identify the above mentioned organism?

……...

b) Give the name of kingdom to which the organism belongs

……

c) State two characteristics of the members of organisms in the kingdom you have mentioned in (b) above.

……

……

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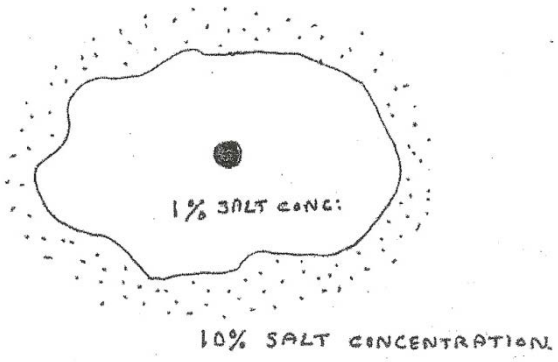
Unit 4. Diffusion, osmosis and active transport

4.1. Multiple choice questions

1. The movement of material in and out of a cell against a concentration gradient with the expenditure of energy is known as 2005
   A. Osmosis
   B. passive transport
   C. active transport
   D. diffusion
2. Question number 4 is based on the following diagram of a cell. 2005

   The cell in the diagram would probably

   A. shrinks
   B. swells up
   C. retains its normal shape
   D. losses its salt content



3. Plasmolysis takes place when a cell is kept in 2007
   A. isotonic environment
   B. hypertonic environment
   C. hypotonic environment
   D. distilled water
4. A path way in which water passes freely through cellulose cell walls from one cell to another is called?
   A. Vacuolar pathway
   B. Synplast pathway
   C. Apoplast pathway
   D. Xylem pathway.

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5. Which mechanism requires ATP energy? 2008
   A. Facilitated diffusion
   B. Active transport
   C. Osmosis
   D. Diffusion
6. The diffusion of water across a selectively permeable cell membrane is called? 2009
   A. Dialysis
   B. Osmosis
   C. Cytoplasm streaming
   D. Cohesion
7. Plasmolysis takes place when a cell is kept in 2010
   A. isotonic environment
   B. hypertonic environment
   C. hypotonic environment
   D. distilled water

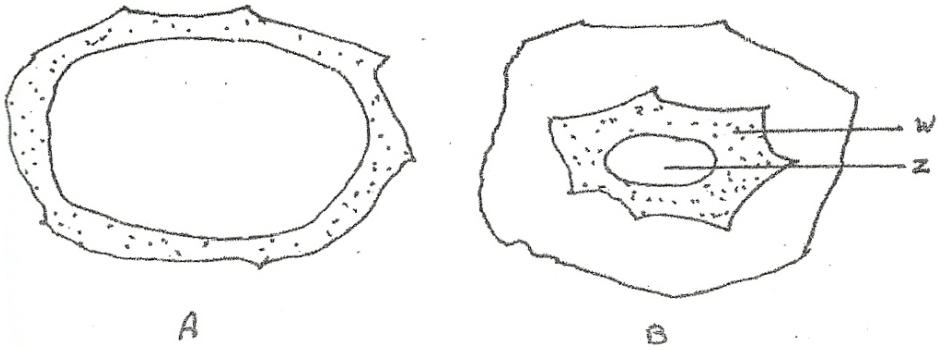
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4.2. Structured questions

1. In diffusion, particles move from a region off high concentration to a region of low concentration. Temperature is one of the factors that increase the rate of diffusion of particles. Give a reason of this. 2004

   .....

2. Below are two diagrams of plant cells, under different conditions. Answer the question below. 2005



   i) Which has been placed in distilled water?

   .....

   ii) Which has been placed in a strong solution of salt?

   .....

   iii) Which cell is turgid?

   .....

   iv) Which cell is plasmolysed?

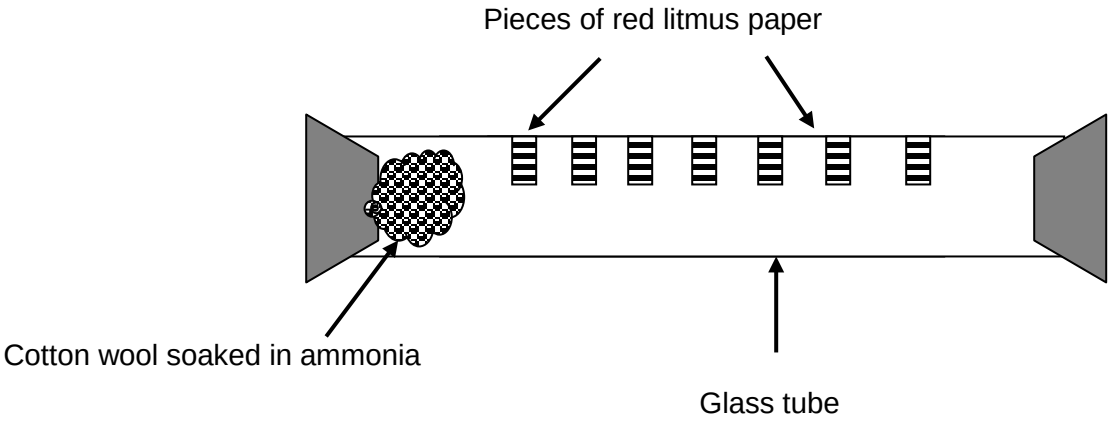
   .....

   v) In plant cell B, what do the labels W and Z represent?

   .....

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3. Some cotton wool was soaked in ammonia. The cotton wool was placed at one end of a glass tube. The ammonia turns the pieces of red litmus paper blue. 2008



i) Write number 1 on pieces of litmus paper that changes colour first.

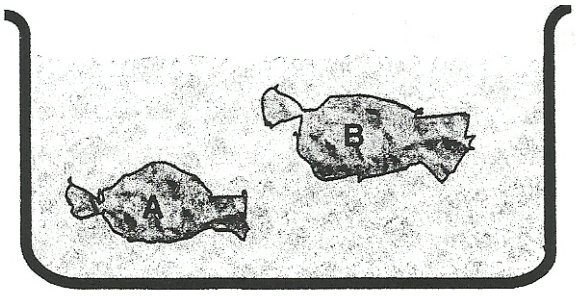
ii) Write number 7 on the piece of litmus paper that changes last.

iii) Draw an arrow on the diagram to show which way the particles move.

iv) What do we call the process that spreads out particles in this way?

…….

4. The following experiment was set up to demonstrate a physiological process. Two tubes A and B made of sheep's bladder were filled with different liquids and placed in a basin containing a liquid. 2012



After 20 minutes it was found that tube A felt hard and the liquid in it had increased. Tube b was soft and contained less liquid.

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a) Explain what took place in tubes A and B.

……

……..

b) Identify the liquid hypertonic to the liquid in the beaker.

……

c) What does the sheep's bladder correspond to in a living organism?

……

5. Table below shows the initial lengths of two Irish potato strip A and B which were placed in different solutions. 2012

Table: initial and final lengths of potato strip.

Potato strip		**Initial Length(cm)**	**Final Length (cm)**
A3	A	3	4.0
B1	B	3	2.5

a) Which potato strip was placed in?
   i. Hypotonic solution?
   ……
   ii. Hypertonic solution?
   ……

b) Calculate the percentage change in length of
   i. Strip **A.**
   ……
   ……
   ii. Strip **B.**
   ……
   ……

c) Which potato would be
   i. Strong?
   ……
   ii. Flabby?
   ……

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6. Safia Hassan used an old fashioned way of killing slugs in the garden. She sprinkled salt on them. This kills them by drying them out. Explain why this would dry them out. 2013

.....

.....

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Unit 5. Biological molecules

5.1. Multiple choice questions

1. Biological catalysts are made up of: 2002

   A. Carbohydrates
   B. Fats
   C. Lipids
   D. Proteins

2. A good example of polysaccharide is 2004

   A. glycogen
   B. glucose
   C. galactose
   D. maltose

3. Fats differ from oils because 2008

   A. Fats have unsaturated fatty acids
   B. Fats have unsaturated glycerol
   C. Fats have saturated fatty acids
   D. Both A and C

4. All the following are proteins **except**: 2008

   A. Haemoglobin
   B. Keratin
   C. Enzymes
   D. Glycogen

5. Which line in the table below correctly matches the food group to its use? 2010

	Food Group	**Use**
A	Fats	Growth and repair of cells
B	Carbohydrates	energy
C	Proteins	protection against deficiency disease
D	Vitamins	Energy

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6. Conjugate protein attached to non-protein part known as: 2012

   A. Phosphate group

   B. Prosthetic group

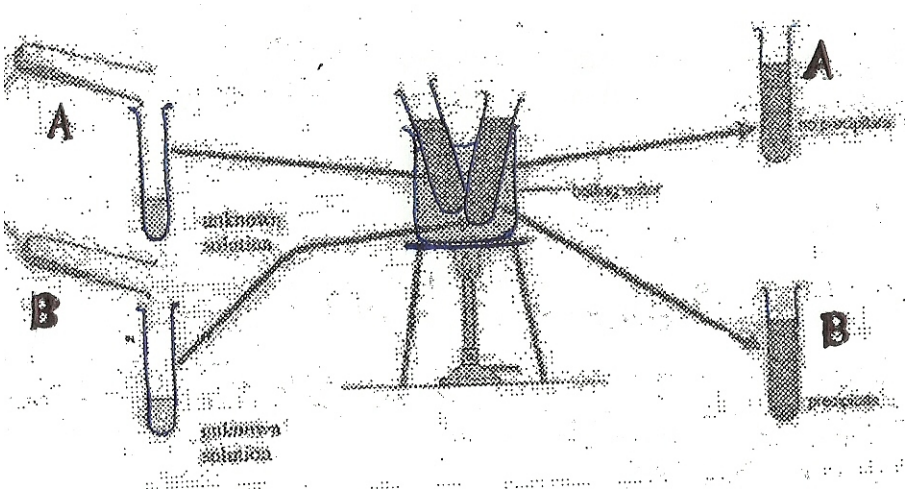
   C. Co-factor group

   D. Co-fusion group

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5.2. Structured questions

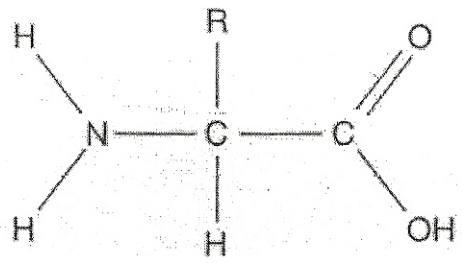
1. Study the diagram above and carefully read the procedure given below. 2004



1. The apparatus is arranged as shown above
2. $2cm^3$ of unknown solution is placed in test tube A
3. $2cm^3$ of another unknown solution is placed in test tube B
4. Equal amounts of Benedict's solution are added to each one of the test tube A and B
5. Both test tubes are placed in a water bath containing boiling water for 3 minutes
6. A reddish precipitate formed in test tube B after 3 minutes
   i. Give a reason for the formation of the reddish brown precipitate in test tube B.
   .....
   ii. Give the chemical formula of the substance contained in test tube B.
   .....
   iii. Why does the colour of the solution in test tube A remain blue?
   .....

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2. The diagram shows the structure of an amino acid molecule. 2004



a) Draw the diagram to show the structure of two molecules linked together

.

b) Name the type of reaction by which two amino acid molecules together to form a larger molecule. .....

c) What is the name of the bond formed between two amino acid molecules?

.....

3. Which one or more monomer units make up each of the following carbohydrates?

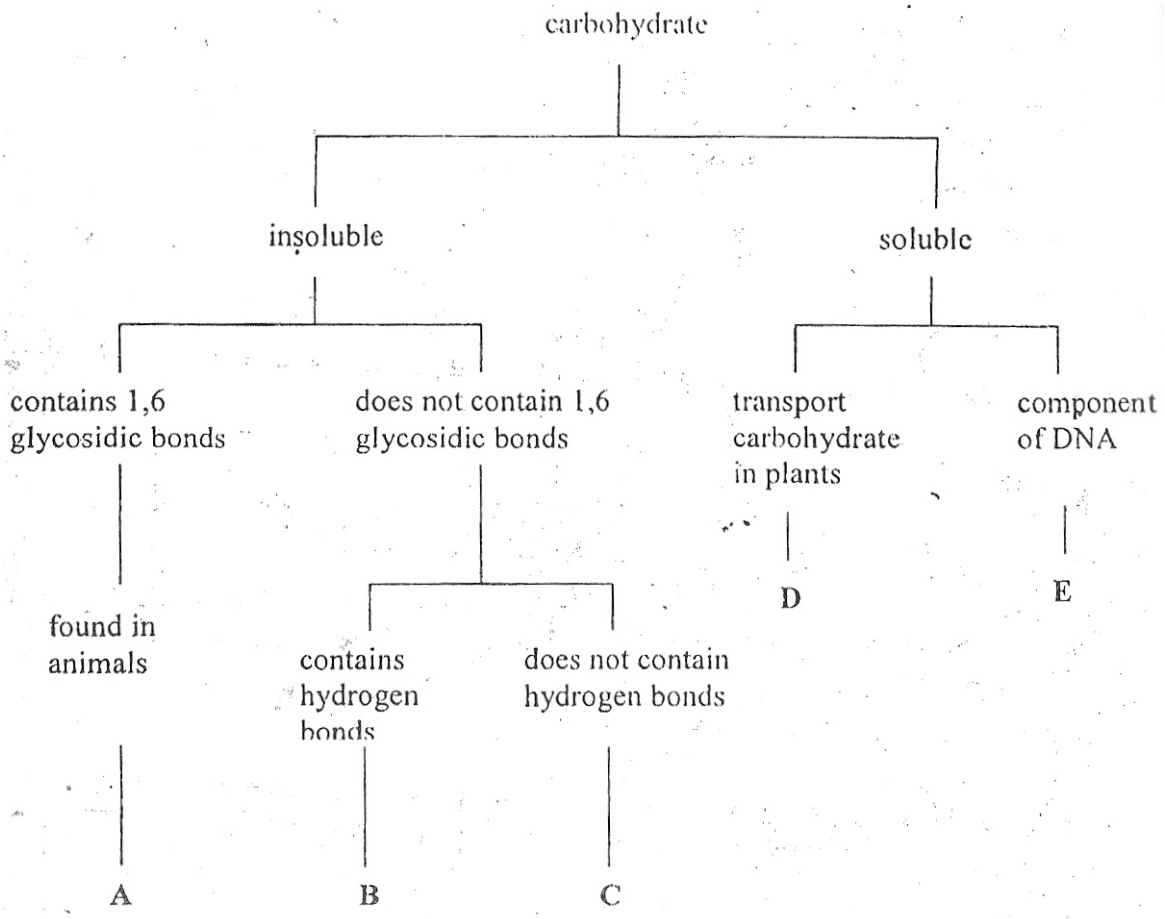
a) Starch: .....

b) Sucrose: .....

c) Lactose: .....

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4. A key which can be used to identify five different types of carbohydrates is shown below.



a) Use the key to identify

i) Molecule A: ……

ii) Molecule B: ……..

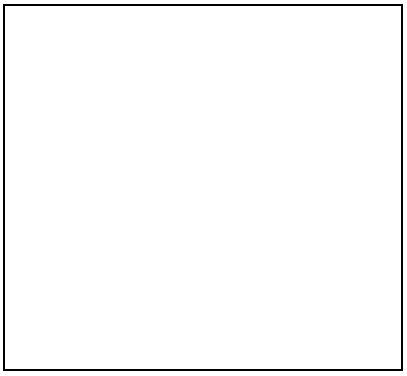
iii) Molecule C ……..

iv) Molecule D: ……

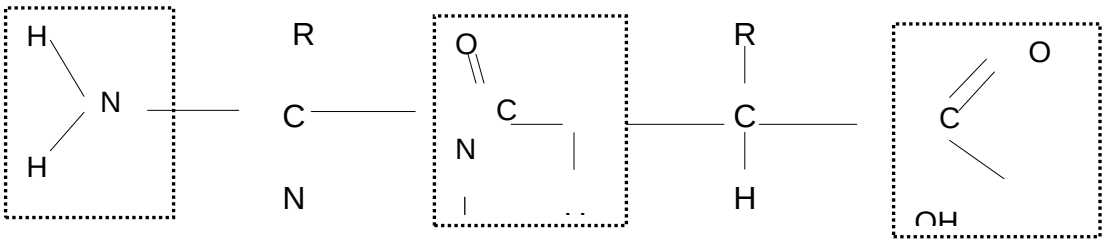
v) Molecule E: ……

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b) Work out the structural formula of ribose? Show your work below.



c) Study the diagram below, which shows a dipeptide. Then answer the question.



Box A Box B Box C

Draw a diagram to show the two molecules produced if this peptide is hydrolyzed

i. ii.

d) What is the name of chemical group in box **C**? .....

e) What is the chemical bond shown in box **B**? .....

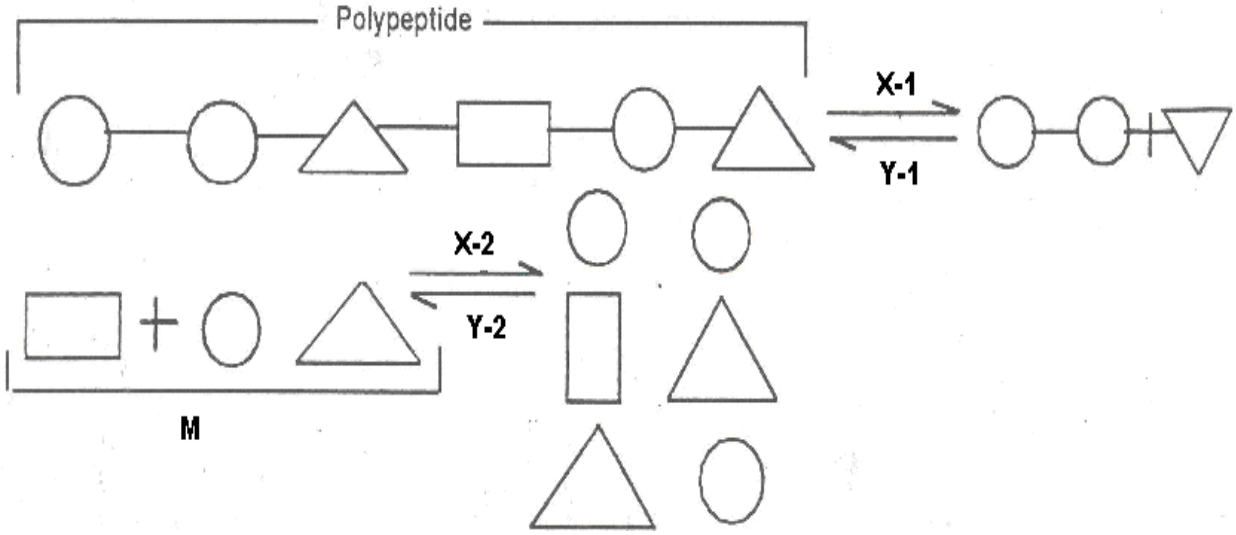
f) According to the structure how do amino acids differ from one another?

.....

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5. The figure below is a schematic representation of the break down of a protein molecule

a) Name the process



i) X-1 and X-2 ……

ii) Y-1 and Y-2 ……

b) Identify the product M: ……

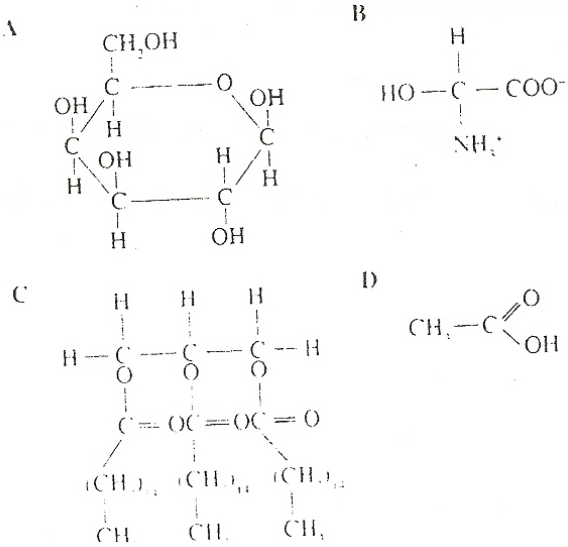
c) State the smallest product of the above diagram.

……

d) Name the bond which holds together molecules M.

……

6. The following figure shows several chemical structures. Look carefully and answer questions below. 2013



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i- Which category or class of compound does A and C belong?

A: ……

B: ……

ii- Give three characteristics of A

a) ……

b) ……

c) ……..

ii- Which molecule is amphoteric and which is hydrophobic?

Amphoteric: ……

Hydrophobic: ……

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Unit 6. Enzymes

6.1. Multiple choice questions

1. If a piece of potato is dropped into a test tube containing hydrogen peroxide, a gas evolve because the potato contains 2007
   A. Starch granules
   B. The enzyme cellulase
   C. The enzyme catalase
   D. Carbonic acid

2. An enzyme which breaks down triglycerides into fatty acid and glycerol is called 2007
   A. Lipase
   B. Nucleotides
   C. Peptidases
   D. Sucrose

3. Each enzyme in the human body 2011
   A. is able to catalyse a wide range of reaction
   B. control a specific type of reaction
   C. function best at a temperature of $100C^{O}$
   D. must be continually produced as it is used up in each reaction it catalyses

4. The highest temperature at which human enzyme works best is about
   A. $40C^{0}$
   B. $37C^{0}$
   C. $50C^{0}$
   D. $35C^{0}$

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6.2. Structured questions

1. Enzymes are a globular protein that speed up the chemical reactions and is known as biological catalysts. 2005

   i) Give reasons to support this statement by stating why enzymes are to speed up chemical reactions?

   ……

   ii) What would happen to the enzyme, if its temperature exceeds more than the optimum?

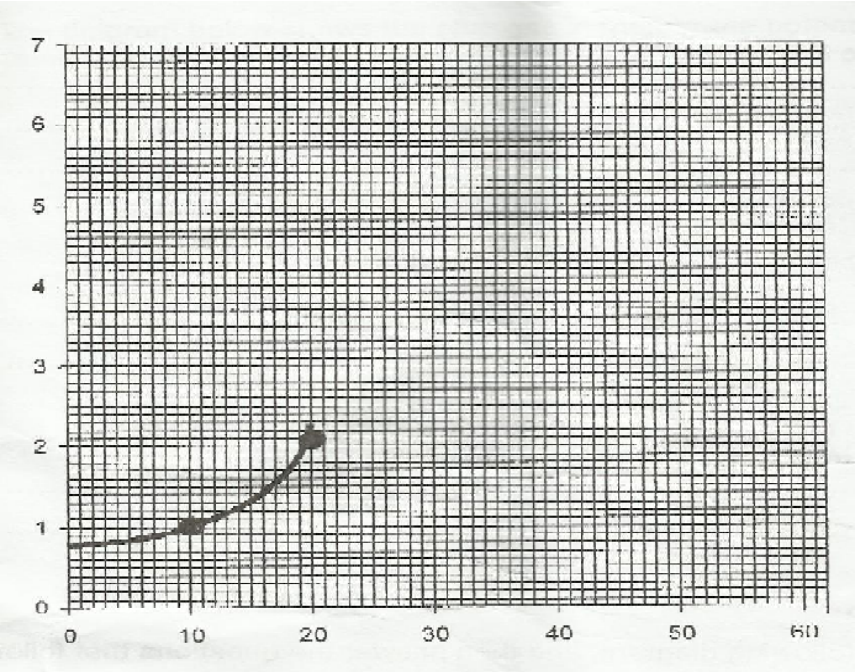
   ……

2. The data below is obtained from an experiment carried out by investigating the effect of temperature on a rate of reaction of enzyme sucrose on substrate sucrose. 2007

Rate of reaction /mg Product per minute	Temperature
1	10c
2	20
3.5	30
4.5	35
5.5	40
5.6	41
4.1	45
1	50

a) Use this information to complete the graph below. It shows how the rate of reaction varies with the temperature. (The first two results have been plotted for you?

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b) i- Explain the result obtained between 10 and 30.

……

ii- what happens to enzyme activity between 40 and 60?

……

iii- why does this happen?

……

c) At what temperature does the reaction work best?

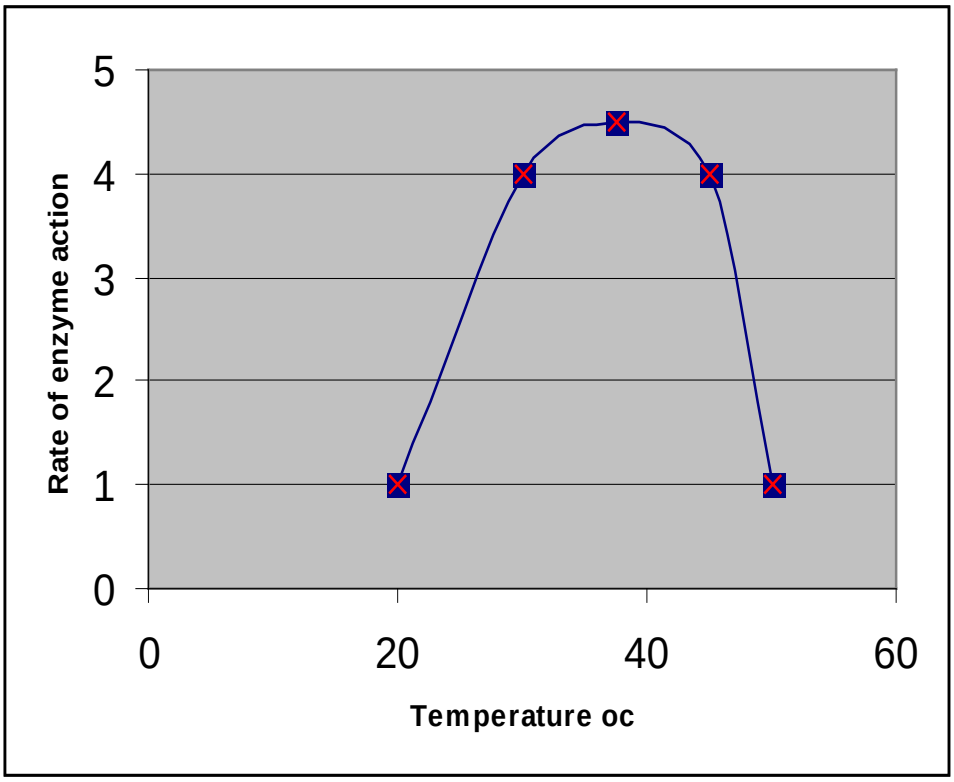
……

d) Give a name to the temperature at which enzymes works best

……..

3. a) The graph below shows the rate of enzyme action in relation to changes in temperature. 2009

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Use the graph to answer the following questions. Explain, giving reasons, the rate of enzyme action

i. Between the first and the second points

……

ii. At the third point.

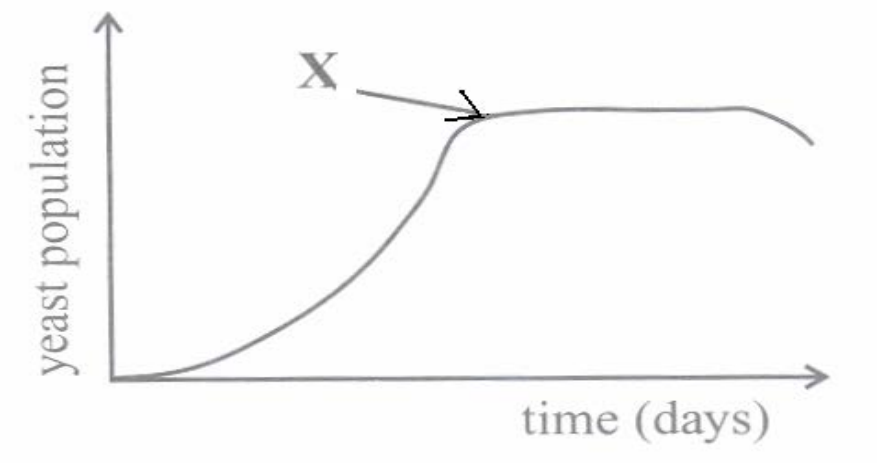
……

iii. Between the fourth and the fifth points.

……

b) Hamid did an experiment to measure the rate of growth of a yeast population at 25^{o}C. The graph shows his results.

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i. Name two conditions, apart from temperature, that Hamid should have kept constant in his experiment.

……

……

ii. Suggest why the population stops growing at point X.

……

4. Give reasons for each of the following: 2013

a) A constant body temperature of 37^0C is maintained is mammals

……

b) Low blood sugar level is harmful to the body. Explain.

……

c) State the main three differences between the composition of maternal blood entering the placenta and the maternal blood leaving the placenta.

……

……

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Unit 7. Nutrition in plants and animals

7.1. Multiple choice questions

1 The form in which animals store excess glucose is: 2002

A. Glycogen

B. Glycerol

C. Starch

D. Cellulose

2. The processes through which living organism acquire and use their food is called

A. Reproduction

B. Locomotion

C. Nutrition

D. Fertilization

3. The dental formula of sheep is 2007

A. $\mathrm{I}\frac{0}{3} + C\frac{0}{I} + P\frac{3}{3} + \mathrm{M}\frac{3}{3}$

B. $\mathrm{I}\frac{0}{3} + C\frac{1}{I} + P\frac{2}{3} + \mathrm{M}\frac{2}{2}$

C. $\mathrm{I}\frac{0}{3} + C\frac{1}{I} + P\frac{3}{3} + \mathrm{M}\frac{3}{3}$

D. $\mathrm{I}\frac{0}{3} + C\frac{1}{0} + P\frac{2}{3} + \mathrm{M}\frac{2}{2}$

4. Which of the following is an example of mutualism?

A. Tapeworms absorbing nutrients from its host

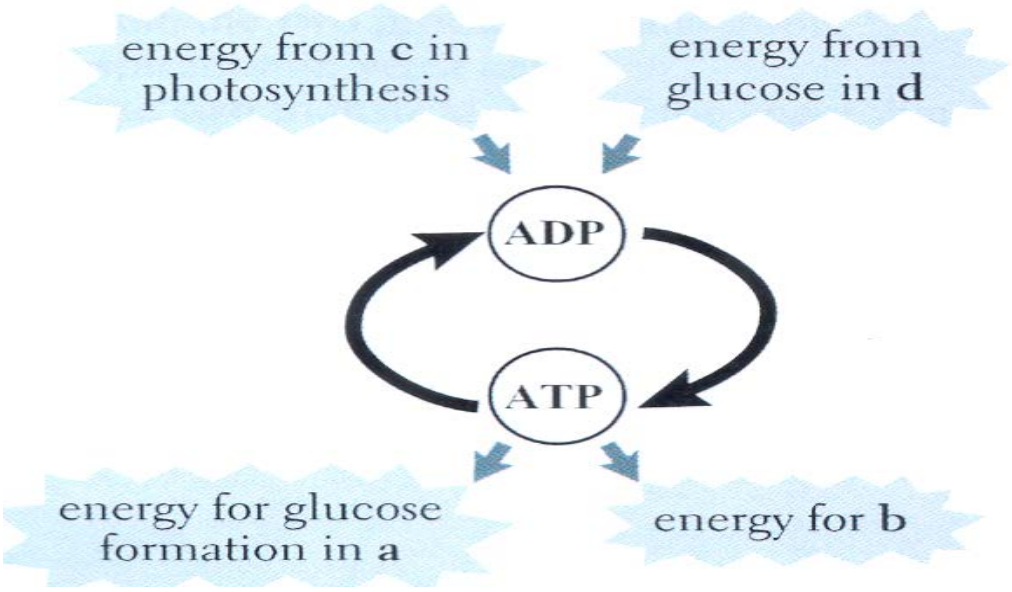
B. A bee getting nectar from a plant which it pollinates in the process

C. Flees feeding on the blood of a vertebrate host

D. Foxes depending on rabbits for a source of nutrients

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5. The rumen of herbivorous animals harbour bacteria which are useful for 2009
   A. water absorption
   B. cellulose digestion
   C. fat emulsification
   D. protein digestion
6. The diagram below shows the involvement of ATP in respiration and photosynthesis. 2009



What process is represented by letter **a**

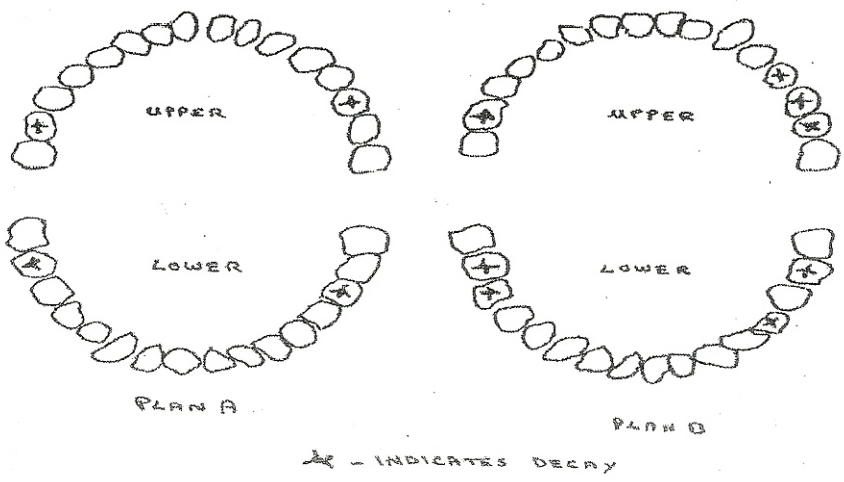
   A. Osmosis
   B. Respiration
   C. Photosynthesis
   D. Fermentation

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7.2. Structured questions

1. The diagram below show the dentition in the upper and lower jaw. 2005

- Plan A belongs to a 25 years old man called Yusuf.
- Plan B belongs to a 25 years old man called Guled.



In the town where Yusuf lives the drinking water contains natural fluoride salts. There are no fluoride salts in the drinking water where Guled lives.

a) How many teeth are showing the symptoms of dental decay?

i) In Yusuf: ……

ii) In Guled: ……

b) What is the percentage of decayed teeth in

i) Yusuf? ……

ii) Guled? ……

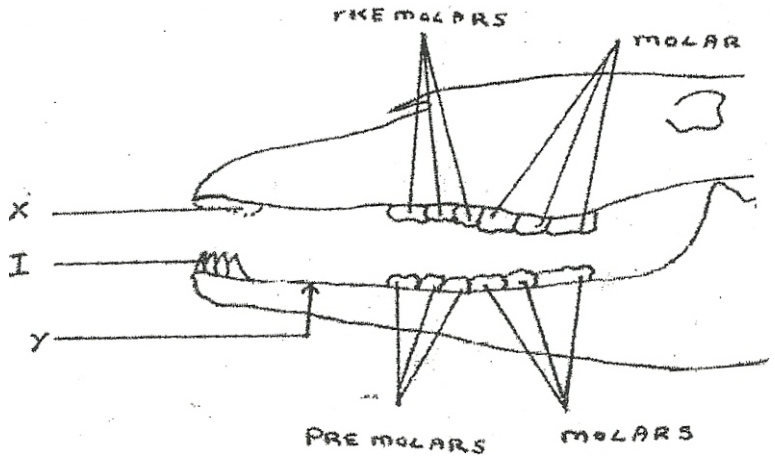
c) Suggest one possible reason why Guled has more decayed teeth than Yusuf.

……

.....

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d) Study the diagram below and answer the questions.



i) Name the structures lebeled X,Y& I.

X: ……

Y: ……

I : ……

ii) Based on the arrangement of the teeth, is this animal a ruminant or a non ruminant?

……

iii) By using the dental formula calculate the total number of teeth of the dental formula;

……

……

……

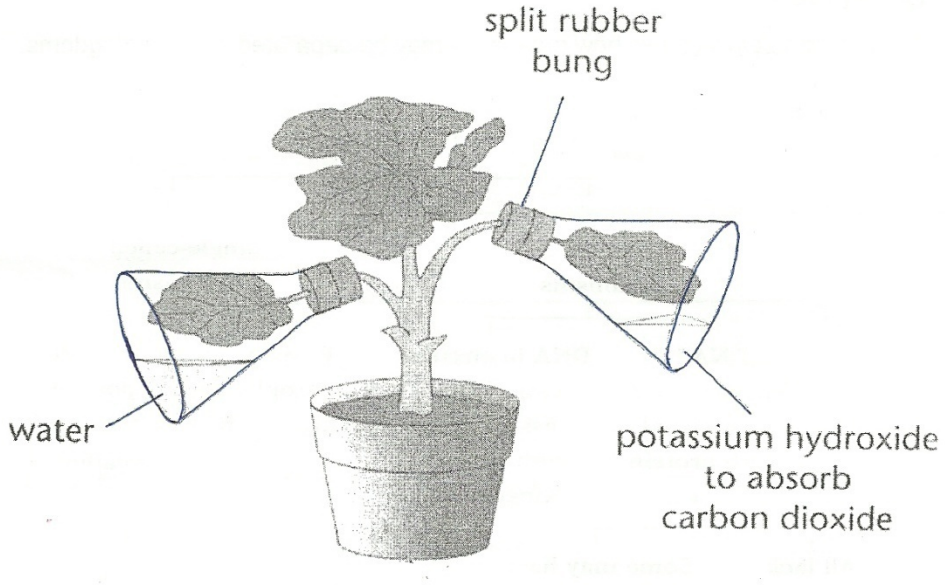
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2. a) A potted plant was kept in the dark for a day. When one of the leaves was tasted for starch with iodine solution, it stayed brown. Explain why this happened.

2006

.....

b) The plant was then set up as in the diagram below.



The plant with flasks attached was then left in the light for several hour, the leaves in the flasks where then tested for starch with iodine solution.

i) The leaf enclosed in the flask with potassium hydroxide stayed brown. The other leaf turned black. Explain what this experiment proves.

.....

.....

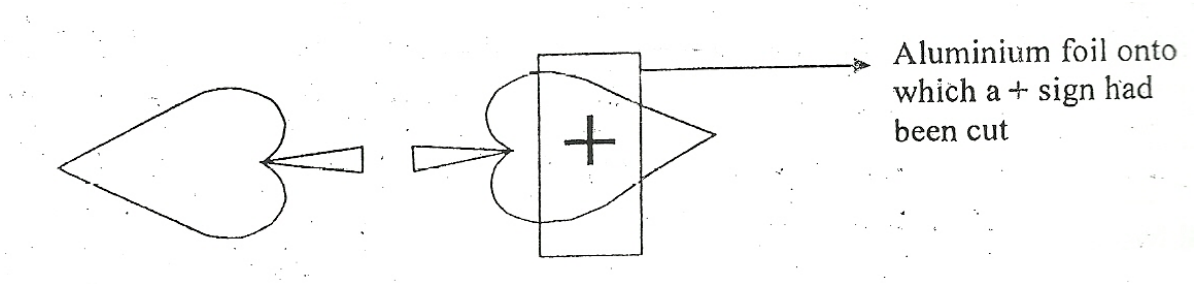
ii) Why was it necessary to enclose the leaf in a flask with water?

.....

.....

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3. This experiment is to investigate one factor affecting photosynthesis. A leave of a potted plant, which had been kept in the dark overnight, was partially covered by an aluminium foil on which a+ sign is marked. The other part of the leaf uncovered. The leaf had been cut as shown below. Before carrying out the experiment, the leaf was placed in sunlight for 3 hours. 2007



a) Which factor was being investigated in the experiment?

.....

b) Which food was tested from the leaf?

.....

c) i) From the diagram above, state the result of the food tested by writing the changes observed on the leaf.

.....

ii) Account for and discuss the result in **C** (i) above.

……

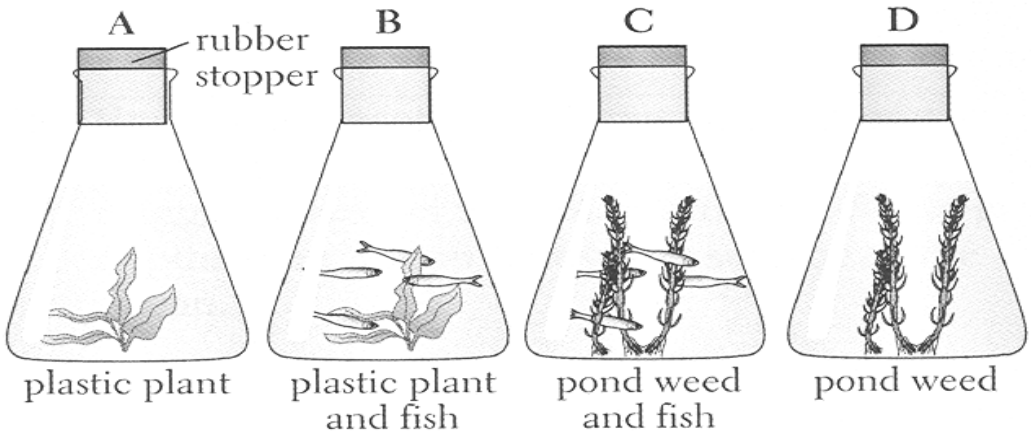
……

d) Why was it necessary to keep the plant in darkness overnight before the experiment?

……

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4. An experiment was conducted using flasks shown below. All flasks contained water, were at the same temperature and were in sunlight. 2008



After two hours the carbon dioxide level in each flask was measured.

i) In which flask **(A – D)** would the carbon dioxide level be lowest after two hours?

……

ii) Explain how you arrived at the choice you made above.

……

5. An organism was found to have the dental formula. 2008

***incisors* 1 / 1, *canines* 0 / 0, *premolars* 3 / 2, *molars* 4 / 4**

i) Calculate the total number of teeth in the organism

……

ii) Suggest the mode of feeding of the organism from which the dental formula was obtained.

……

iii) Give a reason for your answer in (ii) above.

.....

6. i. What is a parasite? 2009

……

ii. What is the difference between ectoparasite and endoparasite?

……

.....

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7. The dental formula of sheep is as follows; 2009

0 / 3 0 / 1 3 / 3 3 / 3

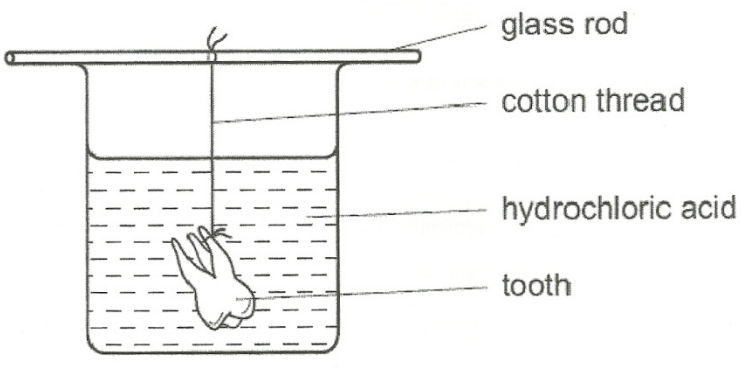
i. Calculate the number of teeth in a sheep from the data above.

……

……

ii. What is the name of the gap between incisors and premolars on the lower jaw of sheep? ……

8. A human tooth was suspended in hydrochloric acid and left for 24 hours, as show in the figure below .when the teeth was removed and washed. The lower part to which the cotton was attached was no longer hard, but soft and rubbery. After replacing the tooth in the acid for another 24 hours, the rest of the tooth was also soft. 2011



a) i) Name the part of the tooth to which the cotton was attached.

……

ii) Name the type of human tooth used in this experiment. State two reasons for your answer.

Type of tooth: ……

Reason 1: ……

Reason 2: ……

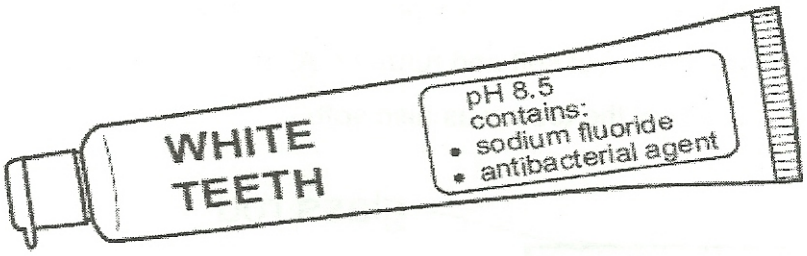
iii) With reference to tooth structure. Suggest and explain why the lower part of tooth becomes soft before the upper part?

……

……

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The figure shows as tube of 'white teeth' toothpaste.



b) State and explain two reasons why regular brushing with this toothpaste would help to protect teeth from decay?

1. ……

2. ……

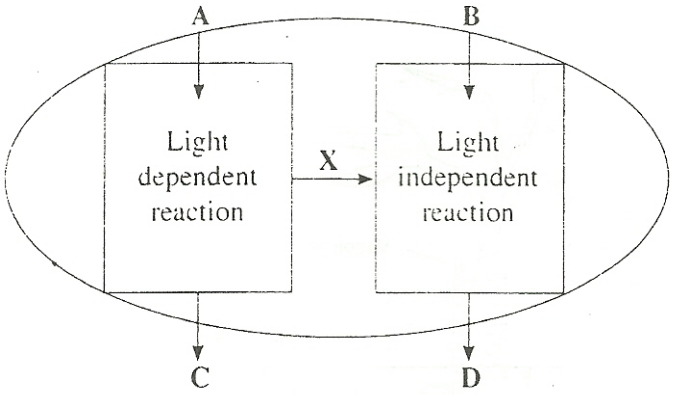
c) Brushing is not the only way of protecting teeth from decay, state two other ways of maintaining healthy teeth.

1. ……

2. …….. .....

9. The following figure is a simplified diagram of the photosynthesis reaction in the chloroplast. 3013

.



a) Name the source labelled A and B which are required in reaction.

A: ……

B: ……

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b) Name the compounds labelled C and D that are produced in the reaction

……

……

c) Name the compounds labelled X which are required in light independent reaction.

……

……

d) Explain how the energy from sunlight is converted to chemical energy of ATP in cyclic phosphorylation.

……

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Unit 8. Respiration

8.1. Multiple choice questions

1. In the process of food oxidation in the cells, the energy released from food is stored by the molecules of; 2005
   A. glucose C. oxygen
   B. adenosine triphosphate (ATP) D. adenosine diphosphate (ADP)
2. One molecule of glucose may produce more energy during aerobic respiration because some energy is trapped in? 2007
   A. Ethanol of aerobic respiration
   B. Ethanol of anaerobic respiration
   C. Carbon dioxide
   D. Water
3. Respiration is a chemical reaction which 2008
   A. occurs only in the body cells of animals.
   B. always has oxygen as a reactant.
   C. involves a sequence of reactions.
   D. is endothermic (absorbs energy).
4. Which one of the following is not the product of glycolysis? 2012
   A. Two NADH molecules C. Two ATP molecules
   B. Two pyruvate molecules D. Two oxaloacetate molecules
5. The oxygen consumed during cellular respiration is directly involved in 2013
   A. Kreb's cycle
   B. The phosphorylation of ADP
   C. The oxidation of pyruvate to acetyl-coA
   D. Accepting electron at the end of electron transport chain.
6. In which process in eukaryotic cells will normally proceed despite the presence & absence of 0_2 2013
   A. Kreb's cycle C. Glycolysis
   B. Fermentation D. Oxidative phosphorylation.

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8.2. Structured questions

1. The chemical equation shown below is the oxidation of a certain food substance. 2010

$$C_{57}H_{104}O_6 + 80O_2 \longrightarrow 57CO_2 + 52H_2O + \text{Energy}$$

Calculate the respiratory quotient of the process.

……

……

……

2. ATP is used as a temporary energy store and supplies energy to carry out various cellular activities. 2010

a) Give three reasons why cells use ATP rather than glucose as a universal currency in cell during cellular metabolism by comparing them.

ATP	**GLUCOSE**
1	1
2	2
3	3

b) i)- ATP is mainly produced in mitochondria during aerobic respiration. Give the term that describes this process.

……

……..

ii)- Name one other process which can also produce ATP molecules on plants .

……

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3. During certain biological investigation it was noted six molecule of oxygen gas was used to completely oxidize certain respiratory substrate during which six molecules of carbon dioxide gas was produced. 2012

   a) Write down the equation and balance it.

      ……

      ……..

   b) Workout respiratory quotient (RQ).

      ……

      ……

   c) Identify the respiratory substrate.

      ……

4. Our body cell performs aerobic respiration and is better than anaerobic. So why does anaerobic respiration sometime happen? 2013

……

……

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Unit 9. Plants

9.1. Multiple choice questions

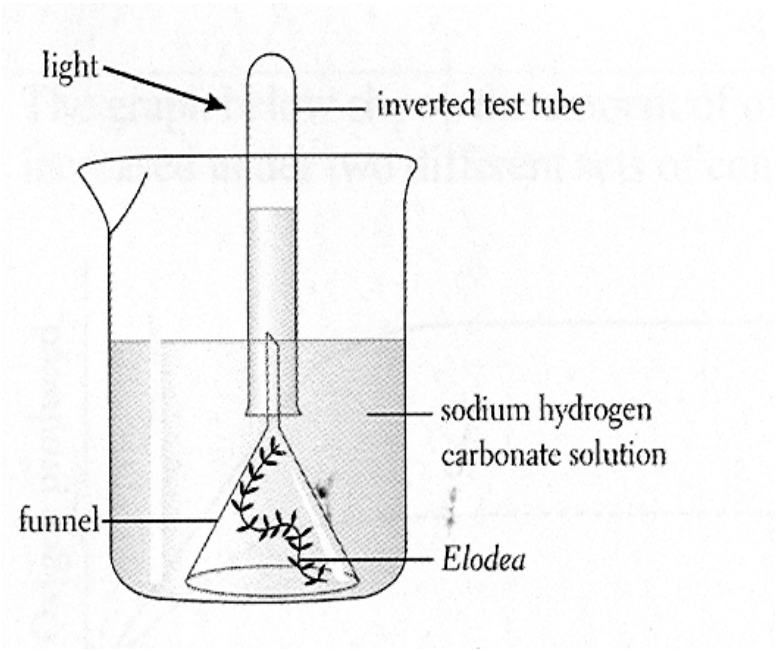
1. The growth response to the stimulus of light is called 2003
   A. Chemotropism
   B. Hydrotropism
   C. geotropism
   D. phototropism
2. Under which of the following conditions will seeds germinate most quickly? 2003
   A. Cold damp soil
   B. Warm damp soil
   C. Warm dry soil
   D. Cold dry soil
3. The waxy substance that covers the upper epidermis of a leaf is usually 2004
   A. opaque
   B. transparent
   C. a very thick layer
   D. green in colour
4. Normally photosynthesis does not take place in 2005
   A. palisade mesophyll
   B. spongy mesophyll
   C. guard cells
   D. Epidermal cells
5. The transfer of pollen grains from the anther to the stigma of a different flower on a same plan is called 2006.
   A. Cross pollination
   B. Self pollination
   C. Double pollination
   D. Fertilization

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6. Spongy mesophyll cells 2006.
   A. Transport material
   B. Cover and protect the leaf
   C. Translocate organic solutes
   D. Allow gaseous exchange
7. A plant which has roots that develop from the stem has a 2006.
   A. Tap root system
   B. Adventitious root system
   C. Fibrous root system
   D. Dangling root system
8. a modified underground shoot with thick fleshy leaves is called 2007
   A. Corms C. Bulbs
   B. Tubers D. Stolens
9. What is a complete flower in which either the stamens or the carpel is absent called? 2007
   A. Staminate
   B. Pistillate
   C. Bisexual flower
   D. Unisexual flower.
10. Roots formed from the stem that can be seen on the ground are called? 2007
    A. Tap roots
    B. Fibrous roots
    C. Adventitious roots
    D. Root cap.
11. Which of the following has **ALL** the conditions necessary for germination of most seeds? 2008
    A. Soil, air and water
    B. Air, warmth and water
    C. Warmth, light and soil
    D. Water, warmth and light

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12. An experiment was conducted using the set-up shown below.



The volume of gas collected in the test tube after 2 hours would **not** be affected by the

A. Temperature of the solution
B. Mass of plant used
C. Intensity of the light source
D. Size of the test tube

13. Photosynthesis is NOT affected by 2008

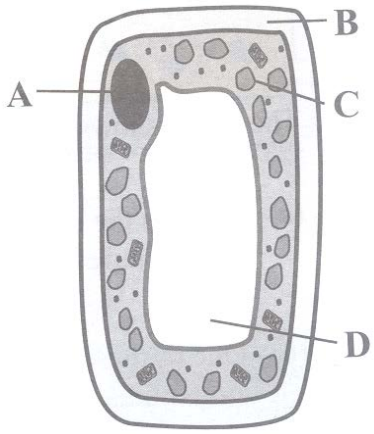
A. Water
B. Temperature
C. Humidity
D. Amount of CO_2

14. Name the bacteria found in the root nodules of leguminous plants 2008

A. Bacterium
B. Monera
C. Fungi
D. Rhizobium

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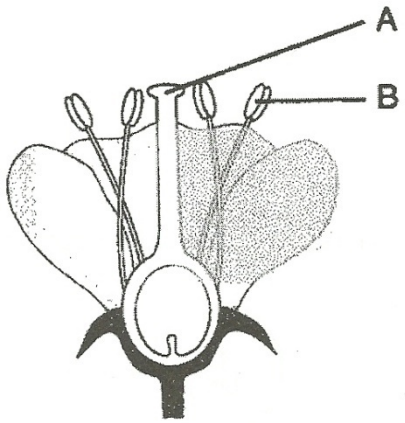
15. The following is a method of breaking seed dormancy. 2009
    A. Exposing seeds to some wavelength of light.
    B. Crushing seeds into powder form.
    C. Boiling seeds to very high temperatures.
    D. Covering seeds with plastic bags.
16. Why is it important that human body temperature is kept at about 37^0 C? 2009
    A. To avoid sweating.
    B. To increase natural immunity of the body.
    C. Because it is the optimal temperature for most enzymes in the body.
    D. Because above or below this temperature, the body is fatigued.
17. Circle the letter that shows chloroplast in the diagram of a palisade cell from a leaf.



18. How are leaves adapted to absorb light?
    A. Change into thorns
    B. Have pointed tips
    C. Presence of vein like structures
    D. Broad and flat surface
19. Which of the following minerals is a trace element? 2009
    A. Sodium
    B. Calcium
    C. Manganese
    D. Chlorine

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20. The diagram below represents a flower. 2010



The transfer of reproduction structure from B to A is known as

A. fertilization
B. differentiation
C. self- pollination
D. cross- pollination

21. Which reproductive method is involved in the production of new organisms by all of the species show below? 2011

A. budding
B. inbreeding
C. artificial selection
D. vegetative propagation

22. Which one of the following hormone is responsible for stem elongation? 2012

A. Indolic acid
B. Abscisic acid
C. Gibirialic acid
D. Cytokins

23. Transpiration pull is used to describe: 2012

A. The force exerted by the apex of the leaf during respiration.
B. Total suction force exerted by plant leaves during transpiration.
C. Total suction force exerted by roots during transpiration.
D. The pull of water and ions form adjacent cells within plants.
E.

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24. Phloem tissue are comprised of: 2012

1. Guard cells
2. Companion cells
3. Parenchyma cells
4. Sieve tube cells

A. 1 and 2

B. 1 and 3

C. 3 and 4

D. 2 and 4

25. Which one of the following words completes the equation below? 2012

Sugar + oxygen ⟶ carbon dioxide + ... + energy

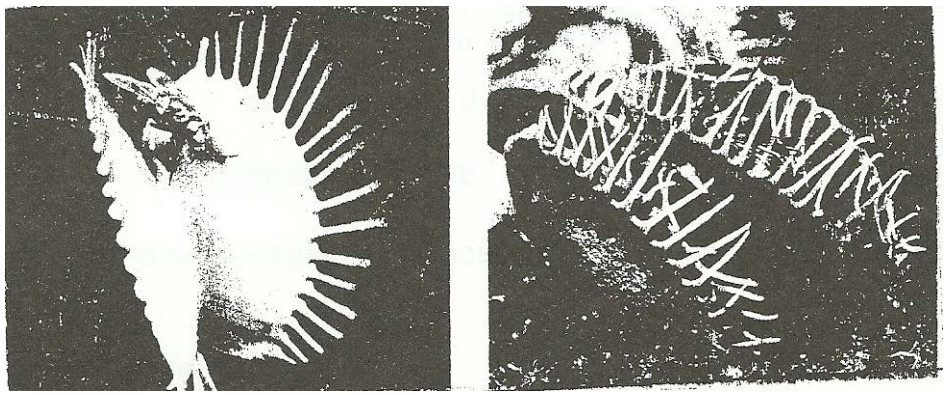
A. Chlorophyll

B. Light

C. Starch

D. Water

26. Which of the tasks is not related to the following leaves? 2013



A. Produce nectar

B. Secrete enzymes

C. Trap insect

D. Attract insect.

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9.2. Structured questions

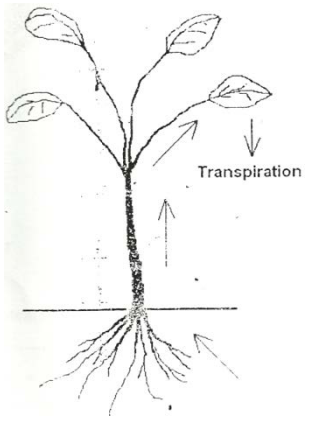
1. a) Without germination young plants are not germinated. Name three factors for their germination. 2002

   ……

   How do seeds develop after germination?

   .....

2. The following diagram shows the movement of water through a plant. 2003



   a) i) Name the process by which water is absorbed from the soil by the roots of a plant

   ……

   ii) Name the part of the stem through which water passes from the roots to the leaves of a plant. .....

   b) Soil water also contains soluble mineral salts. Farmers sometimes increase the fertility of their soil by adding NPK fertilisers

   i) N represents the element nitrogen. What elements are represented by the letters P and K?

   P: .....

   K: .....

   ii) Nitrogen is needed for the synthesis of the green pigment chlorophyll. Explain the importance of this pigment in a plant.

   ……

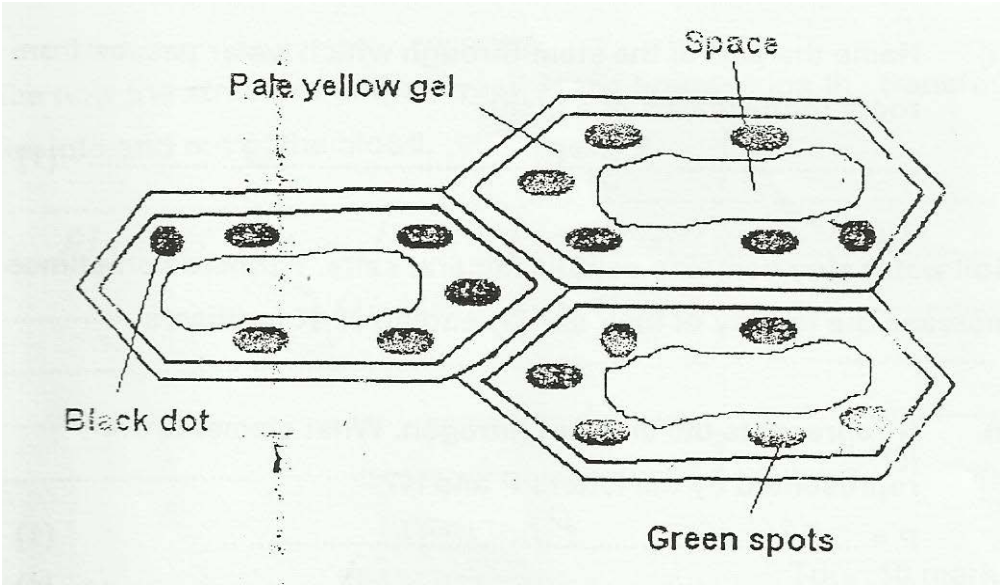
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iii) Explain why the rate of transpiration is greatest on warm windy days.

……

.....

3. A biologist examined the cells of some organic material under the microscope, she draw the following diagram of what she saw. 2003



a) Identify the parts labeled in the diagram.

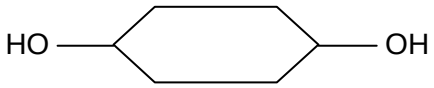
Description	**Part of the cell**
Black dot	
Green spots	
Pale yellow	
Space	

b) The biologist decided that the organic material was from a plant write down TWO pieces of evidence that support this judgment.

……

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c) By using the following symbol which represents glucose.



Draw a diagram to show the glycosidic linkage in polysaccharide.

d) Briefly explain the role of the following in a plant.

i) Starch: ……

ii) Cellulose: ……..

4. Plant roots absorb water and dissolved minerals from the soil. Both get into root though its membrane. Water then moves upwards through xylem vessels. This is called water streaming inside xylem tissue. 2004

i. Name the process by which dissolved mineral salts are absorbed from the soil into the plant root? .....

ii. What are the three factors that affect water streaming through xylem vessels?

.....

.....

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5. Match each of the plant tissues listed in column A with its major functions in column B by drawing a line from the word to the function. 2006

Column A	**Column B**
a- Meristematic	1- To make food for the plant
b- Photosynthetic	2- To fill spaces between other tissues
c- Parenchyma	3- To protect inner more delicate tissue
d- Epidermal	4- to transport water an food substances
e- vascular	5- to make new tissues

6. Match the terms in column **A** with the statements in column **B** 2008

*Column **A***	*Column **B***
1. Plumule	A – attaches plumule to cotyledon stalk
2. Radicle	B – attaches radicle to cotyledon
3. Hypocotyls	C – develops to form the root
4. Epicotyl	D – stores food for the seeds

7. a) Complete the table below by putting plus (**+**) if the organ grows toward the stimulus and minus (**-**) if it grows away from stimulus. *Note that one has been filled to guide you.*

	Stimulus		
	Light	Gravity	Water
Shoot			–
Root			

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b) Complete these sentences about tropism by choosing the correct word or words from inside the bracket

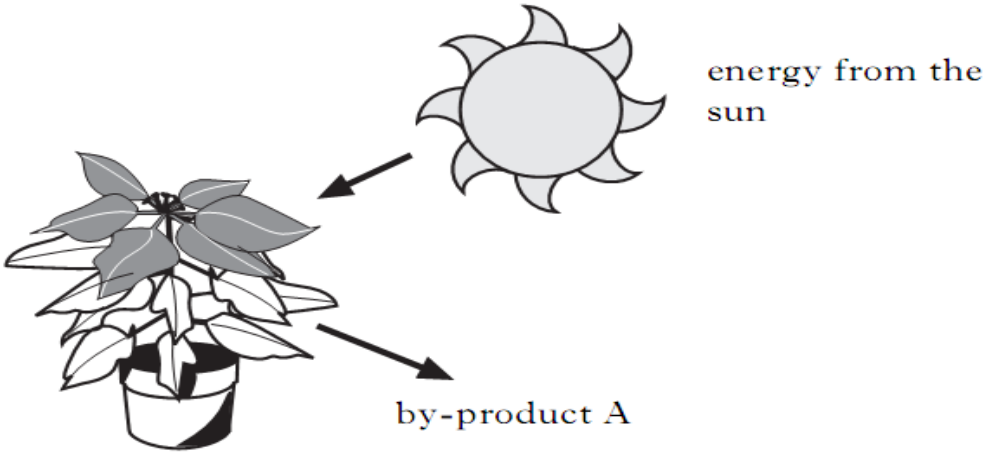
i) A shoot is said to be **(positive phototropic/negative phototropic)**

…… ……

ii) A root shows **(positive phototropic/negative phototropic)**

……..

8. Photosynthesis is the process by which green plants make glucose using energy from the sun. 2010



a) Name the by-product A released during photosynthesis.

……

b) Hydrogen and a high energy molecule are produced during photosynthesis.

i) Name the high energy molecule.

……

ii) Describe the use of hydrogen in carbon fixation.

……

c) i) Explain why an increase in temperature can lead to an increase in the rate of photosynthesis.

……

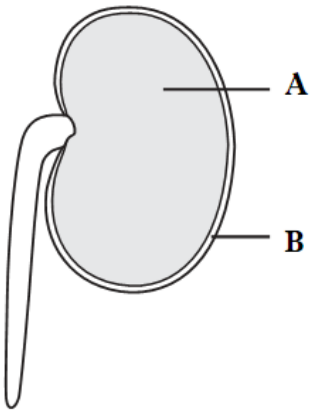
……..

ii) Other than temperature, state TWO limiting factors of photosynthesis.

……

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9. The diagram shows a germinating kidney bean seed. 2010



a) Use the diagram to complete the following table.

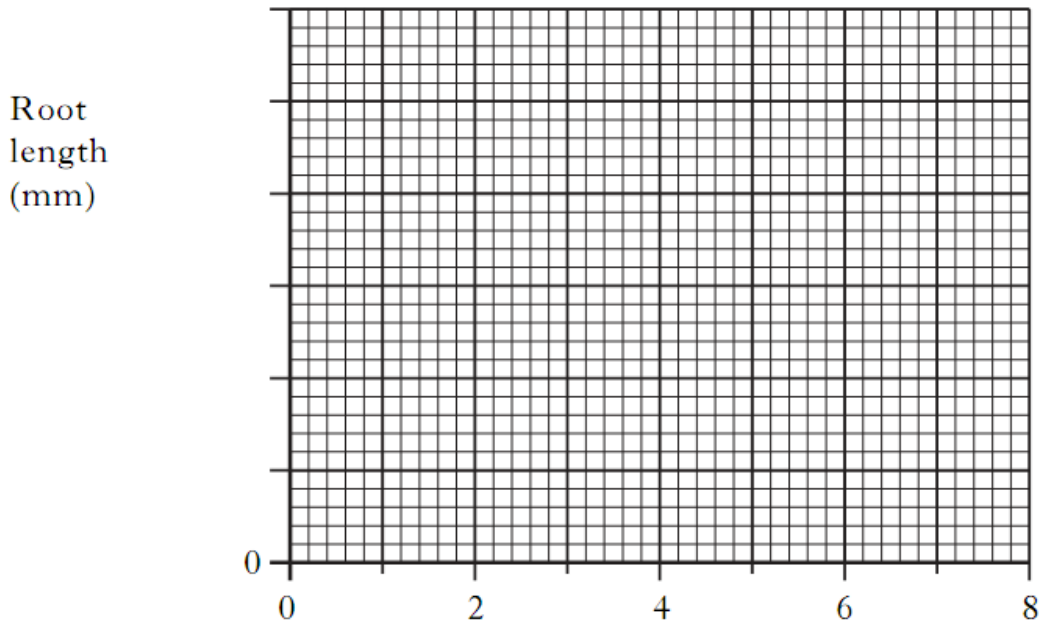
Label	Name	Function
A		Provides energy for growth
B	Seed coat	

b) The root length of the germinating kidney bean seedling was measured every two days. The results are shown in the table below.

Time (days)	Root length (mm)
0	0
2	4
4	8
6	18
8	27

i) On the grid provided, complete the LINE GRAPH by
   a) providing a label for the horizontal axis
   b) completing the scale on the vertical axis
   c) plotting the results

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ii) Between which TWO days was there the greatest increase in root length?

……

10. a) Compele the equation for photosynthesis, using the words listed below. 2011

Oxygen carbon dioxide water

…… + …… = glucose + ……..

b) State one way in which plants use the glucose from photosynthesis

……

11. A flower was found to have inconspicuous petal, log feathery stigma and small light pollen grains. 2012

a) What is likely agent of pollination of the flowers?

……

……

b) What is the significance of small light pollen grains?

……

……

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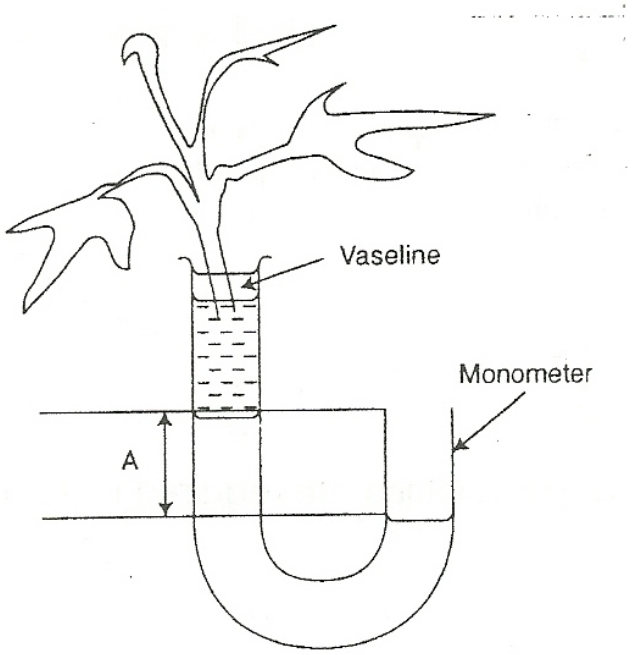
12. a) Explain why oxygen in the photosynthesizing leaf cells passes out in to the air during the day. 2013

……

b) Why would you expect plant root-hair cells to contain more mitochondria than other plant cells?

……

13. The diagram below shows an experiment done on a cut plant fragment. 2013



a) What is the purpose of this experiment?

……

……

b) What forces are involved to enable the mercury to move up in A?

……

……

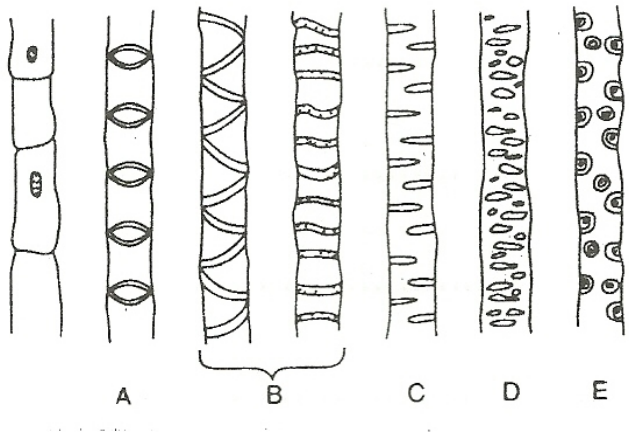
c) If Vaseline was removed, would the result of the experiment be the same?

……

……

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14. The diagram below showed different type of vessels in structure B.



a) Name the pattern of A, B, C, D and E

A: ……

B: ……

C: .....

D: .....

E: .....

c) B is complex tissue, which consist of vessels with different patterns. What is B?

……

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Unit 10. Circulatory system

10.1. Multiple choice questions

1. The blood plasma without the clothing factor is called 2004
   A. sebum
   B. septum
   C. haemoglobin
   D. serum
2. All veins return blood back to the heart except; 2005
   A. Superior
   B. .inferior vena cava
   C. .hepatic portal vein
   D. hepatic vein
3. While oxygen is carried by red blood cells, most of the carbon dioxide is carried by the; 2005
   A. white blood cells
   B. phagocyte cells
   C. lymphocytes
   D. blood plasma
4. The following precaution need ***not*** be taken before blood is transfused from a donor to a recipient. 2009
   A. Test for diseases e.g. AIDS
   B. Know the donor by name
   C. Know the blood group
   D. Sterilize the equipment used
5. oxygen moves into the tissue as the blood is flowing through the 2011
   A. capillaries
   B. arteries
   C. veins
   D. arteries and veins

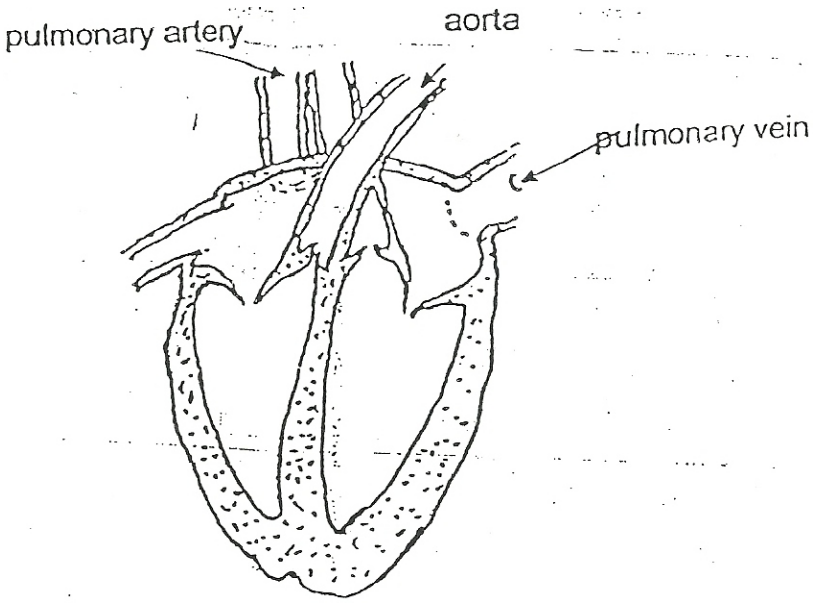
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6. A person whose blood group is O requires blood transfusion. Name the blood group{s} of the possible donor{s}. 2011
   A. blood group AB
   B. blood group A and B
   C. blood group O only
   D. blood group A ,Band O
7. blood transfusion (is) 2012
   A. present in individuals with the Rhesus antigen in the RBCs
   B. consist of lymph vessels
   C. the transfer of blood from a donor to circulation of recipient
   D. blood from recipient to circulation of donor.

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10.2. Structured questions

1. The diagram below shows a cross section of the heart. 2002



a) Using arrows draw on the diagram to show the passage of oxygenated blood toward the body.

b) The heart pumps the blood through two circulatory systems. The pulmonary and the systematic systems. What is main difference between these two systems?

……..

…….....

c) Give the general name to a structure that stops the blood flowing in the wrong direction. .....

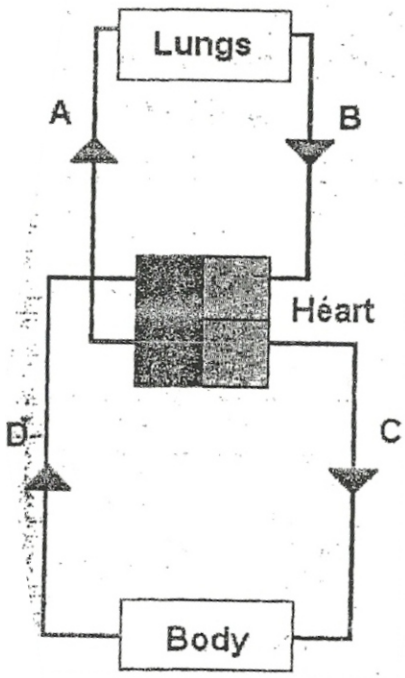
d) In the diagram, clearly label the position of one of these structures, using the letter A.

e) On the diagram, mark with an X the place where the returning blood from the body enters the heart. What is the name given to the blood vessel that returns the blood from the body to the heart?

.....

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2. The diagram below represents the circulation of blood in a human. 2003



a) Which of blood vessels labelled A-D in the diagram?

   i) Aorta: …….....

   ii) Pulmonary artery: …….....

   iii) Pulmonary vein: …….....

   iv) Vena cava: …….....

b) Explain why this may be described as double -circulatory system.

   …….....

c) Why is the colour of the blood in the right side of the heart brighter than that in the left side of the heart?

   …….....

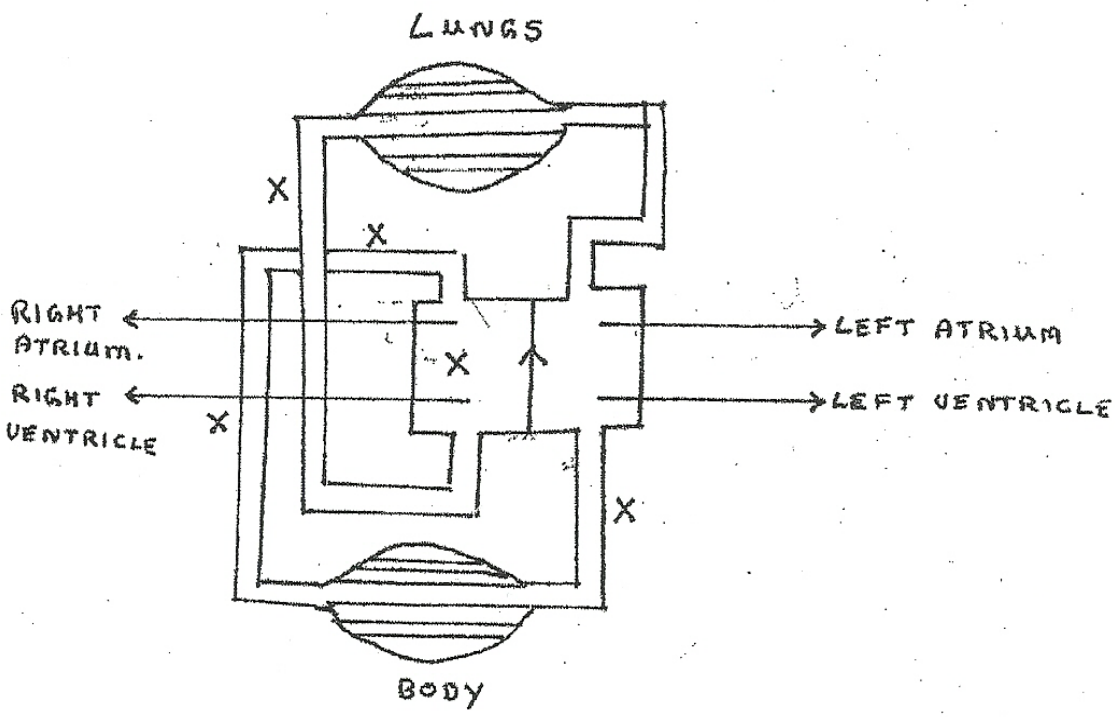
d) Describe how the structure of the alveoli in the lungs helps the transfer of gases into and out of the blood.

   ……

   …….....

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3. Study the diagram below and answer the questions that follow. 2005



a) Use arrows to indicate the direction of blood flow through spaces marked X.
b) Listed below are some properties of 3 types of blood vessels. Separate them into three groups as follows;

a) Those that carry blood to the heart.
b) Those that carry blood from the heart.
c) Those with thick walls
d) Those with thin walls
e) Those that carry blood under low pressure.
f) Those where oxygen and food pass across the walls.

Arteries	Veins	Capillaries

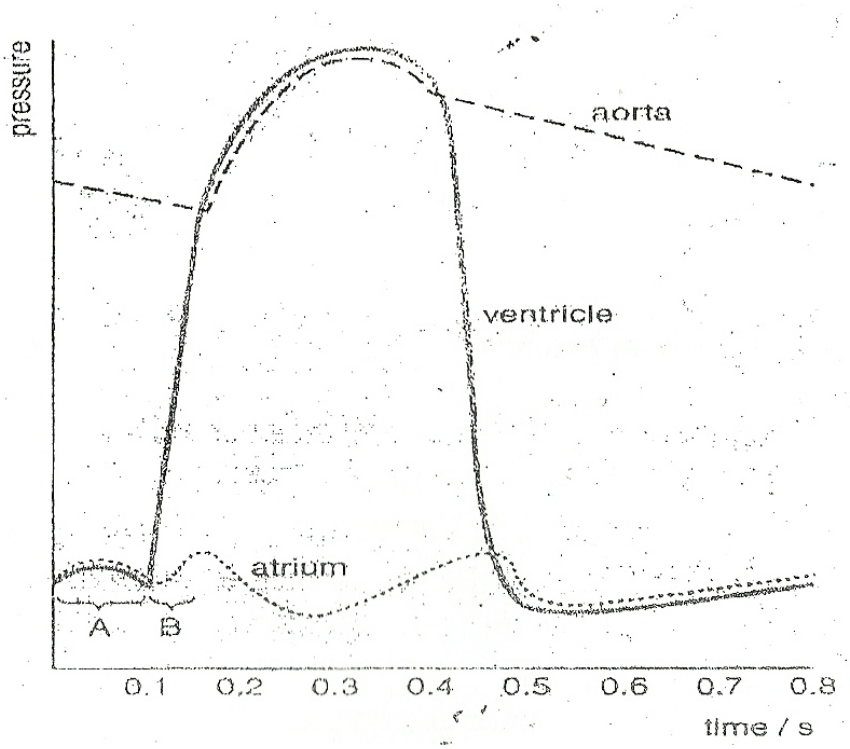
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c) Haemoglobin molecules contained in the red blood cells transport oxygen to all body parts.

i) Write the equation showing the transport of oxygen by haemoglobin.
.....

ii) Write down the equation to show the release of oxygen from haemoglobin.
.....

4. The graph shows the changes in the blood pressure that occur in the left side of the heart. During a single cardiac cycle. Blood leaving the ventricle passes through aorta. 2007



a) During the period lebeled **A** on the graph, the atrioventricular valve is open Explain, by using the information in the graph, what happen during period A

……..

b) What is the scientific name given to the period labeled **A** on the graph?

……

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c) During the period lebeled **B** on the graph, there is a rise in ventricle pressure.

i. What causes this rise in pressure?

.....

ii. Is blood entering or leaving the ventricle during period B? Explain the reason for your answer.

.....

.....

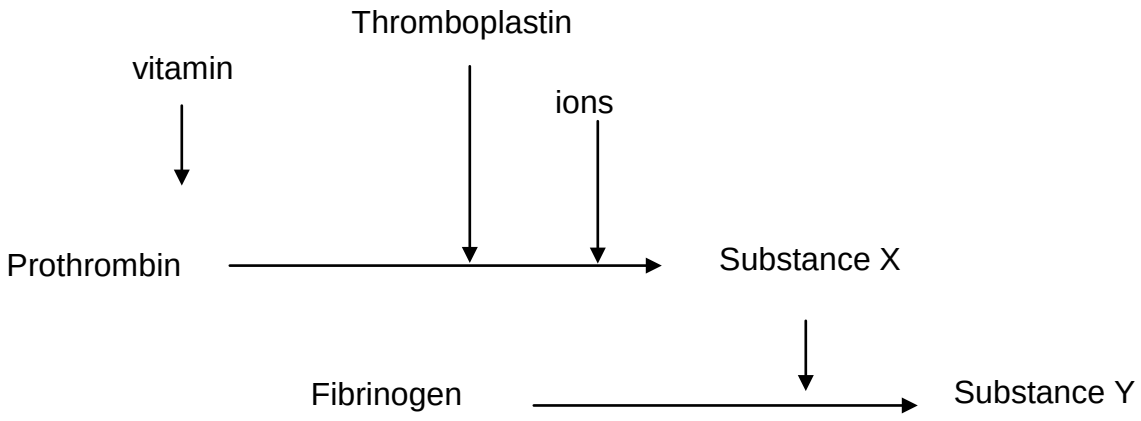
d) Use the information of the graph to work out when the second heart sound or "dup" occurs. Explain the reason for your answer.

.....

5. A person whose blood group is O requires blood transfusion. Name the blood group(s) of the possible donor(s). 2008

……..

6. Study the diagram below. It represents the process that makes blood clot. Then answer questions below. 2009



a) Give the name of the vitamin needed for blood clotting and the ions?

……

b) Name substance **X** and **Y.**

……

……

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c) i-Explain why people who are deficient of the vitamin mentioned above bleed profusely after an injury?

……..

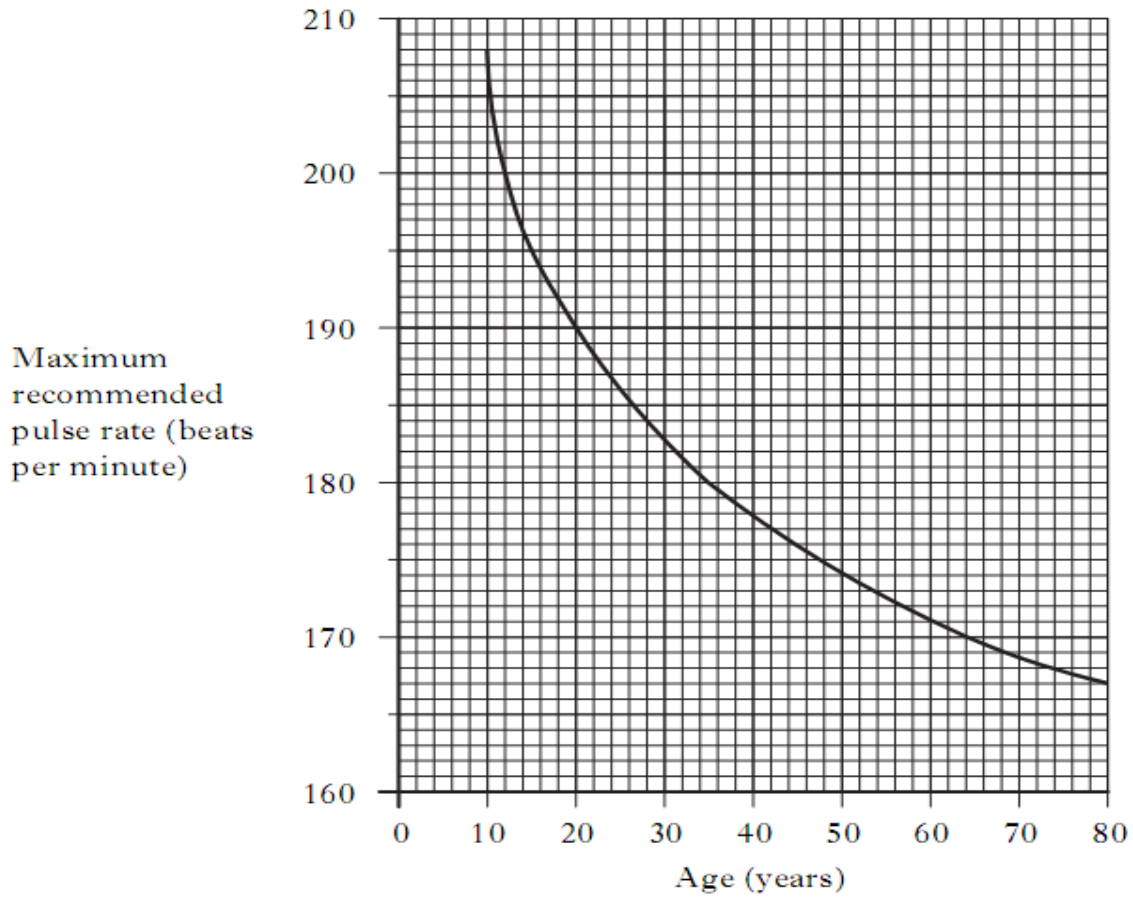
ii- State the name of a disease which results in the blood not clotting?

……

iii- To which category of disease does it belong?

……

7. The graph shows the maximum recommended pulse rate for humans of different ages. 2010



a) What is the maximum recommended pulse rate for a person aged 15 years?

……..

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b) At what age does the maximum recommended pulse rate fall below 200 beats per minute?

……

c) Calculate the percentage decrease in the maximum recommended pulse rate between the ages of 20 and 60 years.

……

……

……

8. a) In respect to the blood flow. Give the difference b/w the systole of atria and the systole of ventricle. 2012

Systole of atria	**Systole of ventricles**

9. a) In the heart, the ventricles have thicker walls than the atria. Why is this? 2013

……

……

b) Why does the left ventricle have a thicker wall than the right ventricle?

……

……

c) List three ways in which veins differ form arteries.

……

……

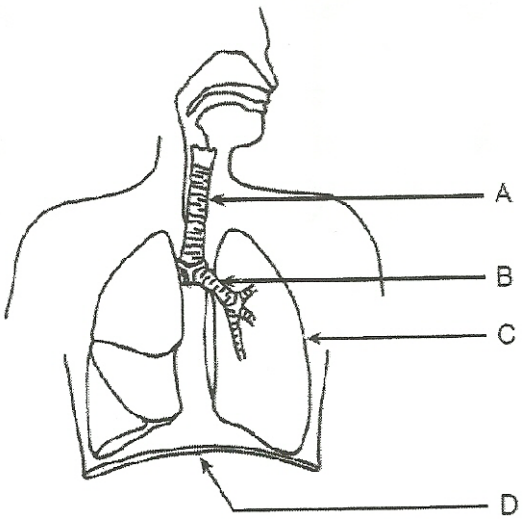
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Unit 11. Breathing system

11.1. Multiple choice questions

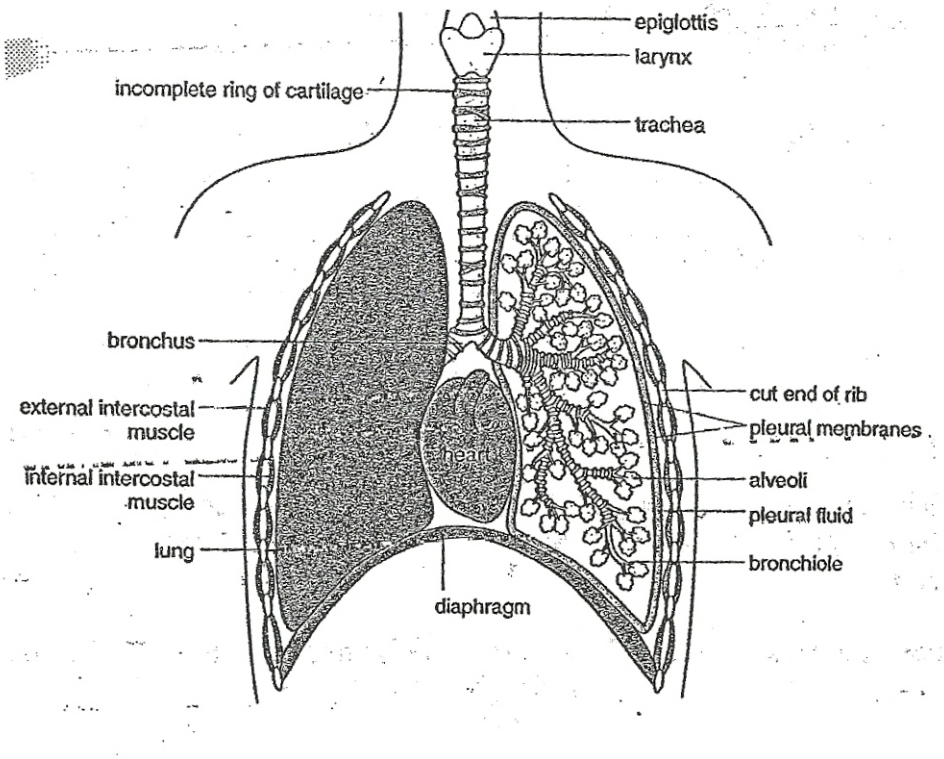
1. The out growth projections which develop from part of the inner lining epithelial tissue is 2006
   A. flagella C. pilli
   B. cilia D. hair
2. Which one of the following does not happen when one inhales fresh air? 2007
   A. The chest and abdomen expand
   B. The ribs move out and up
   C. The diagram moves up
   D. The breast bone moves out and up
3. What is the organ for gaseous exchange in a fish? 2008
   A. Spiracles C. Mouth
   B. Gills D. Lungs
4. Which structure shows in the diagram below contracts causing a pressure change in the chest cavity during breathing? 2011



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11.2. Structured questions

1. Study the diagram carefully and answer questions below. 2004



a) With the help of an arrow, indicate on the diagram above the direction of the air flow during inspiration.

b) What happens to the external intercostals muscles?

.....

c) What happens to the internal intercostals molecules?

.....

d) Does the diaphragm contract or relax? .....

e) In which direction does the diaphragm move? .....

f) What happens to the volume of the thoracic cavity? .....

g) Does the pressure inside the lungs decrease or increase? .....

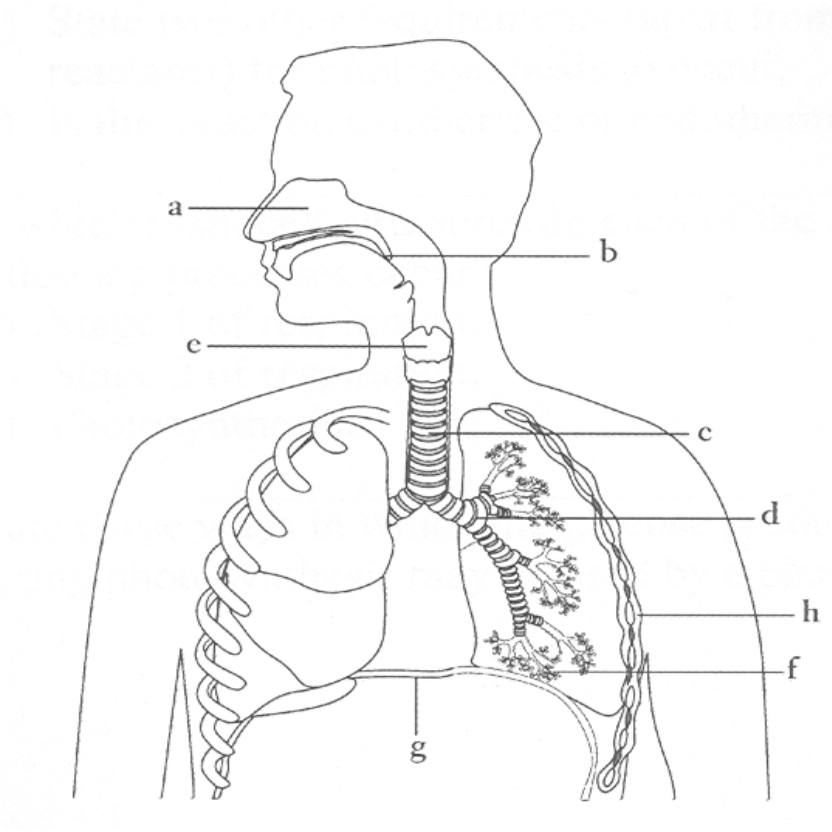
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2. The following structures listed below are the structures of the main air passage of the respiratory tract. Arrange them in the correct order to show how the air enters the respiratory tract from the atmosphere.

   Lung, Bronchi, Larynx, Pharynx, Trachea, Nasal cavity (nostrils).

   1. Nasal cavity, 2. ……..... 3. ……
   4. …… 5. …… 6……..

3. Use the diagram below of the human respiratory system to answer the questions that follow. 2008



a) Which structures shown (use the letters **a** to **h** to answer)

i. Prevents food from entering the nasal cavity: ……

ii. Contracts and flattens when you breathe in? ……..

iii. Filters, warms and humidifies air? .....

iv. Contracts to raise the rib cage when you breathe in? .....

v. Is the site of gaseous exchange between the lungs and the bloodstream?

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……..

vi. Is a bronchus? .....

b) i) Write a chemical equation for the process of aerobic respiration.

……..

i) Is this reaction exothermic or endothermic? .....

iii) What does the word aerobic mean? ……

4. a) How many cells does oxygen pass through on its way from the alveoli to red blood cells? 2013

……

……

b) Why is it important for oxygen to have a large concentration gradient between the inside of alveoli and the blood?

……

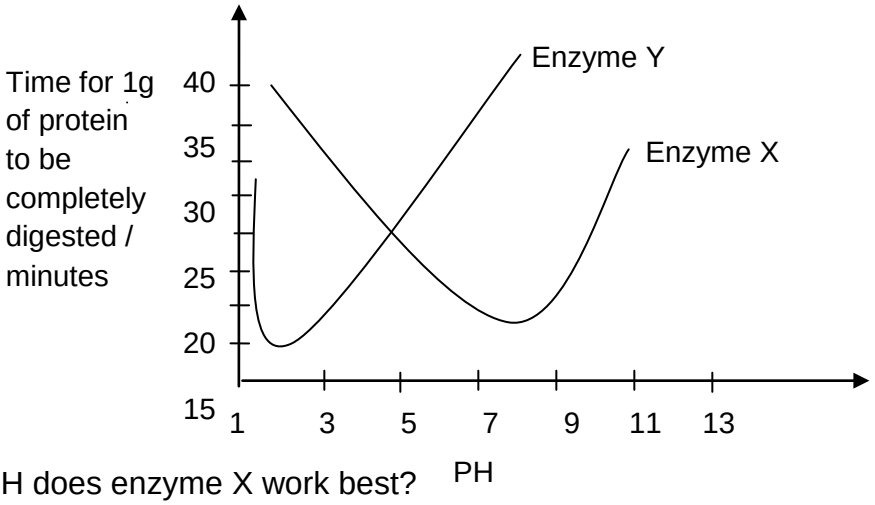
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Unit 12. Digestive system

12.1. Multiple choice questions

1. The graph below shows the effect of pH on the activity of two protein digesting enzymes. 2002



At what pH does enzyme X work best?

A. 2

B. 5

C. 8

D. 11

2 In which part of digestive system of a mammal would enzyme Y work best?

A. Mouth

B. Stomach

C. Large intestine

D. Small intestine

3. Chemical digestion of proteins starts in the 2003

A. mouth

B. oesophagus

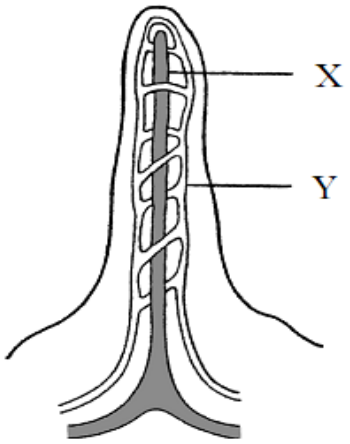
C. small intestine

D. stomach

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4. The diagram below shows some structures in a villus. Which line in the table below correctly identifies the products of digestion which pass into structures X and Y?

2010



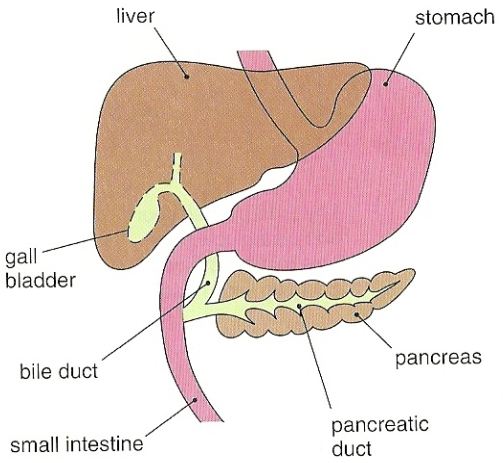
	X	Y
A	glucose	amino acids
B	glycerol	fatty acids
C	Amino acids	glycerol
D	Fatty acids	glucose

5. The digestion of starch begins in the? 2010
   A. Mouth
   B. Gallbladder
   C. Stomach
   D. small intestine
6. Salivary gland produce mucus to 2011
   A. lubricate the food in the stomach
   B. lubricate the food to aid swallowing
   C. protect the mouth from amylase
   D. protect the oesophagus from amylase

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12.2. Structured questions

1. The diagram below shows part of a digestive system. 2004



a) Bile is produced by the liver. Bile is stored in the gall bladder. As chyme (food) arrives at the duodenum. Bile from the bile duct enters the duodenum.

i. Which type of food does bile act upon?

.....

ii. If gall stones block the bile duct and the liver continues to produce bile, the gall bladder will be filled. What will happen to the bile?

.....

iii. Name the disease produced as a result of this condition.

.....

iv. What are the major symptoms of a person suffering from that disease?

.....

2. a) Name two structural adaptations to the wall of the small intestine for the absorptions of different food substances.

1- .....

2- .....

b) The following reaction represents the breakdown of starch in humans.

$$\text{Starch} \xrightarrow{\text{Amylase}} \text{Maltose} \xrightarrow{X} \text{Glucose}$$

i. Name two organs which produce the enzyme amylase in humans.

.....

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ii. Name the sight of production of maltase in the human gut.
.....

iii. Name the enzyme (X) which breaks down maltose into glucose.
.....

3. Bile is an essential secretion in the digestive system. 2005

a) Where is bile made? .....

b) Where is it stored? ……

c) Where is it mixed with the food? ……

d) What is the function of bile? ……

4. Which organ is responsible for reabsorbing water from undigested food to form faeces?

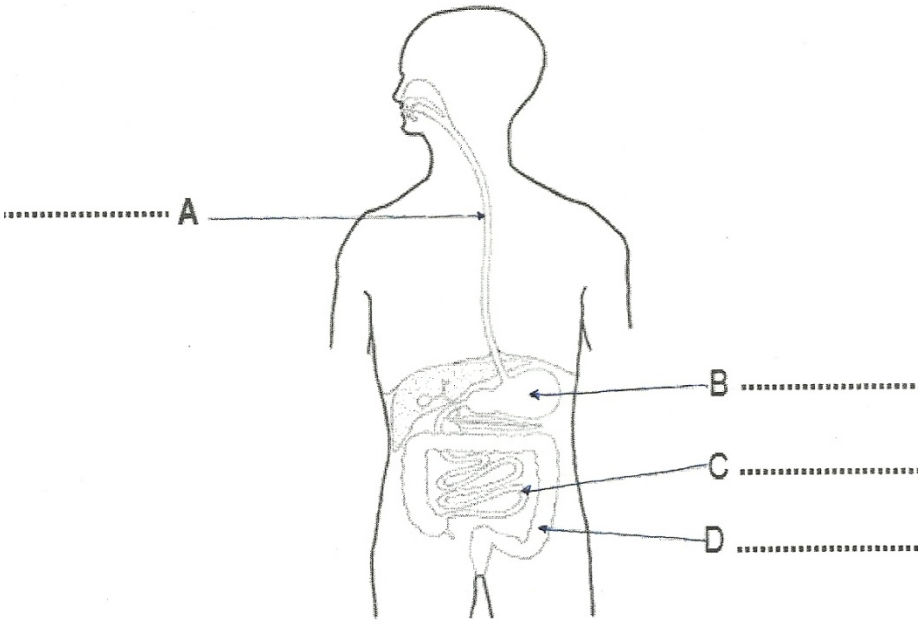
.....

5. The villi of the small intestine are adapted to absorb digested food and the alveoli in the lungs are adapted to absorb oxygen. State four ways in which they are similar. 2013

……

……

5. The flowing diagram is of the human digestive system. 2011



a) Label parts A to D on the diagram.

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b) Complete the following paragraph using some of the word from the list:

Large intestine, absorbed, small intestine, soluble, enzymes, insoluble.

The process of digestion breaks down ……food molecules into smaller……..ones. This process is speeded up by ……The products can then be…… Into the blood through the wall of the ……

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Unit 13. Skeletal and muscular system

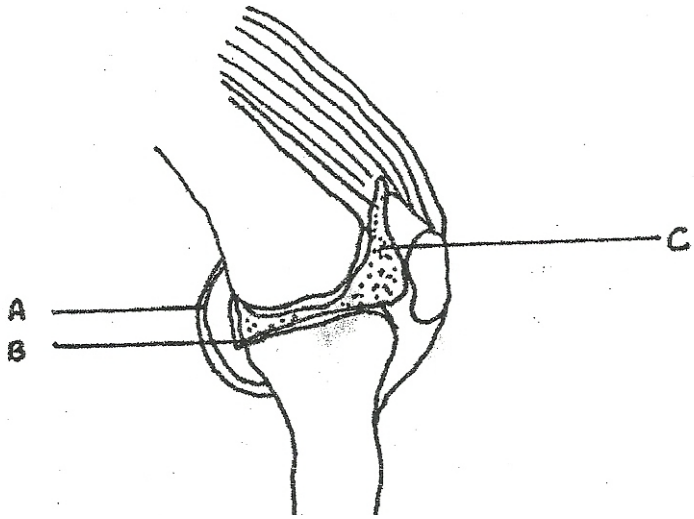
13.1. Multiple choice questions

1. The joint between the femur and the pelvic girdle is an example of a 2003
   A. ball and socket joint
   B. hinge joint
   C. peg and socket joint
   D. sliding joint
2. The biceps muscle 2003
   A. bends the arm at the elbow
   B. bends the leg at the knee
   C. straightens the arm at the elbow
   D. straightens the leg at the knee
3. The pelvic girdle is made of two halves each composed of three fused bones: 2012
   A. Ischium, ilium, pubis
   B. Femur, fibula, tibia
   C. Humerus, radius, ulna
   D. Scapula, clavicle, sternum
4. Exoskeleton is 2012
   A. The skeletal elements, bone and cartilage
   B. The cuticle which performs the functions of the skeleton lies outside the muscles
   C. Made up of s supportive fluid under pressure surrounded by muscles
   D. Found in the neck region

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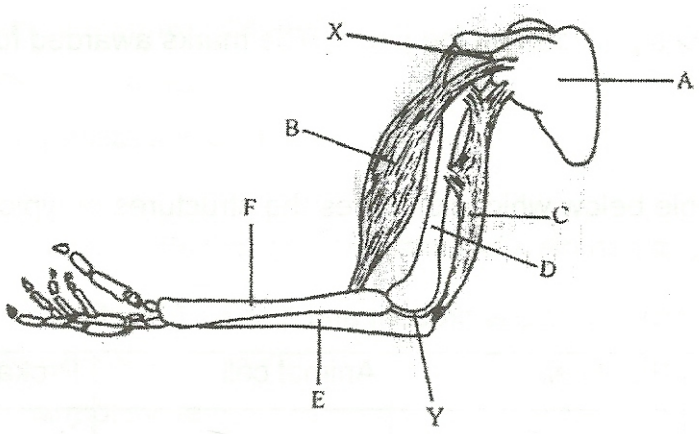
13.2. Structured questions

1. The diagram below shows the structure of human knee joint. 2005



a) Name the parts lebeled A,B&C.
.....
b) What type of joint is this? .....
c) How does it perform the movement?
……
d) How does it differ from ball and socket joint?
……

2. This diagram shows the bones and two of the muscles in the human arm. 2006



a) name the parts lebeled A to F (A-F)
A: ..... D: .....
B: ..... E: .....
C: ..... F: .....

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b) Name the types of joints present in the lebeled **X** and **Y.**

X: ..... **Y:** .....

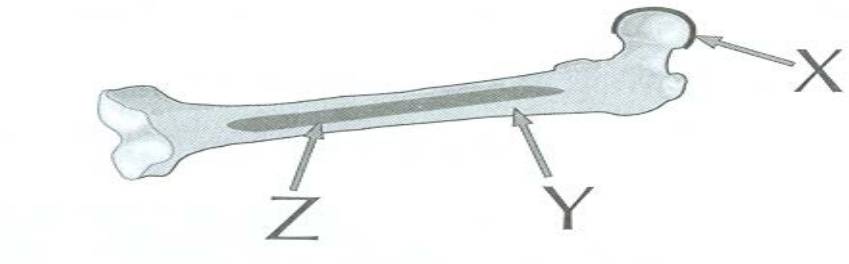
c) What type of movement is possible at part X?

.....

d) What happens when the muscle labeled C contracts?

.....

3. a) The diagram below shows the human thigh bone. 2008



i) Name the parts labeled

X ……..

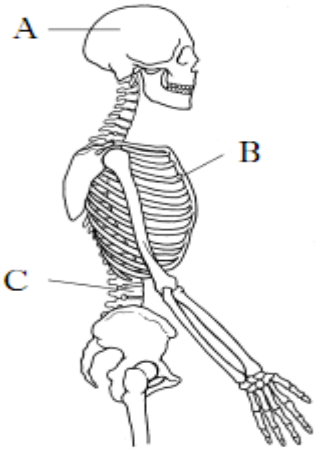
Y ……..

Z ……

ii) Explain the advantage of the bone being hollow.

……..

4. The diagram shows part of a human skeleton. 2010

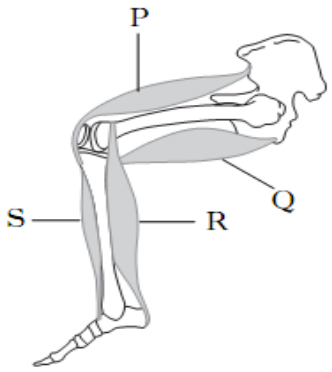


a) Complete the table below to name the part of the skeleton labeled on the diagram and name ONE organ protected by that part.

Letter	Part of skeleton	Organ protected
A		
B		
C		

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b) The diagram shows some of the muscles in a human leg.



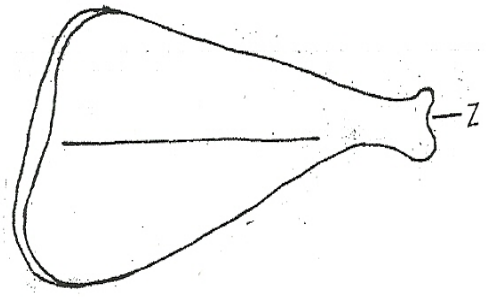
i) Which muscle contracts to straighten the leg?

……

ii) What is the name of the structures which attach the muscles to bones?

……

5. Study the figure below: 2012



a) Identify the bone.

……

b) Name the part of the skeleton which the bone belongs to.

……

c) Name part labelled Z.

……

d) Name the bone which formed with the bone at point Z.

……

e) Name the type of joint formed with the bone at point Z.

……

f) Explain how the above is adapted to its functions.

……

……

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Unit 14. Excretory system

14.1. Multiple choice questions

1. Which of the following is not part of Nephron? 2005

   A. Ureter
   B. Helene's loop
   C. Glomerulus
   D. Bowman's capsule

2. Of the following substance, which is present in the glomerulus's filtration, but normally completely reabsorbed as the filtration passes along the tubules? 2007

   A. Sodium ions
   B. Glucose
   C. Ammonia
   D. Urea

3. Which one of the following is the main function of a nephron? 2011

   A. it breaks down red blood cells to from nitrogenous wastes
   B. it regulates the chemical composition of the blood
   C. it forms urea from the waste product of protein metabolism
   D. it absorbs digest food from the contents of the small intestine

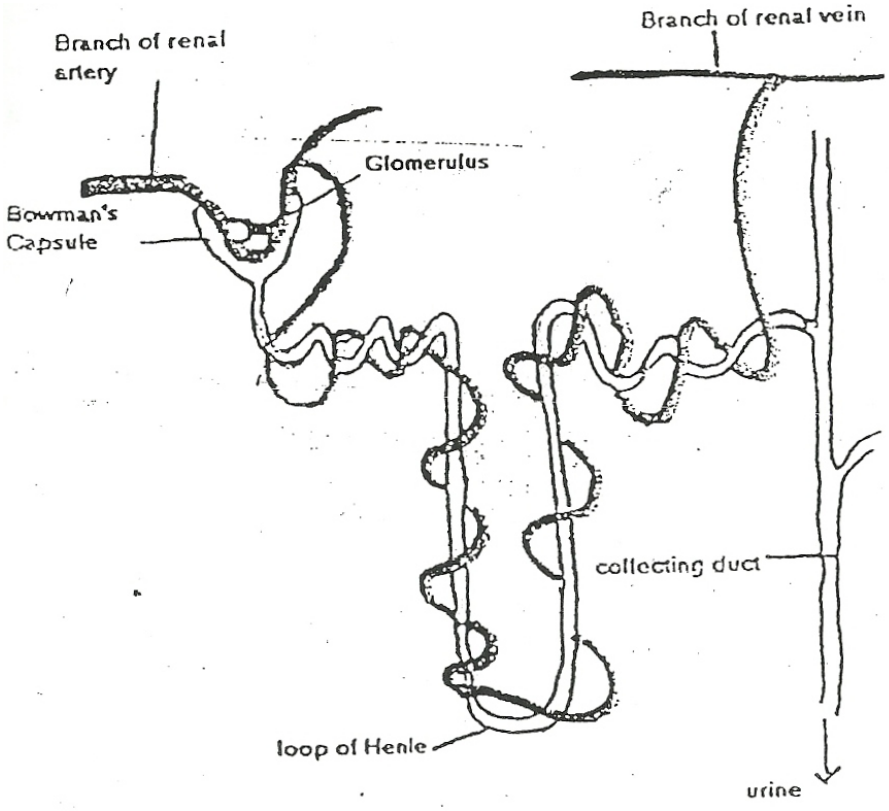
4. Which of the following parts stores urine for temporarily?

   A. Kidney
   B. Ureter
   C. Urethra
   D. Urinary bladder.

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14.2. Structured questions

1. The diagram below shows the functional unit of the kidney. 2002



a) What is the name to this unit?

.....

b) The function of this unit is to filter the blood. Certain substances called filtrates are filtered from the blood. Blood from the renal artery reaches the glomerulus.

i) State two factors that help filtrates move through the glomerulus.

.....

ii) Name the structure the filtrate move into.

.....

iii) Name four substances that are filtered through the glomerulus.

.....

iv) Name two substances that are then reabsorbed.

.....

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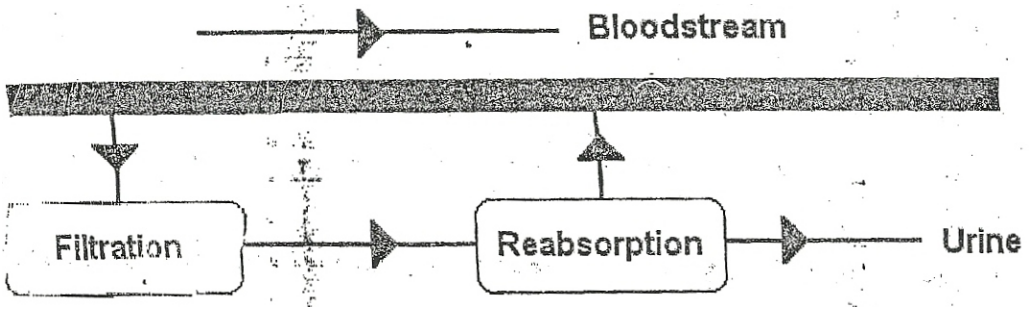
v) Name a structure where reabsorption takes place.

.....

vi) Some molecules do not pass through the glomerulus. Suggest a reason.

.....

2. The following diagram shows the main processes that occur in the kidney. 2003



a) To which of the body's system does the kidney belong?

.....

b) The following table shows the concentration of some substances in the blood plasma, the filtrate and the urine.

Substance	% in plasma	%in filtrate	% in urine
Chloride ions	0.4	0.4	0.6
Glucose	0.1	0.1	0
Protein	7.0	0	0
Sodium ions	0.3	0.3	0.35
Urea	0.03	0.03	2.0
Water	90-93	90-93	95

i) Explain why protein remains in the plasma after filtration.

……..

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ii) State which substance is reabsorbed from the filtrate and explain why this is useful in the body.

……

c) i) in which organs the body does domination occur?

……

ii) Which element is expelled from the body as urea?

……

d) The kidney is concerned with homeostasis. Explain what this term means.

……

3. The table below shows the concentrations of different substances in fluid in the Bowman's capsule and in the collecting duct of the kidney. 2008

Substance	Conc. in Bowman's Capsule (g/100ml)	Conc. in urine (g/100 ml
Water	99	96
Protein	0	0
Glucose	0.10	0
Urea	0.04	2.0
Salt	0.70	0.30

i) Explain why there is a difference in the concentrations of glucose.

……

ii) Explain why the liquid in the Bowman's capsule does not contain any proteins.

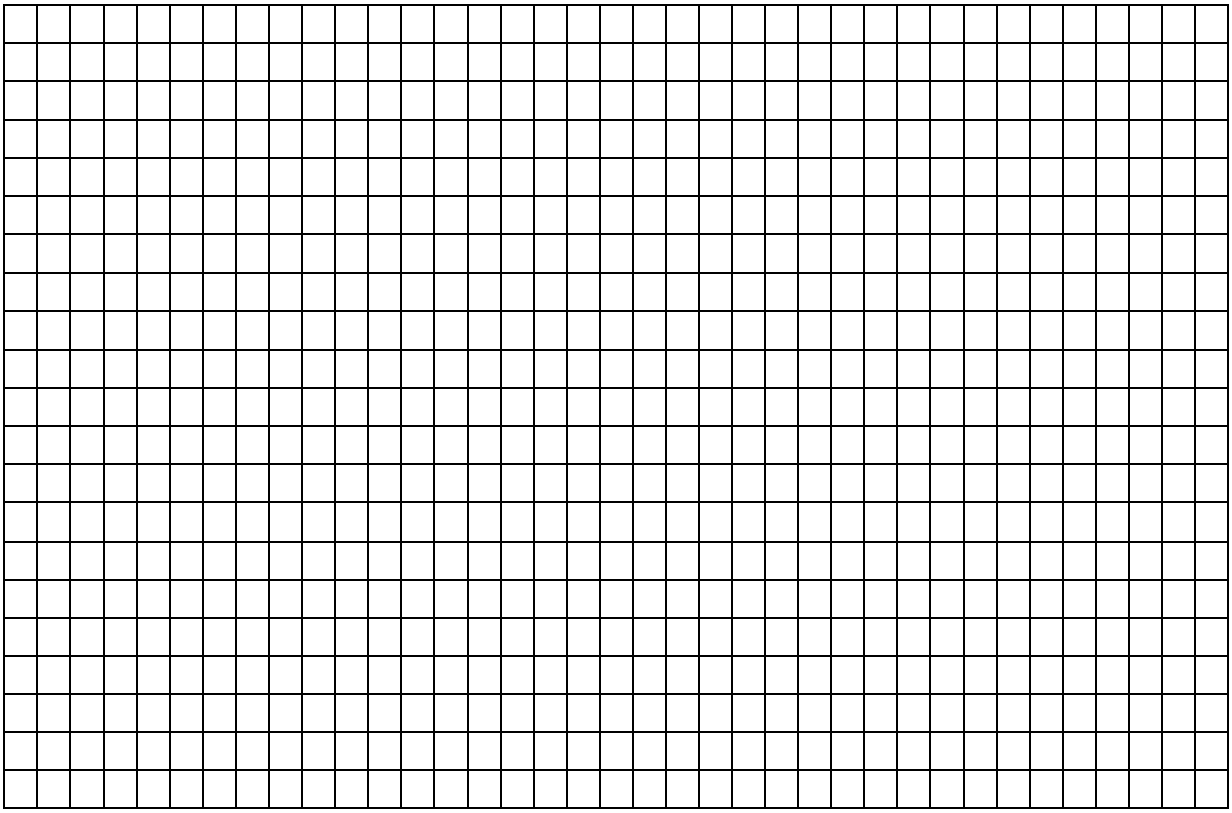
…….. …

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4. The table below shows the relation between urine production and water intake for a period of 18 hours. 2009

Time (Hrs)	**0**	**2**	**4**	**6**	**8**	**10**	**14**	**16**	**18**
Water intake (cm^3)	0	0	1000	1200	1500	2000	2300	1600	1000
Urine output (cm^3)	0	93	95	200	300	425	450	330	95

i. With the help of above table of results, draw a graph of the amount of urine output against time on the grid provided below.



ii. What is the maximum urine output within the 18 hours period?

……

iii. Compare the relationship between urine production and water intake.

……

iv. In which hour does the above table show minimum urine output?

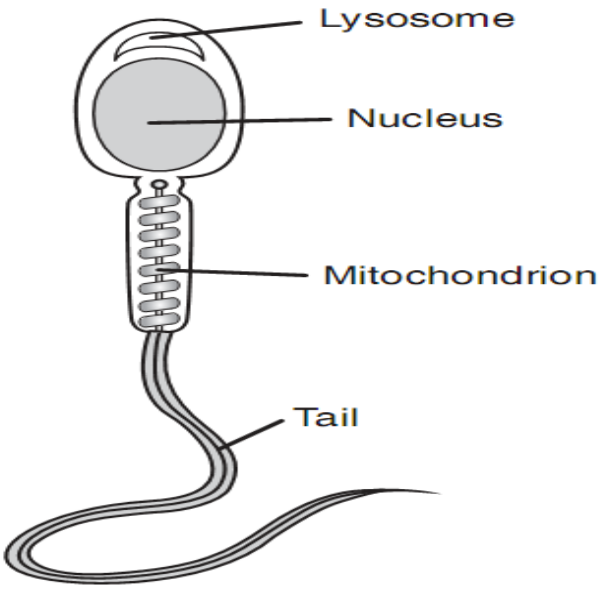
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Unit 15. Reproductive system

15.1. Multiple choice questions

1. Where does fertilization occur in the human female reproductive system? 2008
   A. Oviduct
   B. Uterus
   C. Cervix
   D. Vulva
2. The release of an egg from the ovary is described as? 2009
   A. Menstruation
   B. Fertilization
   C. Gametogenesis
   D. Ovulation
3. The placenta produces
   A. Thyroxin
   B. Glucose
   C. Eggs
   D. Estrogen
4. The diagram below shows a male gamete. 2010



Which structures stores MOST of the genetic information?

A. mitochondrion
B. lysosome
C. nucleus
D. tail

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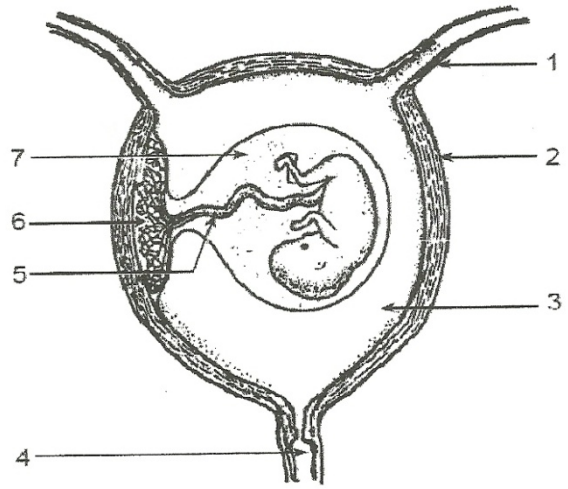
5. The diagram below shows a developing human foetus. Eostrogen stimulates the production of additional blood vessels in structure 2011

A. 1

B. 2

C. 5

D. 7



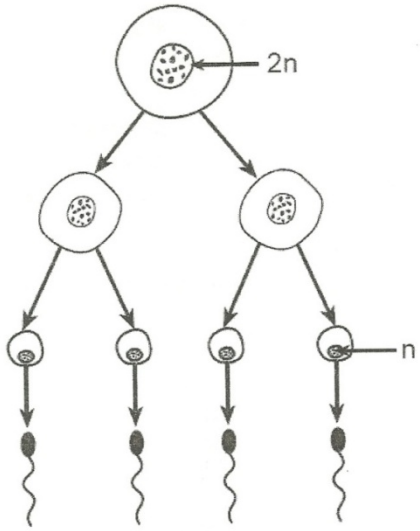
6. The diagram represents a necessary part of human reproduction. This diagram represents the process of 2010

A. ovulation

B. gastrulation

C. mitotic cell division

D. gametogenesis



7. For human zygote to become an embryo it must undergo

A. mitosis

B. cleavage

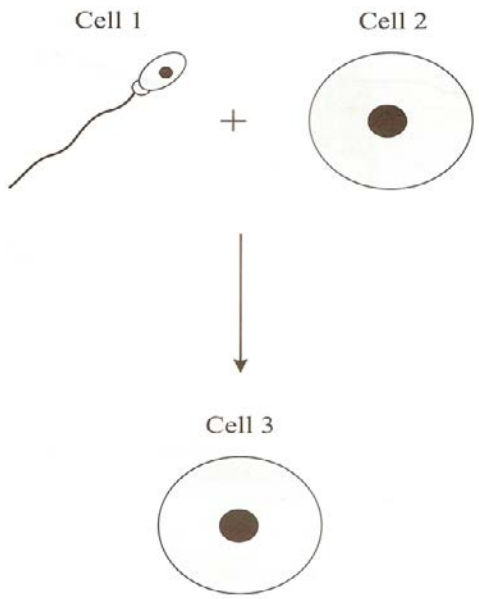
C. regeneration

D. disjunction

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15.2. Structured questions

1. a) The diagram below shows one stage of human sexual reproduction. 2009



i) How many chromosomes are present in cells 1, 2 and 3?

1……

2……

3……..

b) Apart from stimulating sperm production, state four effects of the hormone testosterone in teenagers.

……

……

……

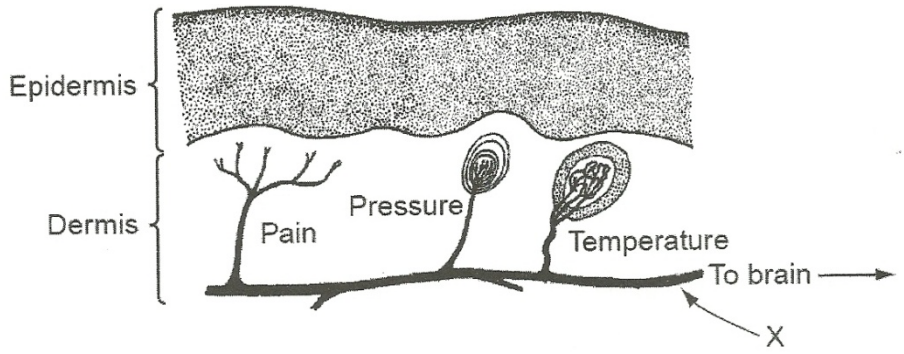
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Unit 16. Sense organs

16.1. Multiple choice questions

1. The sebaceous glands secret oil which gives nourishment to the 2004
   A. Skin
   B. dermis
   C. skin and hair
   D. epidermis and dermis
2. Rotational movement of the head is detected by structure in the inner ear called?
   A. Oval window
   B. Cochlea
   C. Utricles
   D. Semi-circular canals
3. Three types of skin receptors are represent in the diagram? 2011



   Structure x is most likely
   A. a sensory nerve
   B. an effector
   C. a ganglion
   D. a tympanum

4. Which one of the following is sensory cells that respond to changes in position? 2013
   A. Cochlea
   B. Ampulla
   C. Vagus nerve
   D. Auditory verve.

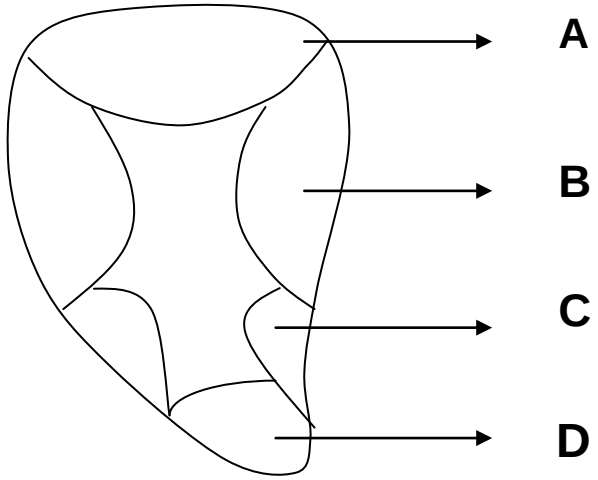
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16.2. Structured questions

1. The eye is a sensory organ stimulated by light. Complete the table by naming the sense organ related to each of the given stimuli. 2003

Stimulus	**Sense organ**
Light	Eye
Chemical taste	
Sound	
Chemical smell	
Touch	

2. The tongue is an organ of taste in humans. Complete this table by correcting the correct taste sensor. 2004



Taste map of the tongue

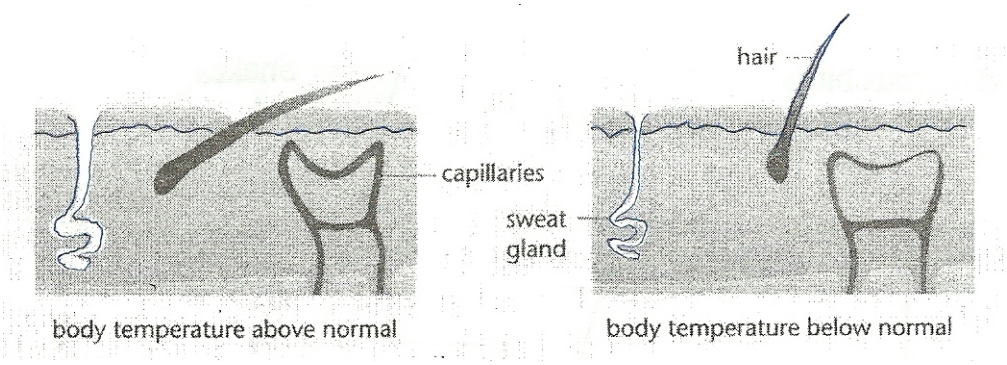
Region of the tongue labelled	**Type of substance it taste**
A	
B	
C	
D	

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3. If you measured the temperature under your tongue standing outside on a hot summer's day and again on a cold winter's day, which one would be higher? 2005

   .....

4. The skin contains a number of mechanisms for controlling body temperature. The two diagrams below show a section through the human skin. One of the diagrams shows the skin when the body temperature is above normal. The second shows the skin when body temperature drops below normal. 2006



   a) Describe what happened to the blood vessels in the skin when the body temperature dropped.

      .....

   b) Why are the sweat glands important when the body temperature goes up?

      .....

   c) The hairs on the skin are raised when the body temperature falls. This has little effect in humans but can help other mammals. Explain how.

      .....

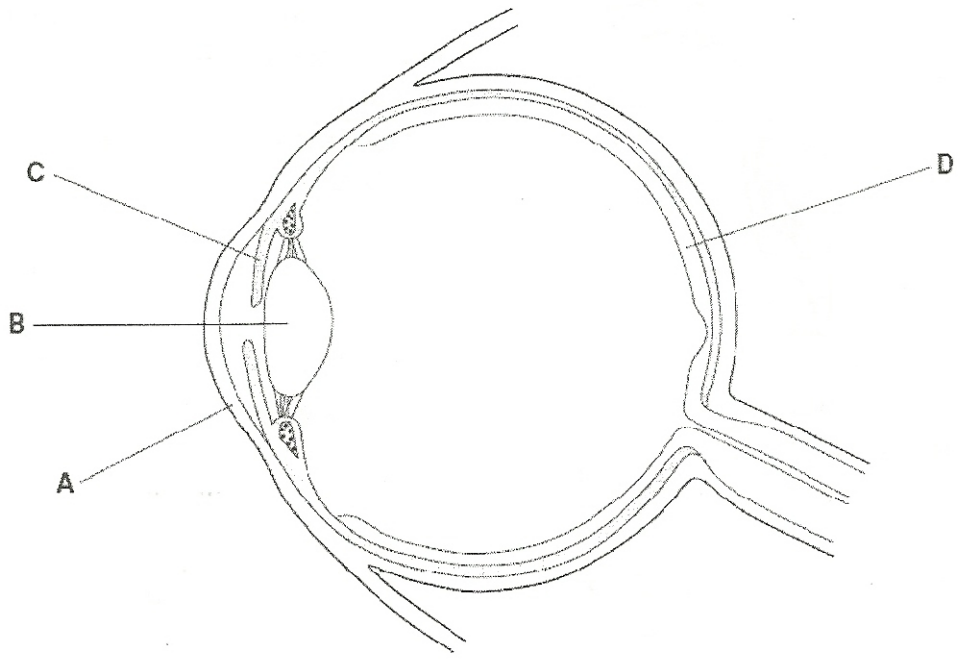
      .....

5. Which organ is responsible for releasing water by sweating?

   .....

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6. The figure below shows the eye in section. 2011



State the function of each of the lebeled parts of the eye.

A: ……

B: ……

C: ……

D: ……

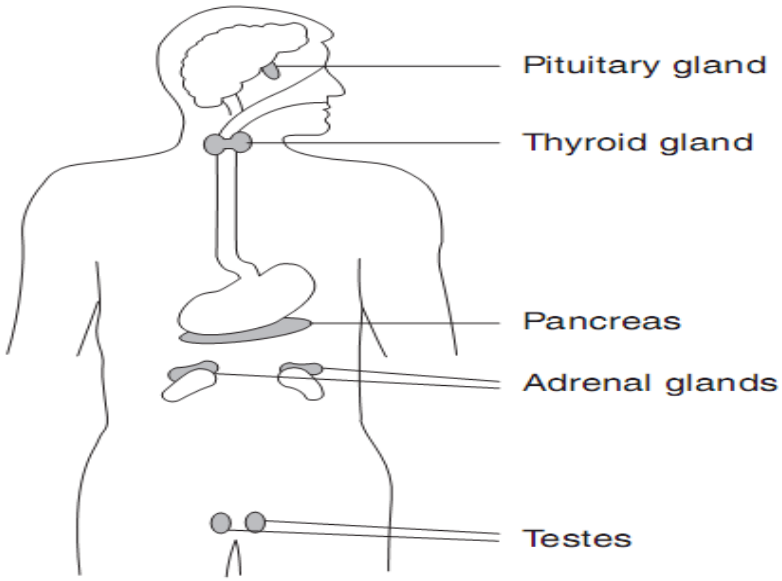
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Unit 17. Endocrine glands

17.1. Multiple choice questions

1. The labelled organs in the diagram below are part of which human body system?

2010



A. Respiratory

B. Endocrine

C. Digestive

D. Circulatory

2. Which one of the following statements below is not true regarding hormones?

2012

A. Hormones work via activation of gene and activation cyclic AMP
B. Hormones are secreted by specialized cells called glands
C. Aldesterone, progesterone and thyroxine are steroid like hormones
D. Testestrone, oxytoxin and somatotropin are peptide hormones

3. The pituitary gland releases

A. Thyroxine

B. Calcitonin

C. Antidiuretic hormone

D. insulin

4. Which one of the following is following is incorrectly matched with its producers?

2013

A. Aldesterone-kidney
B. ADH-hypothalamus
C. Glucagon_pancreas
D. Insulin_pancreas

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17.2. Structured questions

1. Some people suffer from a condition called diabetes. The treatment for this is a regular injection of the hormone insulin. 2003

   i) Insulin is an example of a group of chemicals that act as 'chemical messengers' in the body. what is the group of chemical called?

   .....

   ii) What does insulin help to control in the body?

   .....

2. a) Here is table of blood glucose control. Put (√) in column 2 or 3 to show which hormone (insulin or glucagon) shown can carry the function shown in column 1. 2007

Column1 **When blood glucose level rises above normal**	**Column 2** **Insulin**	**Column 3** **Glucagon**
1) Increase glucose uptake of cells		
2) Converts stored glycogen to glucose		
3) Converts glucose to glycogen		
4) Reduces metabolic breakdown of Glucose		

   b) Where in the pancreases are these hormones produced?

   .....

   c) i) Are these hormones endocrine or exocrine gland?

   .....

   ii) Give reason for your answer.

   .....

   d) Give the name of a disease in which a person has abnormal levels of glucose in the blood.

   .....

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3. A student met a leopard along a forest path. Explain the effect of adrenaline on the: 2008

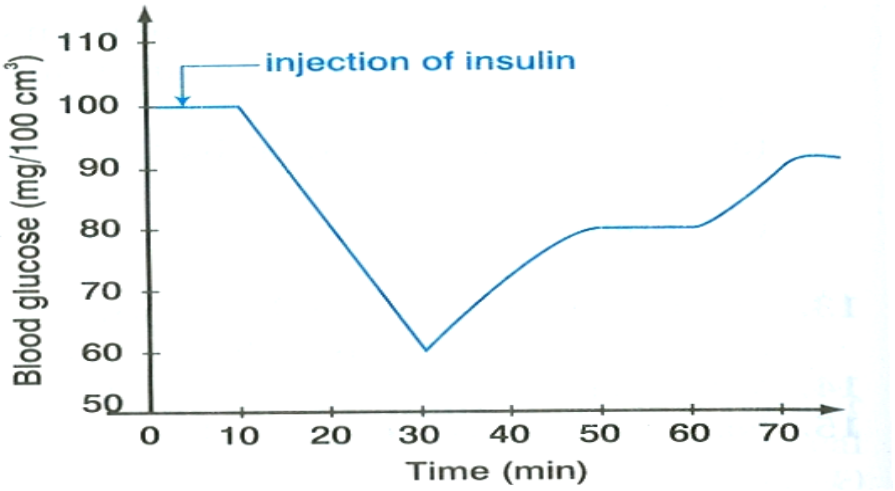
   i) Circulatory system: ……

   ……

   ii) Respiratory system:……

   …… ……..

4. The graph below shows the effect of injecting one unit of insulin into a person. The concentration of glucose in the blood is measured at regular intervals. 2008



   a) State the lowest value of blood glucose observed and the time it was recorded.

   .....

   b) Explain the fall in blood glucose level.

   .....

   c) Name the mechanism that led to the increase in blood glucose level after it had been falling.

   .....

   d) Name the hormone responsible for the conversion of glycogen to glucose.

   ……

   e) State the effects of each of the following in human beings:

   1. too much glucose in the blood: ……

   ……

   2. very little glucose in the blood: ……

   ……

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5. Use words from the list below to complete the sentences below 2009

Glycogen,	***Serotonin,***	***Insulin,***	***Glucose,***	***Sucrose***

i) The release of a substance from platelets is called?

……

ii) The blood stream transports a sugar called?

……

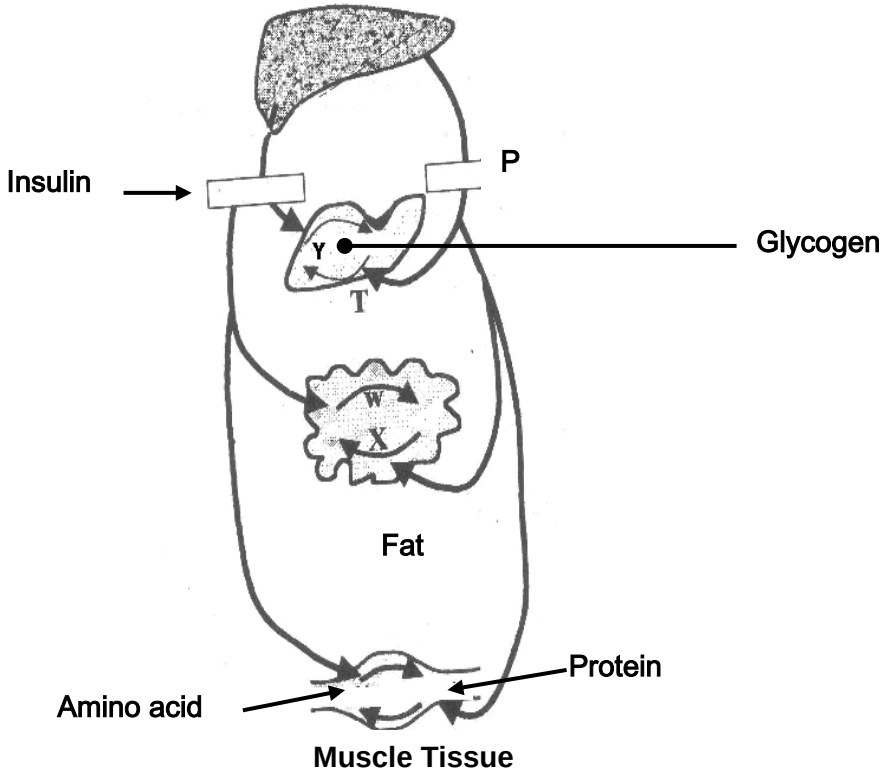
iii) To increase the blood sugar level, Glucagon promotes the breakdown of

……

iv) If the blood sugar level gets too high, the endocrine organ secrets another hormone into the blood called?

……

6. The diagram below shows the homeostatic system concerned with the regulation of blood sugar level. Use it to answer the question the follow. 2010



a) Name the hormone labeled P and the organ labeled T.

Hormone P :……..

Organ T: ……

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b) Name the substance Y which is being converted into the product shown in the organ.

……

c) Name the process by which the precursors labeled X and W are converted into the product shown in the diagram.

……

d) State the condition of the blood which enhances the production of insulin.

.....

e) Name the cells of the pancreas which produce the hormone labelled (P) and insulin.

.....

f) Apart from the two hormones produced by the pan crease, name three other substances which are contained in the pancreatic secretions upon stimulation by the hormone secretion.

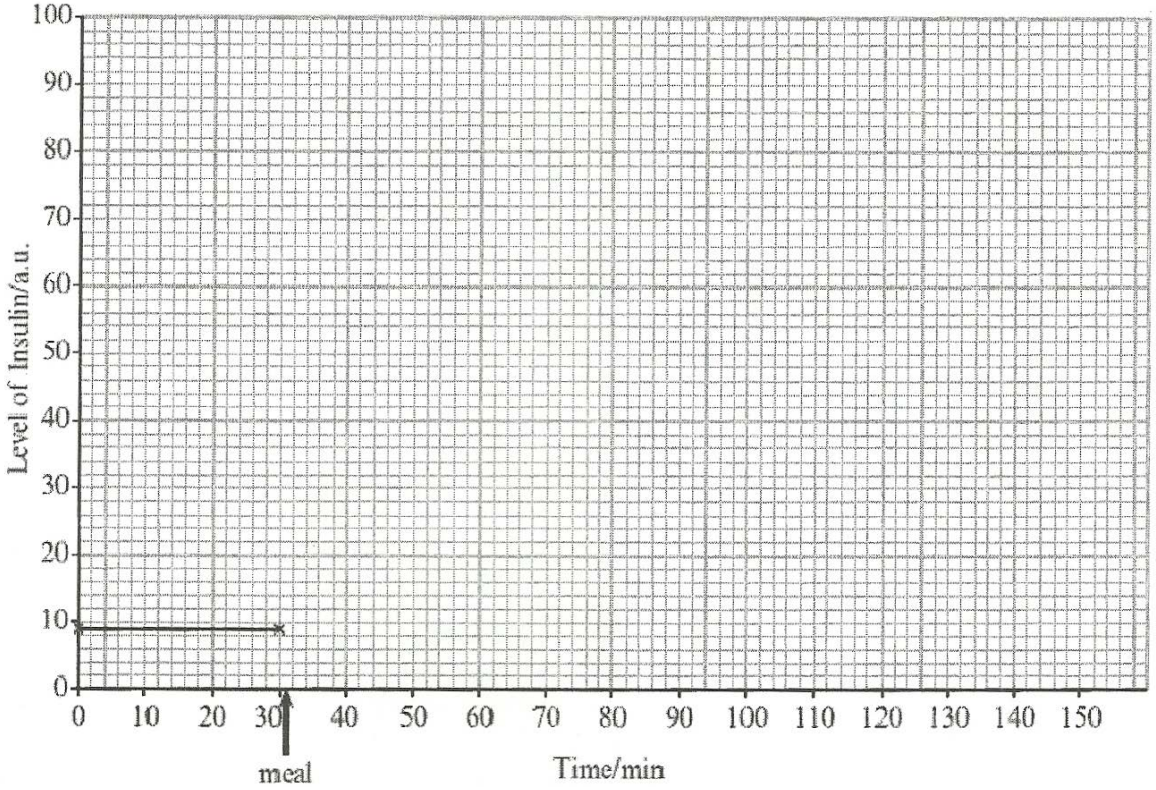
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.....

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7. The hormone insulin is found in the blood. it controls the level of blood glucose. In an investigation, the level of insulin was measured in Sajid`s blood on one day. During this time he ate a meal. The results are shown below. 2011

Time (Min)	0	30	60	90	120	150
Level of insulin (arbitrary units)	9	9	57	94	43	18



a) Plot the results on the graph. Join the plots with a ruler.
The first two have been done for you.

b) From the graph,

i. how did the level of insulin change after Sajid, ate the meal.
.....

ii. write down the level of insulin at 100 minutes.
……

iii. work out the decrease in the level of insulin between 100 and 110 minutes.
……..

iv. what effect would insulin have on Sajid's level of blood glucose.
.....

v. people do not produce enough insulin . Name this medical condition.
.....

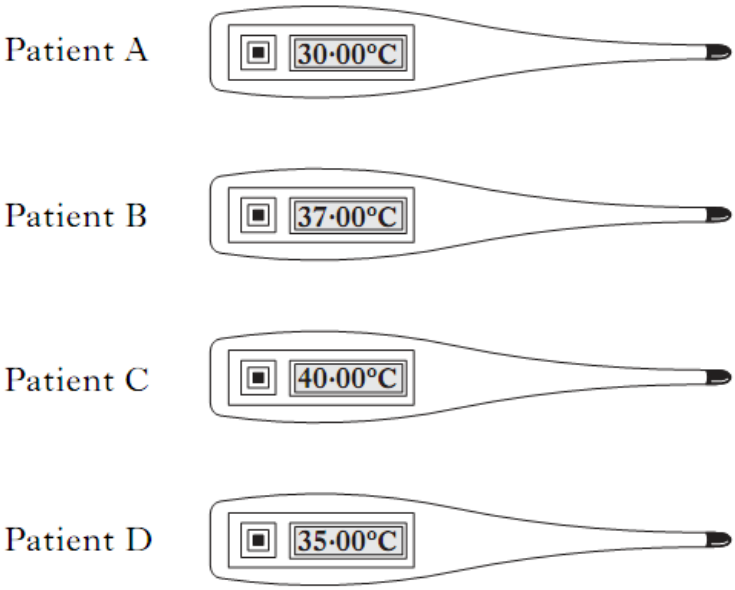
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Unit 18. Homeostasis

18.1. Multiple choice questions

1. Sweating keep the body cold because 2007
   A. It is cold liquid
   B. Its evaporation takes heat from the body
   C. It reflects heat
   D. It prevents body heat from coming to the surface
2. The diagrams of digital thermometers below show the temperatures of four patients in a hospital. Which patient is most likely to be suffering from fever?

2010



3. Why is the intestinal fluid forced out of the systemic capillaries at arteriolar end.
   A. The osmotic pressure of the blood fluid is greater than that of blood
   B. The hydrostatic pressure of the interstitial fluid is less than that of the interstitial fluid
   C. The hydrostatic pressure of the blood is greater than the osmotic pressure of interstitial fluid
   D. The osmotic pressure of interstitial fluid is greater than hydrostatic pressure of blood.

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18.2. Structured questions

1. It is very important for humans to keep their internal body temperature constant. They have a number of systems that help to keep their temperature constant even if the external temperature changes greatly. 2006
   a) What is the normal internal body temperature of humans?

      .....

   b) Why is it so important for humans to keep their body temperature constant?

      .....

2. In a range of temperature between 0-35°C, the rate of reaction of an enzyme is proportional to the temperature. Above 35°C and below 0°C, enzyme activity slows down and eventually stops. **Explain why.** 2008

   ……
   ……

3. Study the table bellows about an uncovered skin of a person exposed to a different temperature. 2012

Temperature in ^{0}C	Heat loss
0	10
10	20
20	40
40	80
50	100
60	140

   a) Plot and draw a graph of temperature against heat loss?



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b) i. At what air temperature vasodilatation happen?

ii- Give a reason for your answer.

……

c) i- Name the process that contributes heat loss?

……

ii. How a sheep does perform that loss?

……

……

d) At what temperature would enzymes start to get denatured?

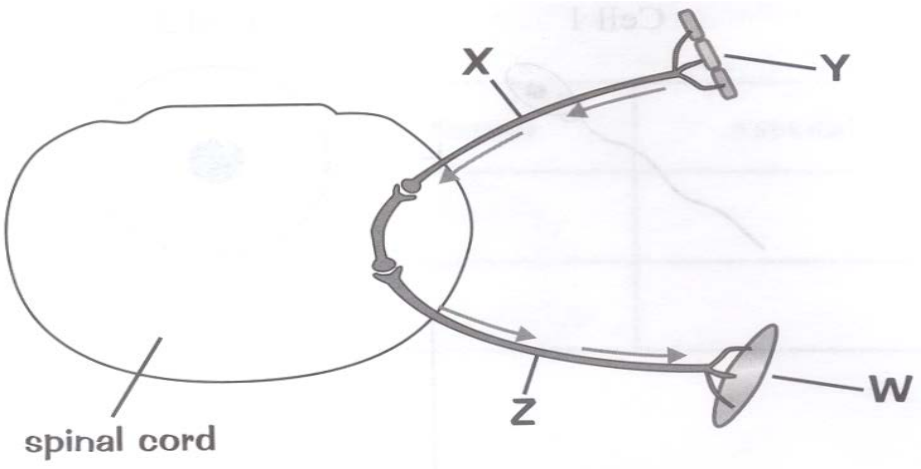
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Unit 19. Nervous system

19.1. Multiple choice questions

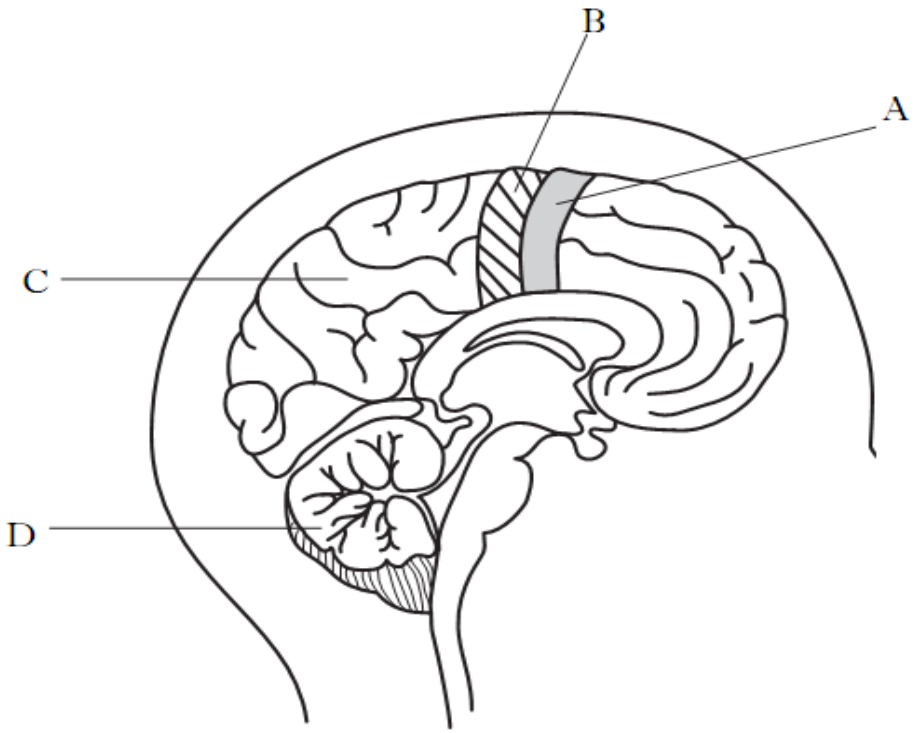
1. The wave of depolarization followed by repolarization is called 2003
   A. Stimulus
   B. response
   C. impulse
   D. reflex action
2. Give an example of a sedative drug 2008
   A. Nicotine
   B. Alcohol
   C. Caffeine
   D. Ecstasy
3. The diagram below shows the nerve pathway involved when a person touches a very hot object. Which letter represents the sensory neuron? 2009



   A. Y
   B. Z
   C. X
   D. W

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4. The diagram below shows a side view of the human brain. Which label identifies correctly the part of the brain which controls balance? 2010



5. Effectors are the best described as 2011
   A. organs that interpret stimuli
   B. structure that respond to stimuli
   C. tissues that initiate stimuli
   D. cells that transmit stimuli
6. An example of a reaction to stimulus 2011
   A. a boy smelling a flower
   B. eyes blinking due to smoke in the air
   C. a person tapping on the shoulder of friend
   D. aloud clap of thunder following lightning
7. If you breathe deeply after running a kilometer distance, the part of the brain that is mostly activated is 2013
   A. Hypothalamus
   B. Spinal cord
   C. Medulla
   D. Pons

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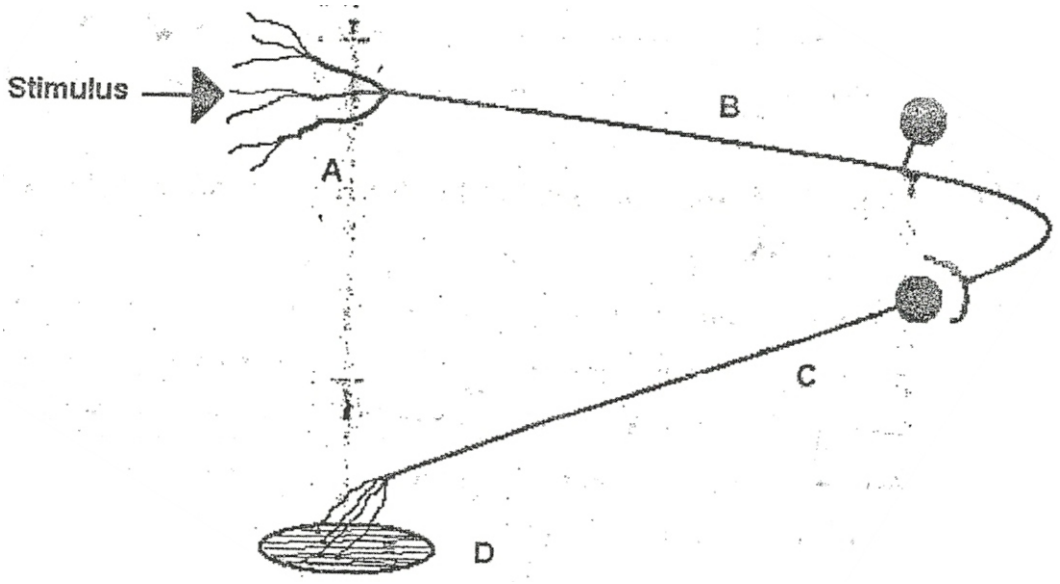
8. Which part of the vertebrae nervous system is not involved in preparation for the fight – or - fight response? 2013

A. Central
B. Somatic
C. Sympathetic
D. Parasympathetic.

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19.2. Structured questions

1. The following diagram represents a reflex arc. 2003



a) Identify parts A-D from the words in the box and write your answers in the table.

Effectors	motor neurone	receptor
Relay neurone	sensor neurone	synapse

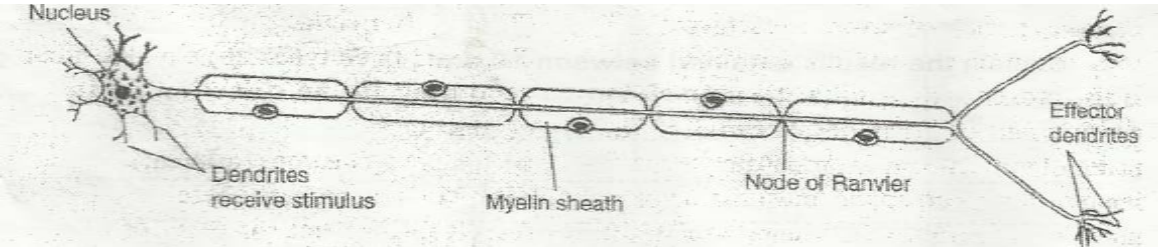
Letter	Part of reflex arc
A	
B	
C	
D	

b) Explain how a reflex action prevents someone from getting seriously injured when touching a hot pan.

……

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2. a) Study the following diagram, and then answer the questions that follow. 2007

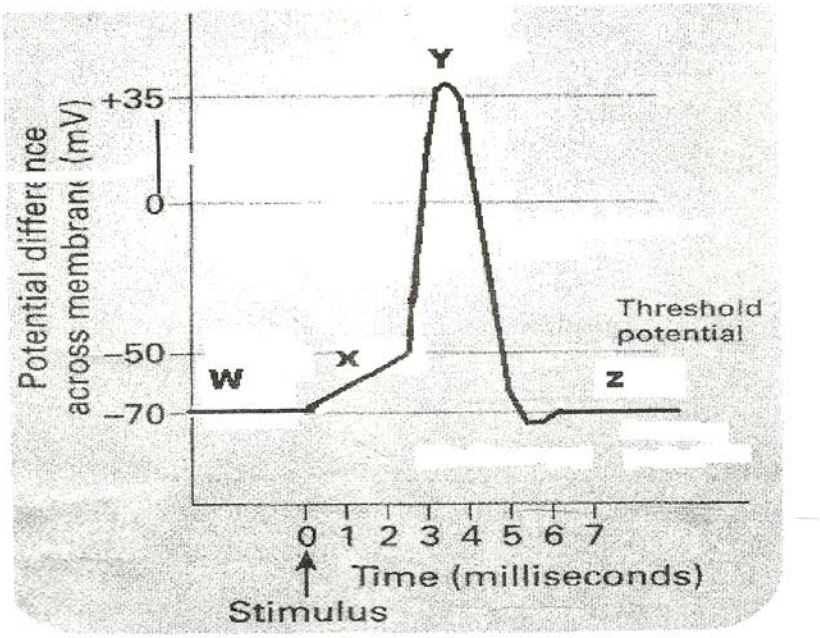


i) Draw an arrow showing the direction of the impulse transmission.

ii) In which direction do dendrites pass the impulses?

……

b) The diagram below shows the changes in membrane potential which occur during the transmission of nerve impulses.



i) State which letter on the diagram corresponds to the process of depolarization of the axons of a membrane. …….

ii) State the direction in which sodium ions move across the membrane during depolarization. .....

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iii) Explain how impermeability of the axon membrane to sodium ions help to maintain resting potential at W.

……..

iv) Mammals have myelinated axons, where as invertebrates, such as squid, have non-myelinated axons. Explain the advantage of having myelinated axons.

.....

v) Explain the condition of impulse along a myelinated axon is faster compared to condition along unmyelinated axons. 2012

…….

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Unit 20. Ecology

20.1. Multiple choice questions

1. A bacterium reproduces every 20 minutes .how many bacteria will there be after three hours? 2003
   A. 9
   B. 256
   C. 512
   D. 1024
2. Different species of living organisms that live in a given area are called 2004
   A. population
   B. community
   C. ecosystem
   D. habitat
3. In tropical rain forests, the producers obtain energy from 2006.
   A. Consumers
   B. Decomposers
   C. Leaf litter
   D. Sunlight
4. The chart below shows the feeding relationship in a certain habitat. 2008

   Grass ⟶ Insect ⟶ Lizards ⟶ Snakes

   Note: The arrow points to the eater

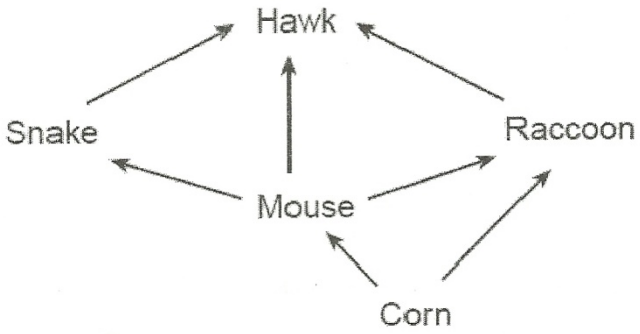
   If a disease killed all lizards, what will be the immediate effects on the other elements?

	Grass	**Insects**	**Snakes**
A.	Decrease	Increase	Decrease
B.	Increase	Increase	Decrease
C.	Decrease	Decrease	Decrease
D.	Increase	Decrease	Decrease

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5. Which of the following may prevent a population from thriving in a particular Habitat?. 2009
   A. Temperature
   B. Food supply
   C. Altitude
   D. Any of these may prevent a population from thriving
6. In the diagram below which organism is classified as both a primary and secondary? 2011

   A. hawk
   B. raccoon
   C. snake
   D. mouse



7. Animals that feed exclusively on herbivores are known as 2010
   A. pramry consumers
   B. carnivors
   C. ominivors
   D. produsers
8. The spray used in fresh water bodies to kill snails is called 2011
   A. molluscide
   B. pesticide
   C. fungicide
   D. herbicide
9. A generation is 2012
   A. Different forms of the same gene on the same gene locus
   B. All the genes or alleles on organism process
   C. The genetic formula of an organism responsible for particular trait
   D. A group of organism of approximately the same age within a population

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10. Which one of the following combinations of environmental factors results exponential growth of parasitic fungus infects tropical plants?

	Temperature	Humidity	Wind spread
A	High	High	Low
B	High	Low	Low
C	High	Low	High
D	low	Low	High

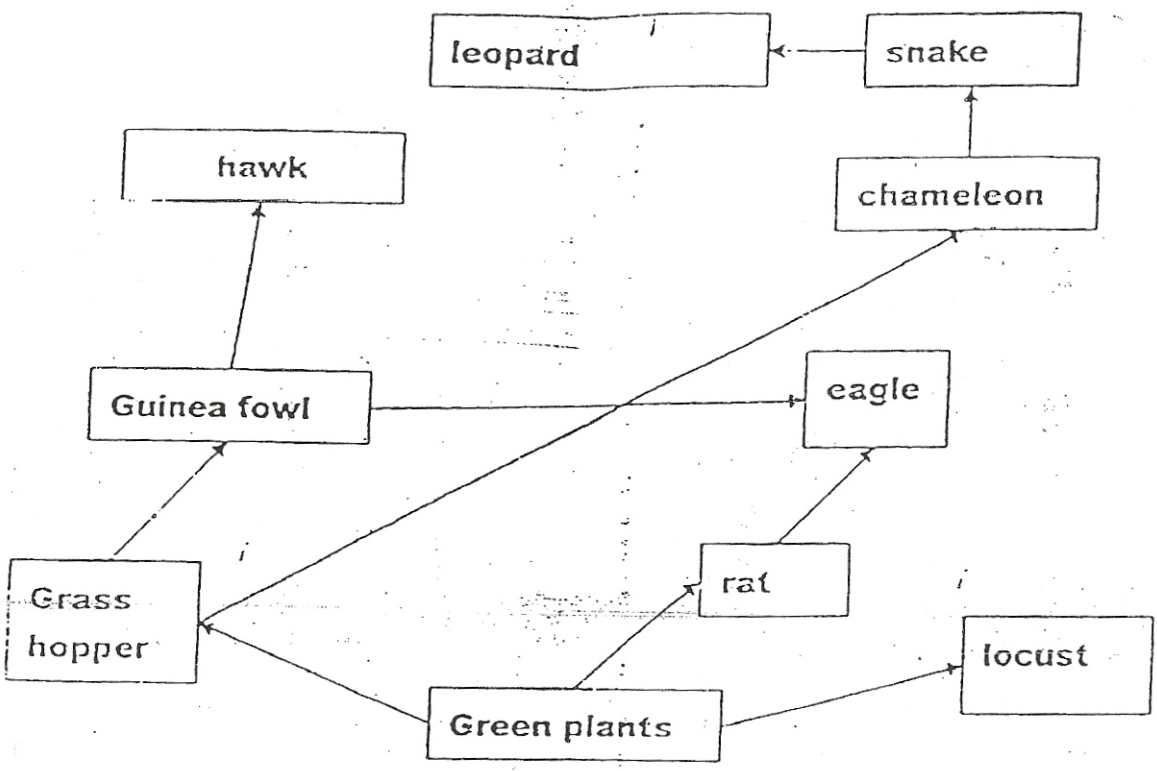
11. Population's carrying capacity is 2012

A. The number of organism in an environment
B. The number of population that can defend their territory
C. The number of organisms in a population that can be supported by the available resources in the environment
D. The number of organisms in a population that cab reside in specific area in a population

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20.1. Structured questions

1. Study the food web and answer the following questions. 2002



a) What would happen to the animal populations if there was a locust invasion and why?

……

b) If there was plenty of rain but an outbreak of disease caused 80% mortality in the rat population:

i) What would happen to the guinea fowl population?

.....

ii) Explain why this would happen?

.....

c) Name two organisms in the food web. One which is a secondary consumer and which is tertiary consumer.

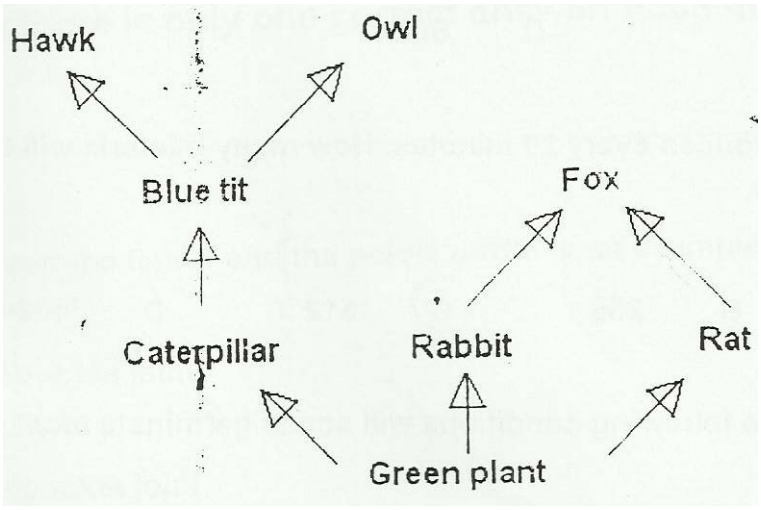
.....

d) Using the diagram construct a food chain.

.....

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2. The diagram shows part of a food web. 2003



a) i) Name source of energy of the food web?

.....

ii) Name the producer in the food web?

.....

iii) Name an organism that is tertiary consumer

.....

b) From the food web above, name a food chain that contains four organisms.

.....

c) i) why might a farmer use an insecticide?

.....

ii) What effect might an insecticide have the organisms in the above food web?

.....

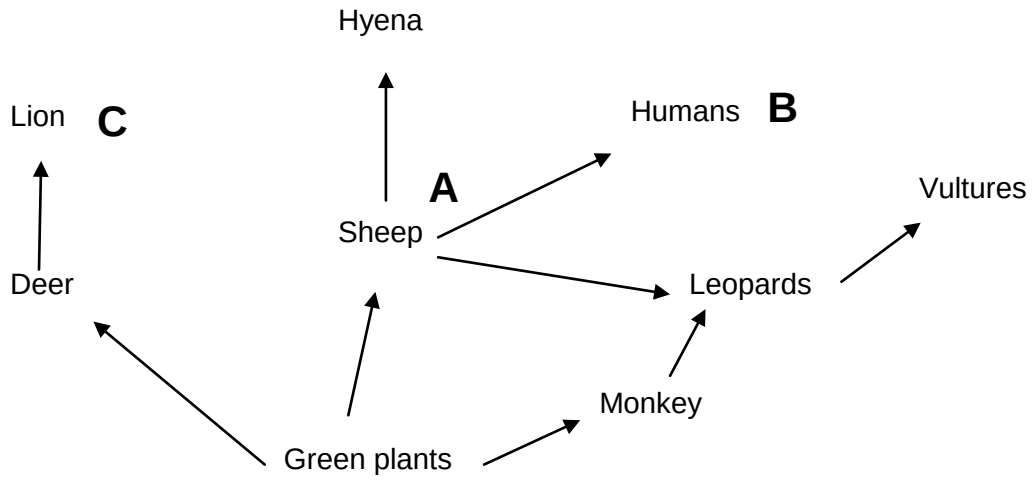
d) Explain the difference between autotrophic nutrition and heterotrophic nutrition using examples from the food web.

i) Autotrophic nutrition: .....

ii) Heterotrophic nutrition: .....

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3. Study the following food web and answer the questions that follow. 2004



a) Name three levels of feeding relationship where one population feed on another.

i. .....

ii. .....

iii. .....

b) What do we call the different stages (levels) of energy flow in the food web?

.....

c) What will happen to the population of lion, if disease spreads among deer population that exterminated 95% of deer?

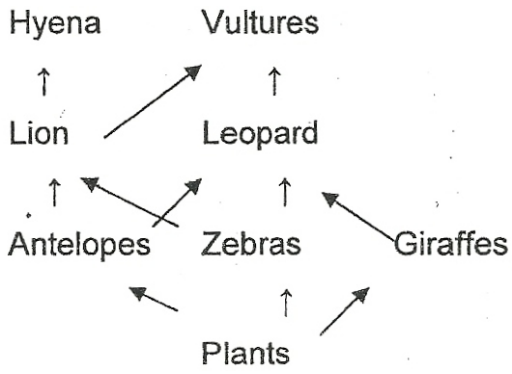
.....

d) Write down the shortest food chain from the food web given above.

.....

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4. Study the food web shown below and answer the questions. 2005



a) Construct a food chain from web above.

.....

b) Name the organisms that occupy the second trophic level.

.....

c) If 90% of leopard and lion populations disappear due to the spread of a disease,

i) what would happen to the population of zebras?

.....

ii) what would happen to the population of hyenas?

.....

iii) Give reason for your answer.

.....

d) If the lion population increases, predict what might happen to antelopes?

.....

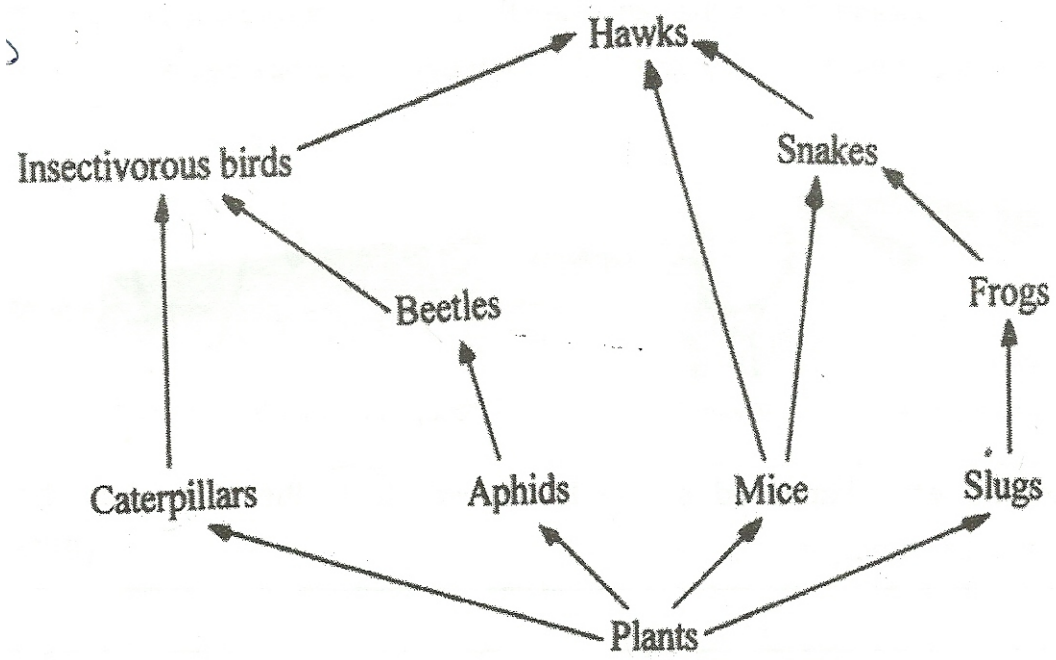
5. A rhinoceros in a national park was found to be infected with ticks. State the trophic level occupied by the: 2008

i) Rhinoceros: …….

ii) Ticks: ……..

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6. a) Study the diagram below, illustrating a food web. 2006



i) In the food web above which organisms assumed tertiary consumers?

……

ii) What is the other name for the second trophic level?

.....

b) Write down two food chains that end with

i) Tertiary consumers: .....

ii) Quaternary consumers: .....

c) i) What would happen to the population of mice if 95% of the frog population disappears? .....

ii) Give reason for your answer above: .....

.....

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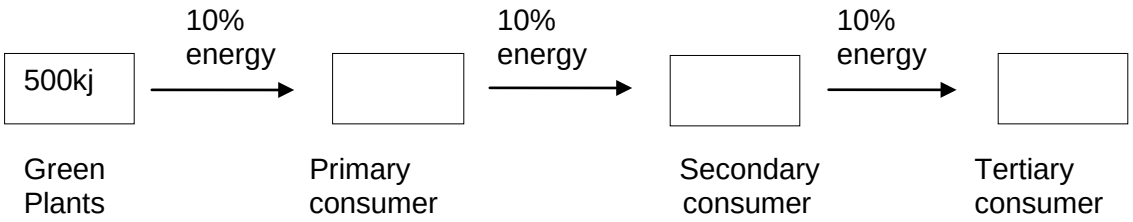
7. in a study done by a group of students to estimate the density and total population of water –melon seedlings in a field, the following information was obtained:-
   water –melon count in six throws = 10, 3, 5, 4, 6, and 8.
   Size of the fields = width 25 meters, length 40 meters.
   Calculate the approximate density and total population of water –melon seedlings in the field? 2006

   Density =

   Area of a field =

   Total population =

8. The figure below shows an example of the energy losses in a food chain which stats 500 KJ of plant materials. 2007



   a) How many kj of energy will there be at the primary and secondary consumer's level?
      ……
   b) List two ways in which the energy is lost between the different consumers levels.
      .....
      .....
   c) Contract a food chain in which humans are secondary consumers.
      .....
   d) In countries where food is in short supply, humans are more frequently primary consumer. Explain why you think people in these countries benefit by being primary consumers.
      ……...

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9. a) The formation of acid rain is a serious environmental concern today. Sulphuric acid is present in acid rain and has adverse effects on both plants and animals. 2008

i) Name two acids other than sulphuric that can be found in acid rain.

…… ……

ii) State two other effects of acid rain.

.....

.....

iii) State two ways of preventing acid rain.

.....

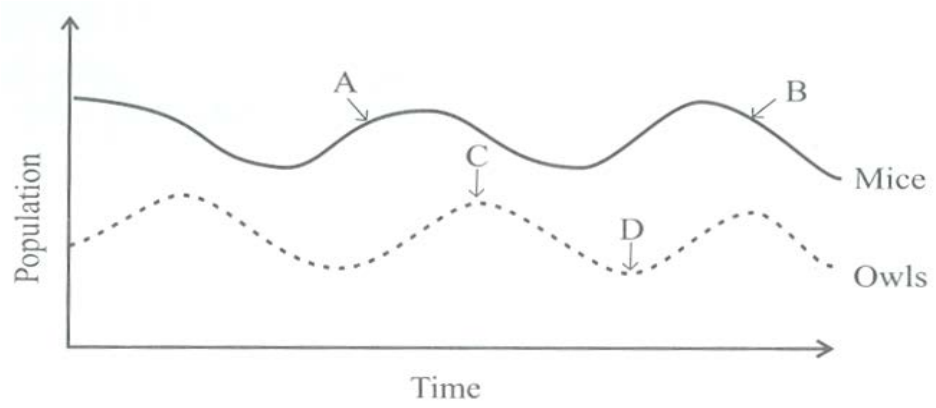
b) What effect is brought by the pollution of dust?

.....

c) Explain why plants shed their leaves during dry weather.

.....

10. The graph below shows the changes in a population of owls and in a population of mice over a number of years in an area. 2008



a) At which point, A, B, C or D, are there fewest owls?

……

b) Suggest why the number of owls fall after point C.

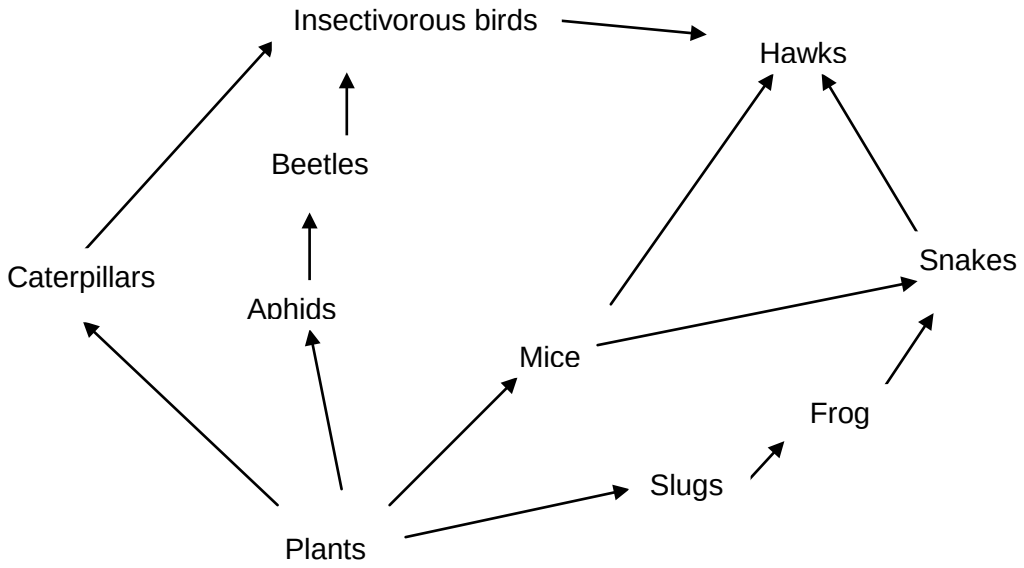
……

c) Suggest what might happen to the owl population if another species is introduced that also eats mice as its main food source.

……

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11. Study the food web shown below and answer the questions that follow. 2009



a) i- Name the producers in this food web.

.....

ii- State the process by which the organisms you have named above obtain their food? .....

b) Write down a food chain from the food web that ends in quaternary consumers.

……..

c) Suggest what would happen in the ecosystem if there is drought?

.....

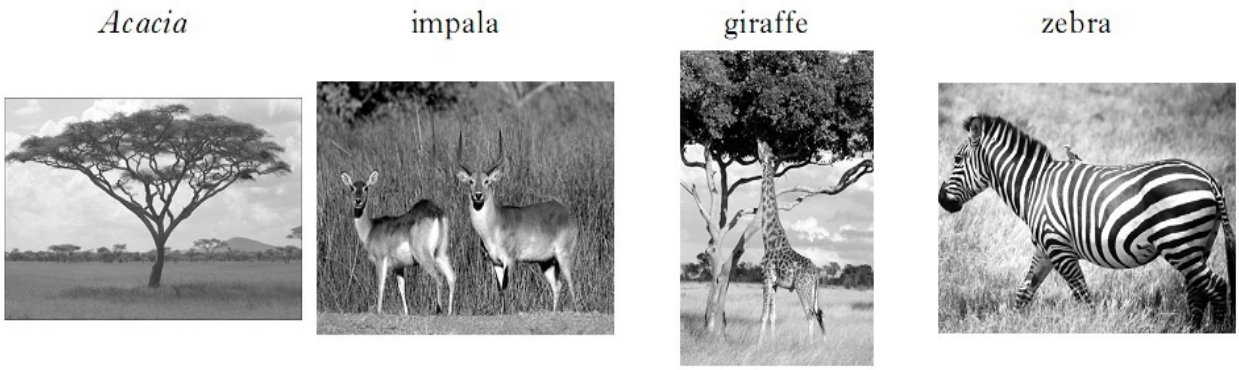
d) Suggest another group of organisms not shown in this food web that are of great importance?

…….....

e) What is the name given to an organism that obtains its food by killing other organisms? .....

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12. In Africa grasslands impala, giraffe and zebra feed on Acacia trees. Impala and zebra also graze on grasses. 2010



i) Sate one way that competition for food is reduced between zebras and giraffes.

……..

ii) The acacia tree is adapted to withstand long periods of drought. Suggest an adaptation that acacia tree show that allows it to survive long dry periods.

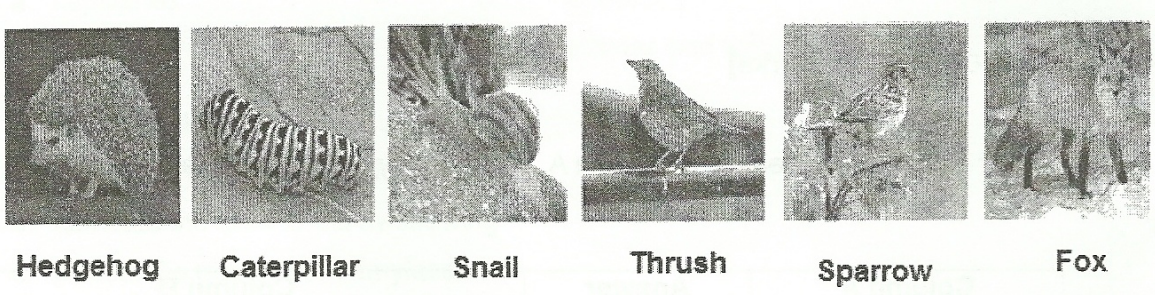
……..

iii) In Erigavo grasslands, sheep are often found as grazers. A very large flock of sheep was introduced into the area of ungrazed grasslands. Explain why this would decrease biodiversity within this area.

……

……

13. Read the information about organism in woodland and use it to answer the question. 2011



Snail and caterpillars eat leaves.

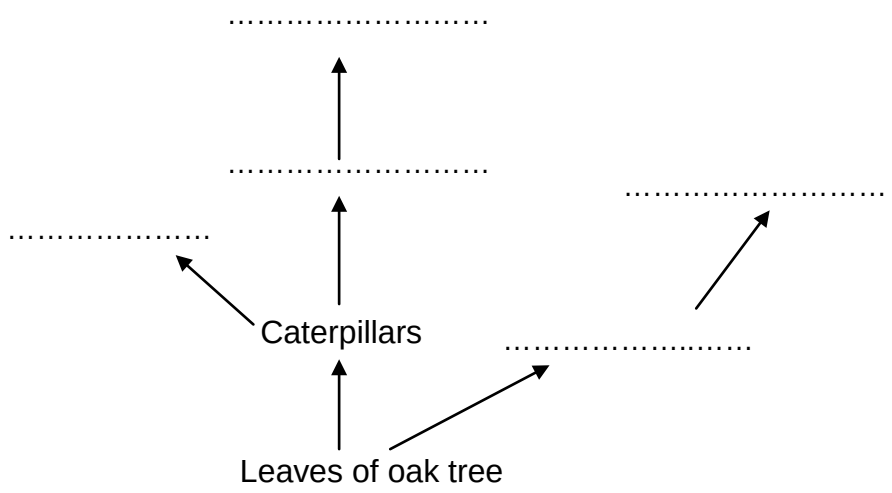
Caterpillars are eaten by sparrows and hedgehogs.

Thrushes eat snails.

Foxes eat hedgehogs.

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a) Complete the food web below using only information above.



b) From the food web above name

i) The producer: ……

ii) One herbivore: ……

14. Study the diagram below and answer the following questions. 2011



a) In what from is energy passed from the sun to the grass?

……

b) In what from is energy passed from the grass to the zebra?

…… .....

c) When the zebra dies. The energy in its body is released by decomposers.

i) Name one group of microorganisms involved in this process.

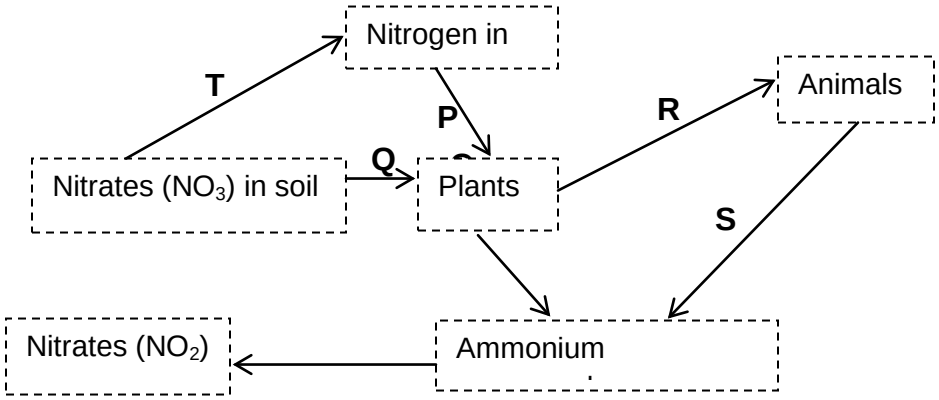
.....

ii) Suggest in what from most of the energy is finally passed to the environment.

.....

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15. The diagram below represents a simplified nitrogen cycle. 2012



a) Name processes

i. P: ……

ii. Q: ……

iii. R: ……

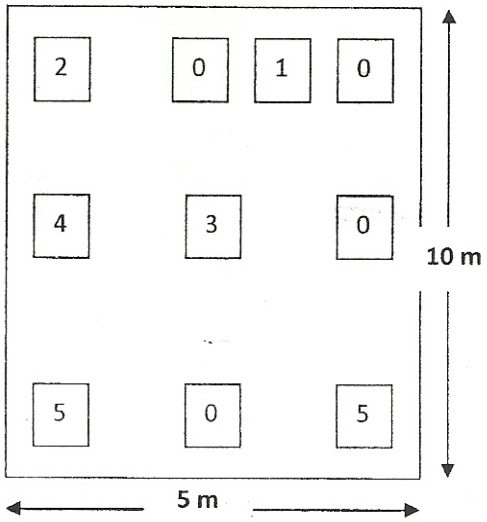
b) Name the organisms responsible for the processes

i. P: ……

ii. S: ……

iii. T: ……

16. Mr. Geedi analyses the population of species **W** in an area **A** by using **1m x 1m** quadrates (shown the diagram bellow). The number in the quadrate represents the appearance of species **W.** 2012



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a) Write the formula.

……..

……

b) Calculate the density.

……

……

c) Calculate approximate number of population.

……

……

d) Calculate species frequency.

……

……

17. An investigation was carried out to study the type of food eaten by birds found in forest and Savannah in a certain area. The table below compares the feeding habits of the birds found in a closed forest area and an open dry Savannah of the area.

2012

Diet	Percentage of birds in	
	Forest	**Savannah**
Insects only	60	50
Vertebrates	10	10
Seeds	5	20
Fruits	25	10
Other plant materials	5	6
Number of species	120	60

a) Work out the difference in the number of birds species that feed on:

i. Seed found in forest and Savannah.

……

……

ii. Fruit found in forest and Savannah.

……

……

b) State two factors that cause this difference in.

i. Seed found in forest and Savannah

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……

……

ii. Fruits found in forest and Savannah.

……

……

c) In another investigation two vertebrate species from the Savannah were counted and recorded on monthly basis as shown below.

Year	Month	Species A	Species B
1998	July	96	240
1998	August	79	590
1998	September	75	900
1998	October	87	750
1998	November	-	230
1998	December	99	80
1999	January	129	200
1999	February	96	330
1999	March	99	300
1999	April	79	320
1999	May	135	90
1999	June	104	450

i. Which species show more fluctuation in number?

……

……

ii. Suggest an explanation for this.

……

……

d) Suggest two ways by which the Savannah environment can be destroyed and how it can be conserved.

……

……

……

……

……..

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Unit 21. Genetics

21.1. Multiple choice questions

1. Which of the following will contain a haploid number of chromosomes? 2003
   A. Bacterium
   B. Pollen grain
   C. Neuron
   D. Palisade cell
2. Which of the following is not a component of the DNA molecule? 2003
   A. Adenine
   B. Cytosine
   C. Guanine
   D. Uracil
3. In humans, the eggs produced by the female contain X chromosomes so females are 2004
   A. heterogametic
   B. homogametic
   C. gametogenic
   D. hybrid
4. The three-base sequence in a tRNA molecule that is complementary to a particular-base sequence (the codon) in an mRNA is called: 2004
   A. triplet codon
   B. codon
   C. anticodon
   D. nonsense codons
5. DNA molecule is responsible for the formation of 2004
   A. tRNA
   B. mRNA
   C. rRNA
   D. ribosomes

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6. If one strand of DNA contains ATGCC bases, the complementary strand would contain; 2005
   A.CCGTA
   B. TACGG
   C.GGCAT
   D. GCATT
7. Which one of the following is an example of discontinuous variation? 2006.
   A. Gestation period in the elephant
   B. Body weight of impala
   C. Leaf length in acacia
   D. Number of toes in humans.
8. The phenotypic black guinea pigs, which are heterozygous black for color of skin are 2007
   A. BB & Bb
   B. Black
   C. White
   D. Grey
9. Male individuals with non-disjunction of the sex chromosomes that have a predisposition to violence have chromosomes whit genotype of 2007
   A. XXY
   B. XYY
   C. XXX
   D. XO
10. RNA molecule contains the following, except 2007
    A. One chain of nucleotides
    B. Base uracil
    C. Sugar ribose
    D. Sugar deoxyribose

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11. What name is given to a sudden change in a gene or chromosome? 2008

A. Allele

B. Genotype

C. Mutation

D. Phenotype

12. What would be the phenotype of F1 generation if Tall plant (dominant) is crossed with a Dwarf plant (recessive)? 2009

A. All tall plants

B. Some tall, some dwarf

C. All dwarf plants

D. None of the above

13. Mutations are changes in the 2009

A. sugar-phosphate backbone of DNA

B. base-pairing rules for DNA

C. sequence of bases in DNA

D. colour of the skin

14. Human blood group are determined by 2010

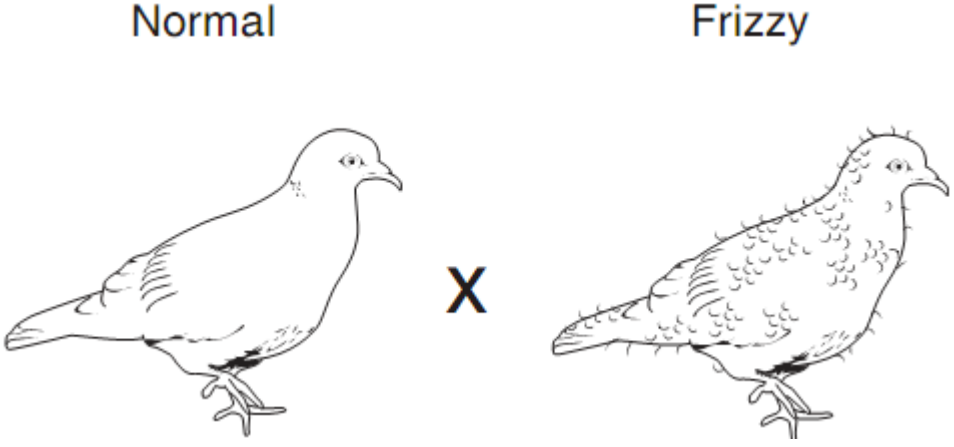
A. Genes

B. Allele

C. Nucleotides

D. Chromosomes

15. In pigeons the allele for male normal feathers (F) is dominant to the allele for frizzy feathers (f). 2010



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If a purebred, normal-feathered bird (FF) is crossed with a frizzy-feathered bird (f f), how many different feather phenotypes are possible in the offspring?

A. 1
B. 2
C. 3
D. 4

16. Skin colour in humans is an example of 2010

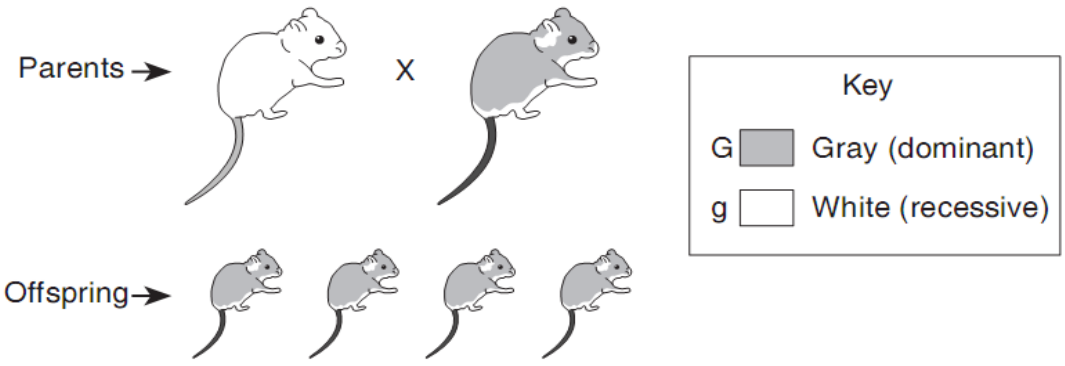
A. discontinuous variation
B. co-dominance
C. polygenic inheritance
D. random assortment

17. Many cells have a nucleus that contains chromosomes. These chromosomes carry genes that are composed of 2010

A. hormones
B. DNA molecules
C. minerals and water
D. undigested food molecules

Base your answers to questions 25 and 26 on the diagram below.

The diagram shows the offspring of a white mouse and a gray mouse. All of the offspring are gray. 2010



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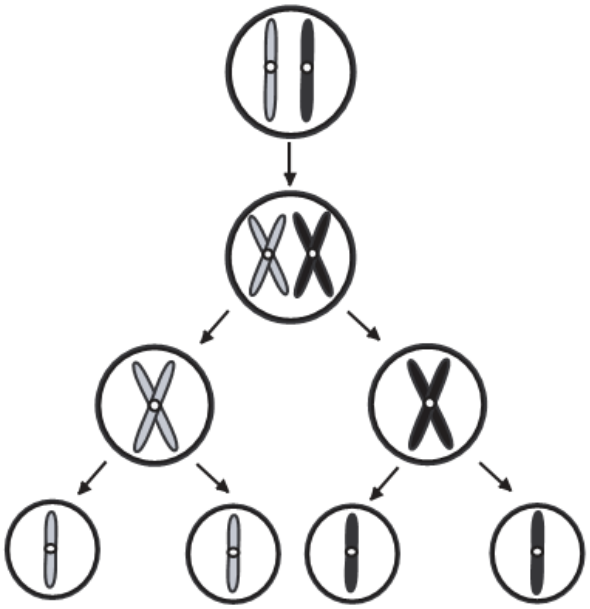
18. Which is a correct gene combination for the parents shown in the diagram?

A. GG x GG B. gg x gg C. gg x GG D. Gg x Gg

19. If two gray (Gg) mice mated, what percent of their offspring would have pure white fur?

A. 25 % B. 50 % C. 75 % D. 100 %

20. The diagram below shows a cellular process that occurs in organisms. 2010



This process is known as

A. Meiosis

B. Mitosis

C. Endocytosis

D. Phagocytosis

21. In hypothetical example, the G allele gives green-coloured fur for mice and is dominant over the g allele which gives blue coloured fur as homozygous condition. a cross blue heterozygous green mice produced mice progeny of which two third ($\frac{2}{3}$) are green and one third ($\frac{1}{3}$) is blue. 2012

A. The G allele and the g allele are co-dominant

B. The g allele is also recessive lethal

C. The G allele is also recessive lethal

D. The g allele is epistatic to G

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22. Listed are probable causes for spontaneous mutation except, 2012

A. Spilled mispairing

B. Replication error

C. Radiation exposure

D. Base isomerization

23. Meiosis is 2012

A. The stages of division in mitosis.

B. The types of reproduction namely asexual and asexual.

C. The types of cell division that gives rise to four reproductive cells (gametes)

D. The external fertilization

24. The DNA strand that is synthesized discontinuously is called the 2013

A. The leading strand

B. Sense strand

C. Lagging strand

D. Active strand.

25. In meiotic division, homologous chromosomes undergo synapsis forming bivalent in_____ 2013

A. interphase

B. prophase I

C. prophase II

D. metaphase I.

26. Red-green colour blindness is an X-linked recessive disorder in human body. The colour blindness inherited the mutant gene from one of his grand fathers. From whom does he inherit the mutant gene?

A. Maternal grand mother

B. Maternal grand father

C. Paternal grand father

D. None of the above.

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27. A sterile male with mental retardation of breast enlargement is a result of

A. XXY

B. XYY

C. Turner's syndrome

D. Down's syndrome

28. A gene library is a collection of

A. recombinant plasmid of bacteria

B. plasmid fragments inserted into DWA

C. gene fragment inserted into bacterial chromosomes

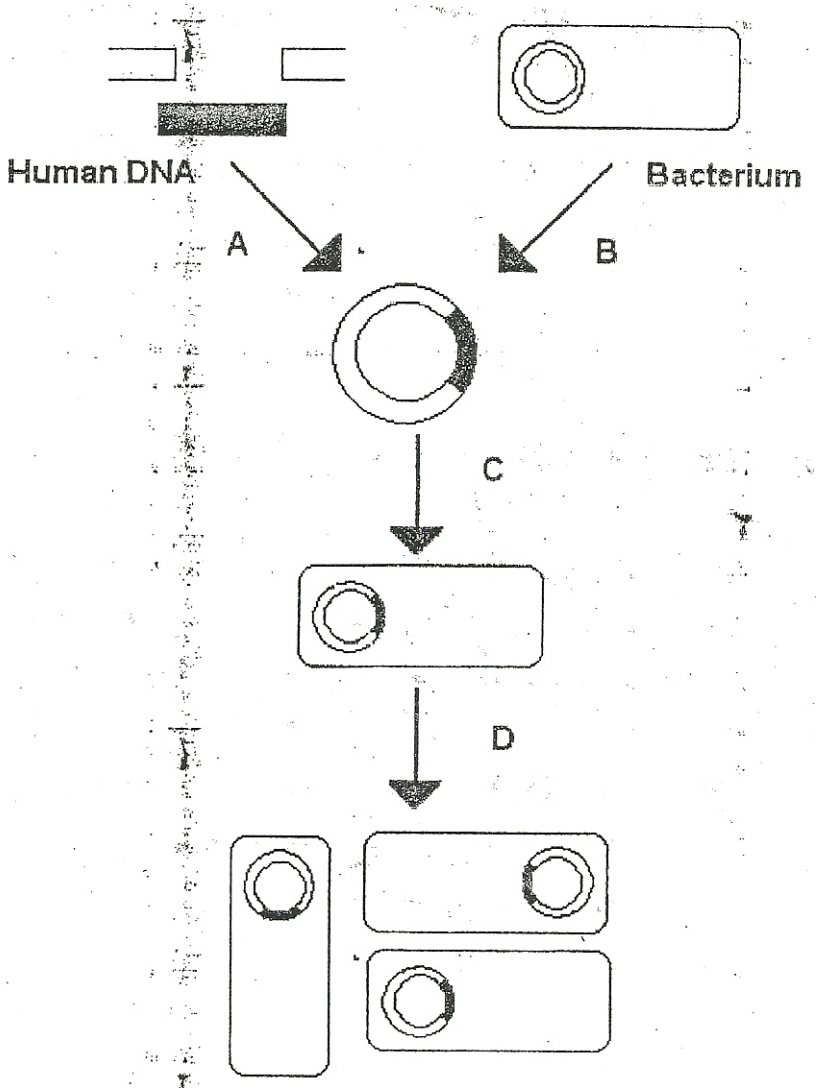
D. recombinant viral DNA.

A. I, II & III B. I & III C. II & IV D. I & IV

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21.2. Structured questions

1. Insulin is produced by genetically engineered bacteria. The following diagram shows four stages in the process. 2003



a) Explain as fully as you can what is happening in stages A-D.

Stage A: ……

Stage B: ……

Stage C: ……

Stage D: ……

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b) Give TWO reasons why insulin made in this way is better that insulin extracted from the organs of animals.

1. .....
2. .....

2. The gene for haemophilia is recessive. It is found on the X chromosome and not found on the Y chromosome. A carrier female for haemophilia was crossed with a normal man (not carrying for the gene haemophilia). 2002

a) Using suitable symbols show the possible phenotypes. Use h as the recessive gene and H as the dominant normal gene.

.....

.....

.....

b) What is the ratio of the different phenotypes produced?

.....

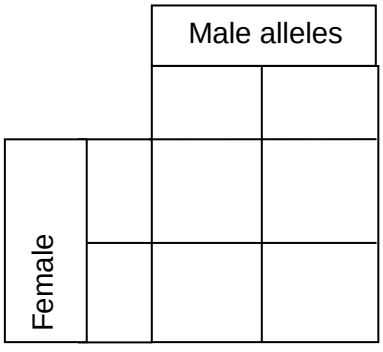
3. A man was known to be heterozygous blood group A. His wife was known to be homozygous blood group B.

a) Write down alleles of each parent's blood group.

Man: ……..

Wife: ……..

b) Complete the grid to show all f the possible blood groups that one of their children might have



c) Write down the phenotypes and the genotypes of the children.

.....

.....

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4. Color blindness is a genotypic disease which is transmitted through a recessive gene linked to the X chromosome. The normal gene maybe represented by X^C. With respect to the gene for colour blindness. 2004

   i) Give the allele represented by the recessive trait.

   .....

   ii) Woman who is carrier colour blindness marries a normal man, show the genotype (possible alleles) of the carrier women.

   .....

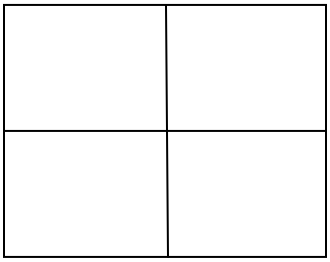
   iii) What is the genotype for a normal man?

   .....

   iv) By using the answers of (ii) and (iii), show the possible genotype and phenotype of the male and female children from the marriage.

Male alleles

Female alleles



   .....

   v) Colour-blindness is more common in men than in women, illustrate the reason.

   .....

5. Rhesus factor is determined by a pair of alleles Rh, and rh. A male who is heterozygous for rhesus factor married a female who is negative for rhesus factor:

   i. Show the possible alleles for the male who is heterozygous.

   .....

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ii. Show the possible alleles for the female who is rhesus negative.

.....

iii. Work out the genotypic and phenotypic ratio of their children?

Male alleles

Female alleles

Genotypic ratio: ……

Phenotypic ratio: ……..

6. A tall plant which has heterozygous for tallness (trait) is crossed with a homozygous recessive short plant. 2005

a) Show the alleles for both:

i) Tall plant: …….

ii) Short plant: …….

b) Work out the phenotypic and genotypic ratio of their offspring.

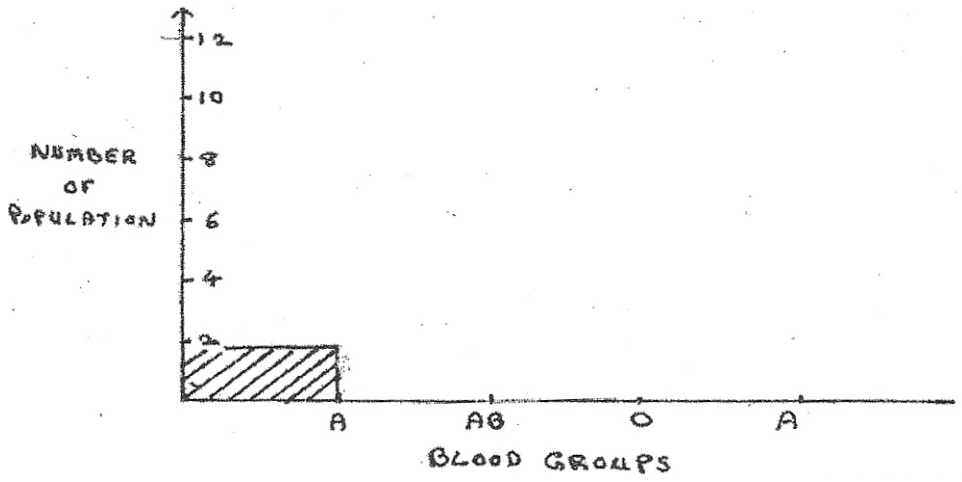
.....

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7. The table below shows the data collected from a population showing blood groups distribution. 2005

Blood group	Number of population
A	2
AB	10
O	12
A	3

a) Plot these on the bar chart (the first one is plotted for you).



b) Does the chart continuous variation or discontinuous variation?

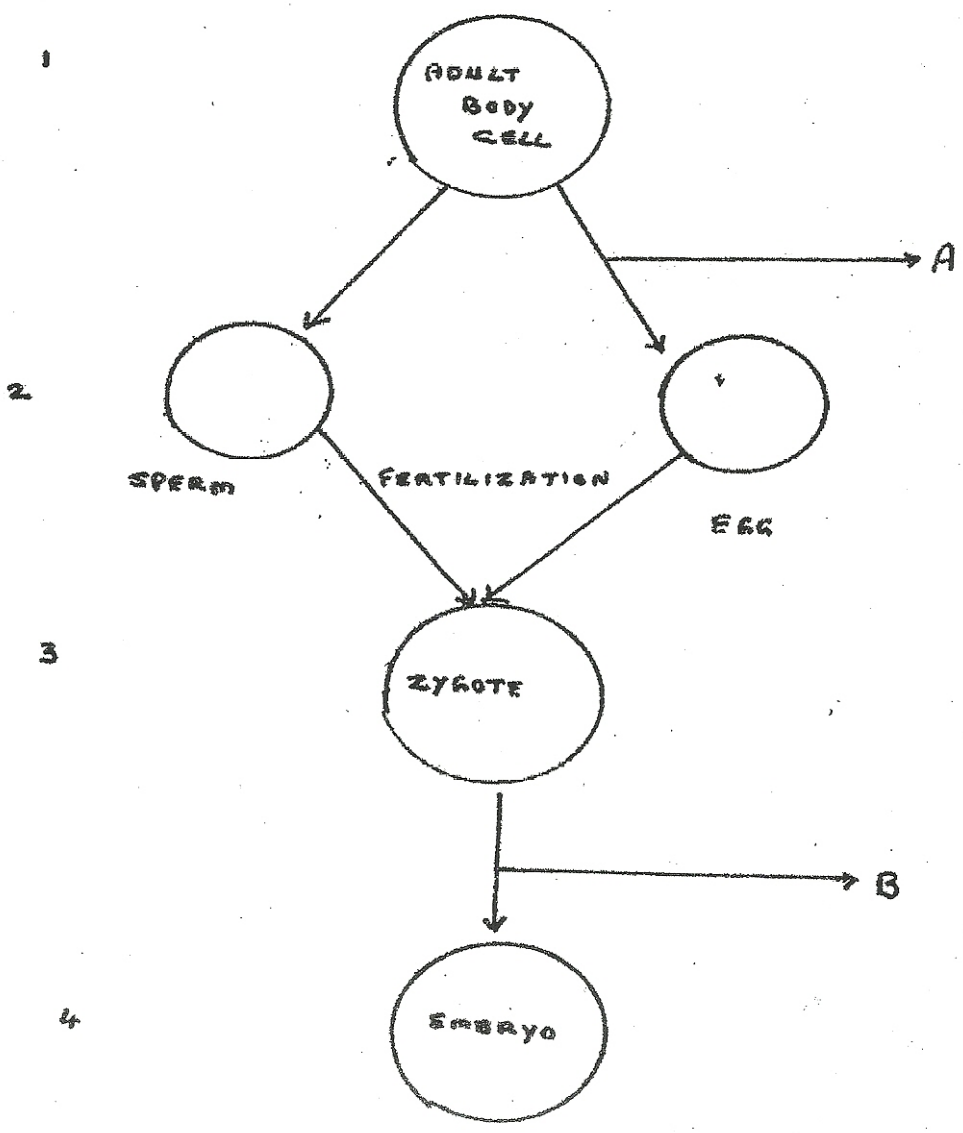
.....

c) Give a reason of your answer:

…….....

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8. Diagram below shows the human life cycle. The circles represent the cells: 2005



a) Name the cell division taking place at A and B.

A: .....

B: .....

b) Which of the cells in the diagram are diploid (have the full number of chromosomes) and which are haploid (have only half the number of chromosomes)

Diploid..... (i)……..(ii)……...(iii)……...

Haploid…….(i)……..(ii)…….

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9. Arrange the followings in order of size starting with smallest:
   Nucleus, chromosomes, cell, gene, chemical base and tissue.

   .....

10. A boy's mother had patch of while hair called "a white forelock" which is caused by dominant allele (H). The boy's father does not have a white forelock (normal).He has the genotype (hh). 2006.

    a) Use the information given above to help you fill in the table. If the gametes shown on the left hand side can carry the allele shown at the top of the columns, put a tick in the box. If the gametes cannot carry the allele shown, put a cross (x)

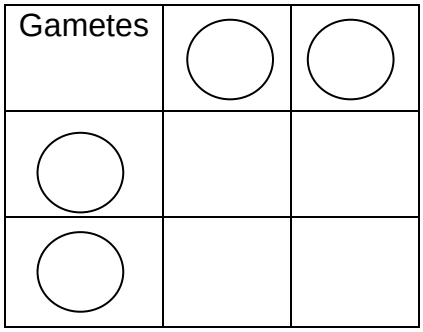
	H	h
Mother's gametes		
Father's gametes		

    b) Show how you worked out your answer by filling in the diagram below.

	Father	Mother
Parental genotype		
Parental gametes		

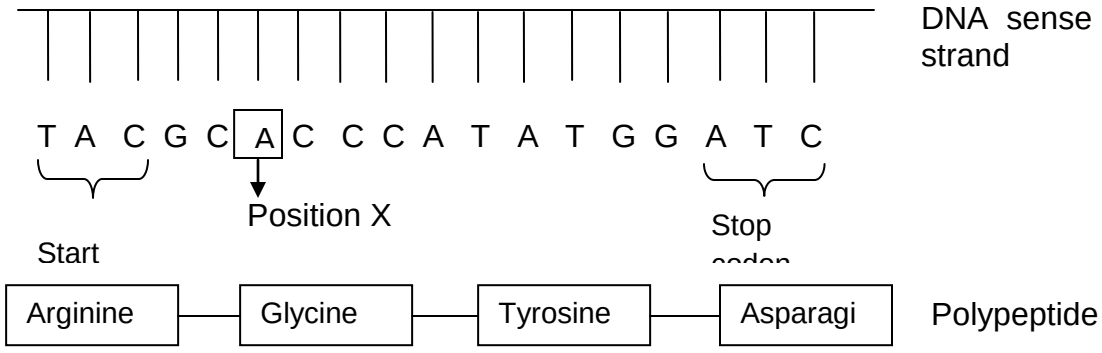
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Use this punnett square.



Possible genotype of boys	2 Hh	2 hh
Possible phenotype of boys	2 white forelock	2 normal

11. The base sequence of a particular gene and the polypeptide that the gene codes for are shown below. 2007



a) What the three bases make up the anti-codon on the molecule at tRNA that is responsible for carrying the tyrosine amino into place during translation?

……

b) Explain why mutation that substitutes the base found in position **X** will have no effect on polypeptide that is produced by the gene?

.....

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12. Two tall plants marked with plant A and plants B are grown in the same field. They have the same phenotype for tallness, but their genotype is different, one is homozygous dominant and the other is heterozygous, you are asked to determine which one is homozygous dominant and which one is heterozygous by answering these question 2007

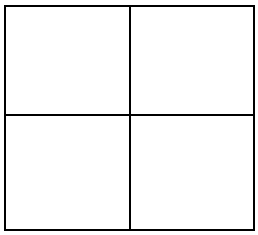
a) Name the process that involves such a cross.

.....

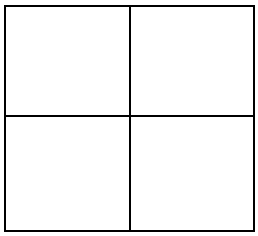
b) State the genotype of the other organism used to cross these unknown plants.

.....

c) i) Find out, by using two different grids, the genotype of unknown parents.



.....



ii) Give reason why one of the parents is homozygous dominant and the other is heterozygous.

.....

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13. A homozygous recessive red cow was mated with a homozygous dominant white bull. All the first generation (F1) were neither red nor white. Such individuals are said to be **roan**. 2008

i) Using **r** to represent the gene for red colour and **R** to represent the gene for white colour, work out the genotypes of F1 offspring.



ii) Suggest a reason why all the F 1 were roan.

……

iii) If the calves were interbred (F 1 selfed), determine the phenotypic and genotypic ratios.

……

……

……

……

……

14. a) Insulin production is a good example for practising genetic engineering.

i) Define genetic engineering

……

……

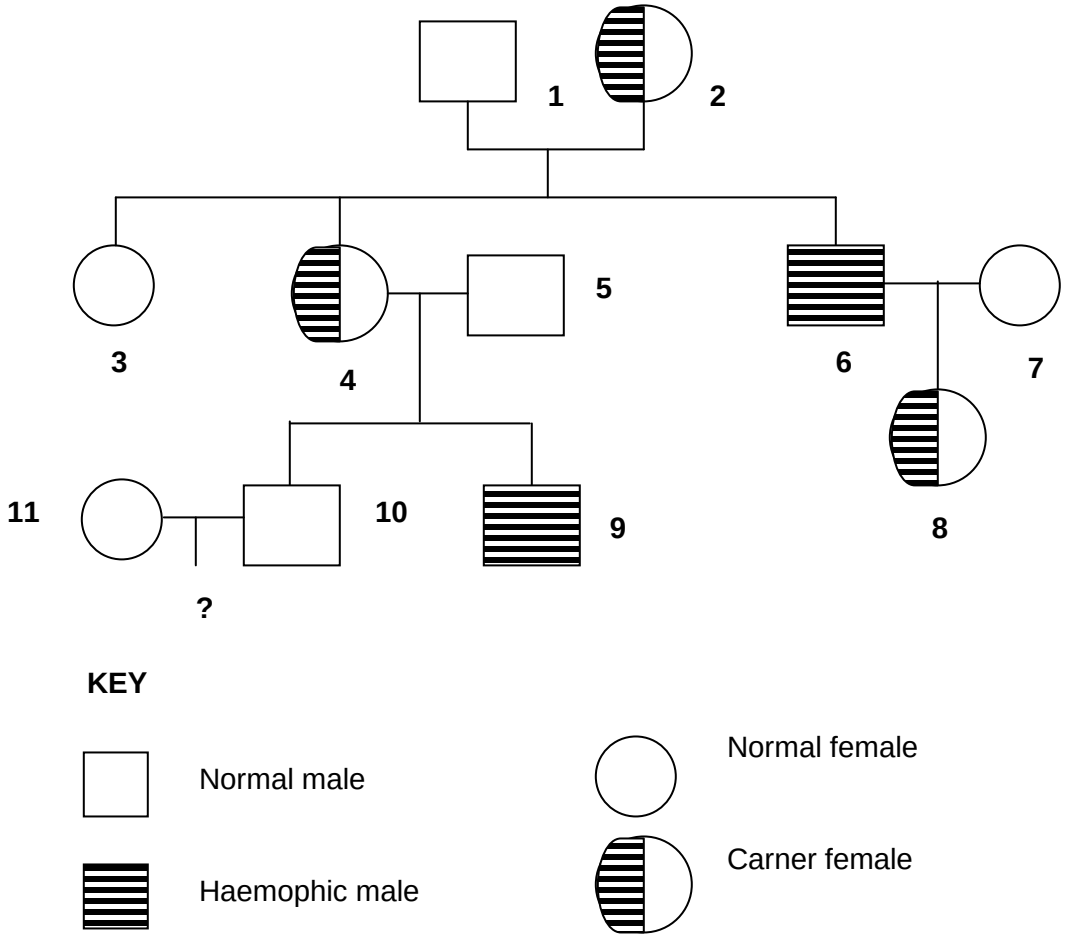
ii) Give the vector used for insulin production

.....

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15. Study the diagram below about a family history of inheritance of Haemophilia.

2009



a) Individual 3 is a girl, what is her genotype?.....

b). Individual 6 is a boy with haemophilia. Suggest why he became haemophilic.

.....

c) Write possible genotype of individual 4 and 5.

i) individual 4:…….

ii) individual 5:……..

d) What will be the genotype of next born child to individual 10 and 11 ?

.....

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16. Abdi and Hassan are two tall students having same phenotype but different genotype. You have been asked to find their genotype. 2009

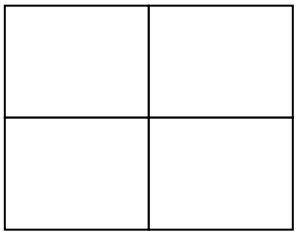
i) Name the process used to find their unknown genotype.
……

ii) Show your work here to find genotype

Abdi Short homozygous recessive

Genotype ?? X ……

Law of segregation. …….. …….. ……..

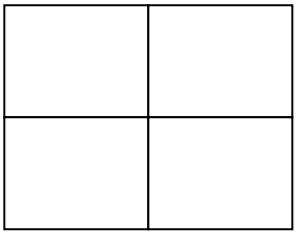


This shows that Abdi has genotype of …….. ……..

Hassan Short homozygous recessive

Genotype. ?? X ……..

law of segregation. ……. ……. …….



This shows that Hassan has genotype of ……

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Unit 22. Biotechnology

22.1. Multiple choice questions

1. The volume of dough prepared for bread making increases after mixing because of 2006.
   A. Oxygen trapped inside it's particles
   B. Carbon dioxide trapped inside it's particles
   C. Water added
   D. The amount of flour
2. The use of micro-organism to solve practical human problems in food , medicine , farming and environment is called 2010
   A. biodiversity
   B. biotechnology
   C. biometry
   D. biochemistry

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Unit 23. Diseases and immunity

23.1. Multiple choice questions

1. Poliomyelitis is caused by a 2003

   A. Virus

   B. Parasite

   C. Fungus

   D. Bacterial toxin

2. Which of the following lymphocytes leave the bone marrow and collect in the thymus gland where they mature in to? 2004

   A. B lymphocytes

   B. T lymphocytes

   C. Phagocytes

   D. None of these above

3. Anaemia is

   A. contagious disease

   B. dietary disease

   C. air borne disease

   D. a disease in all blood cells

4. The type of white blood cells that mature in thymus gland are: 2005

   A. neutrophils

   B. basophiles

   C. acidophils

   D. monocytes

5. Genetic disease which results in a person having light skin and white hair is called 2006.

   A. rickets

   B. albinism

   C. haemophilia

   D. down's syndrome

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6. Which of the following requires tsetse fly as a vector? 2007

A. Malaria
B. Elephantiasis
C. Leishmaniasis
D. sleeping sickness

7. What is the immune response in which antibodies come from another person who has encountered the antigen called? 2007

A. Active immunity
B. Natural active immunity
C. Passive immunity
D. Artificial passive immunity

8. What is the change called in which antigen causes our immune system not to recognize it?

A. Antigenic drift
B. Antigenic shift
C. Antigenic movement
D. Antigenic revealment

9. Which one of the following provides natural passive immunity? 2008

A. Colostrums
B. Milk powder
C. Water with sugar
D. Vaccination

10. HIV/AIDS can NOT be transmitted 2008

A. through a blood transfusion using contaminated blood
B. from an infected mother to baby during child birth
C. through sexual intercourse with an infected partner
D. sharing plates with an infected person

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11. Which of the following is **NOT** a deficiency symptom due to lack of Vitamin C?

A. Week teeth and bleeding gums
B. Reduced resistance to diseases
C. Scurvy
D. Night blindness

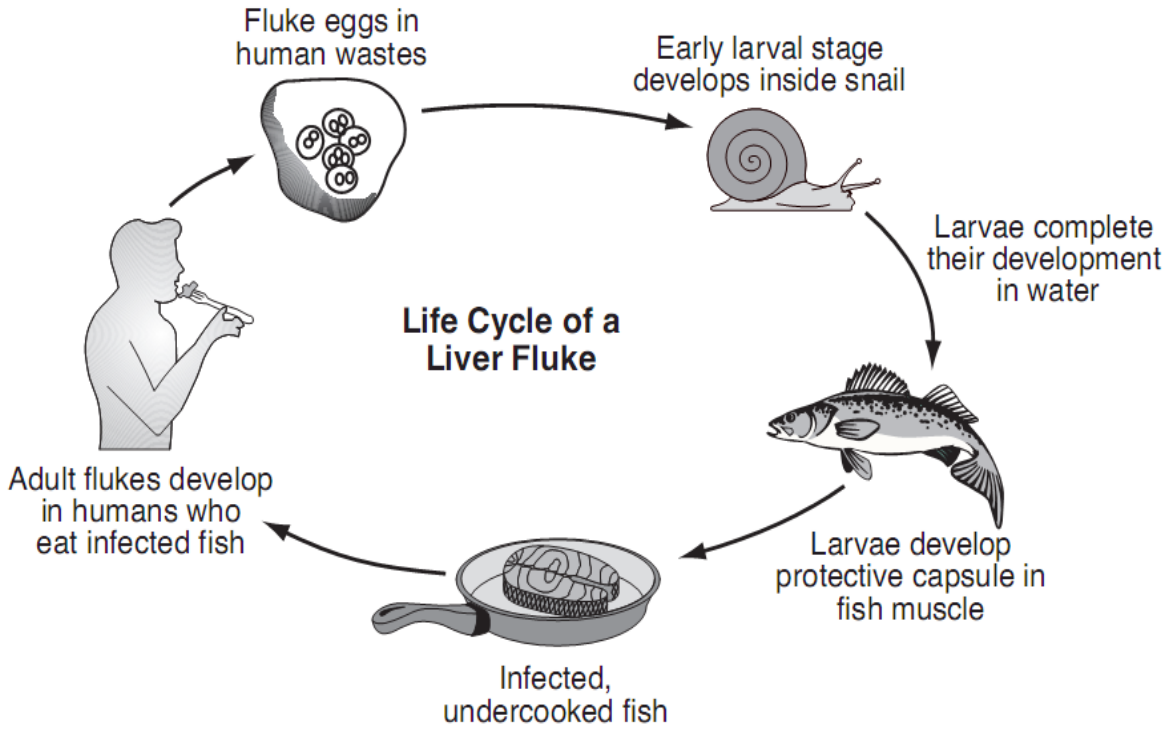
12. Below are symptoms of a certain disease 2010

★ mild fever show by raise in temperature ★ sweating at night
★ coughing especially after working ★ loss of weight

Which disease has the above symptoms?

A. TB B. Malaria C. Typhoid D. Choler

13. The diagram below shows the life cycle of a liver fluke. 2010



This diagram shows that the liver fluke

A. depends on other organisms for survival
B. dies when it enters the fish
C. completes its life cycle in the snail
D. survives at very high temperatures

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14. Leukaemia is a disease of the 2011

A. Liver
B. Heart
C. bone marrow
D. Islets of langerrhans

15. What function does lymphatic system serve in the immunity system? 2012

A. Return of fluid to blood circulation

B. Transport of fatty acids in the body

C. Filtration of foreign matter in lymph nodes

D. T-lymphocytes travel mainly through the lymphatic system

16. Which one of the following examples includes active immunity? 2012

A. Immunity acquired when baby actively consumes its mother's milk

B. Protection acquired when a person recovers from an infection

C. Immunity acquired when specific antibodies are injected to resist a certain disease such as tetanus

D. Application of antivenom to a person suffering from snake bite

A. 1 only
B. 2 only
C. 2,3, and 4
D. All of the above

17. Which of the following best describes an antigen presenting cells? 2012

A. An immune cell with MHC class III protein on its cell surface
B. When a cell has an affinity for cytotoxic T– cell
C. A neutrophils that has ingested a bacteria
D. A macrophage which interacts with a helper T-cell with the aid of CD4 receptor

18. Which one of the following shapes belonged by bacteria called salmonella typhi? 2012

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A. Spirilli

B. Rod shaped

C. Spherical

D. Flattened shaped

19. An example of non-sexual transmitted disease is

A. Gonorrhea

B. Malaria

C. Syphilis

D. Aids.

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23.2. Structured questions

1. Distinguish between the following terms: 2002

   i) Infectious diseases and non infectious diseases

   ii) Pathogen and a T- lymphocytes

   iii) Active and passive immunity

   iv) An antibody and an antigen.

   .....

   .....

   .....

   .....

   .....

   .....

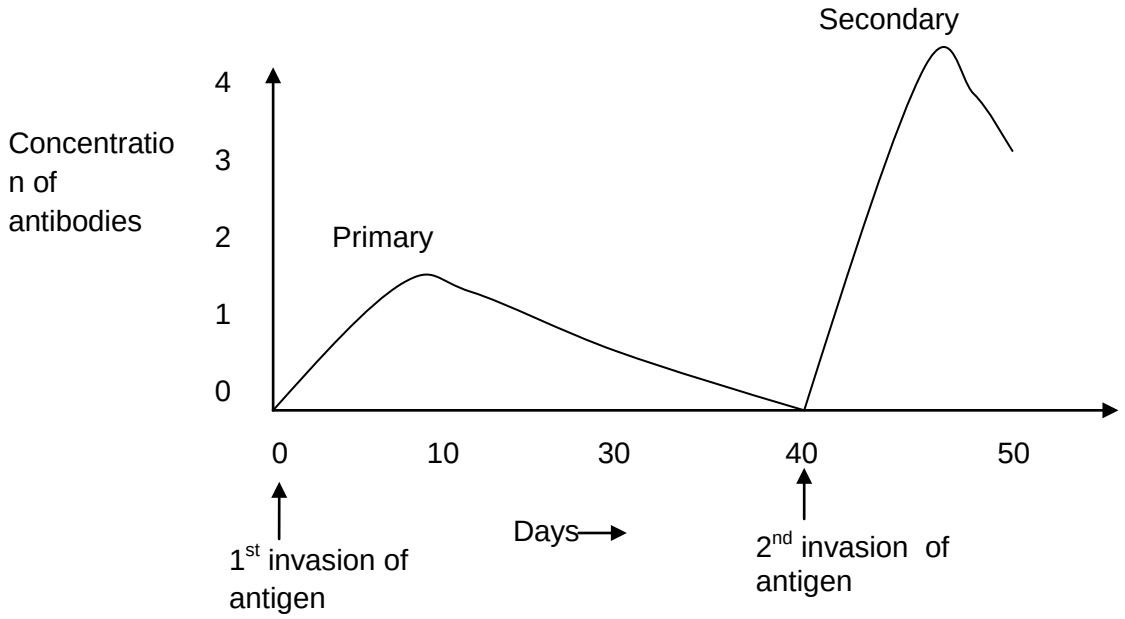
   .....

   .....

   .....

   .....

2. The graph below represents the concentration of antibodies during two invasions of antigen into an individual. 2004.



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a) Which period of invasion has more antibody production?

.....

b) Why is secondary response faster the primary response?

.....

3. a) Study the table below, which Is partially completed. Complete the blanks in the table. 2005

Disease	pathogen	Method of transmisions	symptoms	Control measure
Cholera				
Malaria	plasmodium			

b) Why some diseases reoccur (infects time after time) even after full recovery?

……

4. a) The table below has five statements about disease transmission and control that apply to malaria, cholera, AIDS, and tuberculosis. Put a tick in the box (√) if the statement applies to that disease. You should only need to tick only four boxes. 2006

Statement	**Malaria**	**Cholera**	**Aids**
1-causive agent is bacterium			
2-causive agent is blood borne			
3-sexually transmitted			
4-transmitted by insect			

b) Explain how someone can be diagnosed as HIV positive, but not show any symptoms of AIDS.

.....

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c) Explain why TB has become major cause of death for people who are HIV positive.

.....

d) Explain why care must be taken in selecting antibiotics for treating cases of TB.

.....

5. The following table shows information on common human diseases. Complete it by filling in the missing information. 2008

Disease	Pathogen	Mode of transmission	Symptoms
	Mycobacterium		Dry cough
Cough		Air and food borne	
Malaria			Anemia

6. State three ways in which an antigen can conceal from the antibody. 2010

i) ……

ii) ……

iii) ……

7. For each of the disease in column A choose matching cause in column B. 2011

Column A	Answer	Column B
1. Obesity		A) Deficiency in vitamin C
2. Kwashiorkor		B) Deficiency in niacin
3. Goiter		C) Deficiency in vitamin B1
4. Anaemia		D) Deficiency in iron
5. Night blindness		E) Deficiency in protein
6. Beriberi		F) Deficiency in carbohydrates
7. Bellagra		G) Deficiency in iodine
8. Scurvy		H) Deficiency in vitamin A

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8. A diseased organ, for example the kidney, may be replaced by a healthy one transplanted from a donor. 2013

i- State why the transplanted kidney may by recognized by recipient?

……..

ii- Explain how transplanted kidney is rejected and destroyed by recipient.

……..

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Unit 24. Answers

Unit 1. Answers for multiple choices and structured questions

1.1. Answers for multiple choices

1.A, 2.C, 3.A, 4.B, 5.A, 6.B, 7.C, 8.C, 9.A, 10.D, 11.A, 12.C, 13.C, 14.A, 15.C, 16.A, 17.A

1.2. **Answers for structured questions**

1.

Column A	Column B
1	Mitochondaria
2	Chloroplast
3	Nucleus
4	Chloroplast
5	Cell membrane

2.

	Plant cell	Animal cell	Prokaryotic cell
Nucleus			
Plasmid			
Mitochondria			

3.

Column 1- Descriptions	Column 2- Name of organelles
1.	A- mitochondaria
2.	B- chloroplast
3.	C- centrioles
4.	D- ribosome
5.	E- nucleus

4. a)

Structure also in animal cell	**Letter**
Nucleus	A
Cell membrane	B
Cytoplasm	C

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b) chloroplast

5. a) i- The fluid mosaic model

ii- the phospholipid double layer is fluid. lipids and protein molecules can move laterally and rotate on their axis.

b) A: Phospholipid layer
B: Extrinsic protein
C: Glycoprotein – carbohydrate

c) i- Solubility- water soluble molecules diffuse slower across membrane than that of fat soluble molecule.

ii- Particle size: Smaller molecules pass faster than the larger molecules

iii- Charge of the particle: Polar molecules are repelled by non- polar hydrophobic lipid membrane. Thus they diffuse very slowly compared to non-polar molecules.

d) by mutual attractive forces between hydrophobic amino acid R –groups projecting from proteins and hydrophobic tails of the lipid molecules.

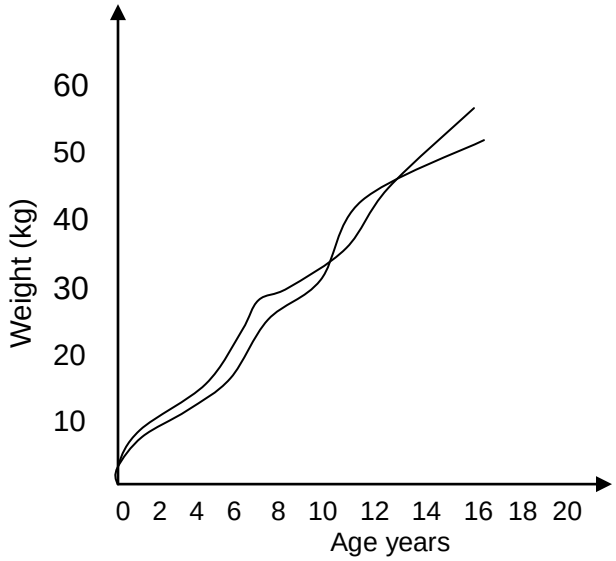
Unit 2 Answers for multiple choices and structured questions

2.1. Answers for multiple choices

1.C, 2.D, 3.D,

2.2. Answers for structured questions

1. a)



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b) 26 kg
c) There is an increase in mass between the ages of 13-16 because of the puberty.
d) Growth is very rapid in the first two years in both boys and girls. It then the growth slows down up to the late childhood (4 – 10). Between the ages of 12- 16 there is very rapid increase in mass because of puberty. The growth in weight then slows down according to the boys but still increases in girls at about 20. After 20 it ceases.
e) Because menstruation loses more blood with iron.
f) Progesterone and testosterone

2. a)

Organism	**Respiratory surface**
Fish	Gills
Reptiles	Lungs
Paramecium	Membrane

b) i) three pairs of legs, two antenna, three part body
ii) Gills
3. Feeding, growth, movement, excretion, sensitivity, respiration.

Unit 3. Answers for multiple choices and structured questions

3.1. Multiple choice questions
1.D, 2.D, 3.B, 4.C, 5.B, 6.B

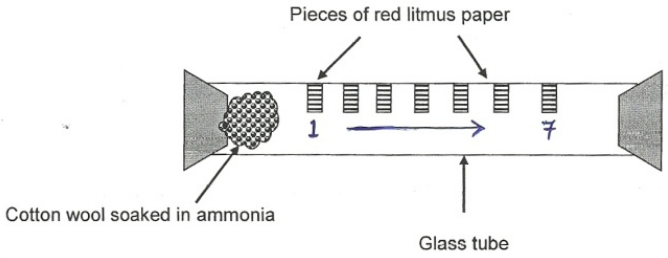
3.2. **Structured questions**
1. a) plants b) autotroph, cellulose of cell walls, starch storage. c) D d) E.
2. Because they have similar physiological features.
3.a) Bacteria b) monera c) cell wall, no true nucleus.

Unit 4. Answers for multiple choices and structured questions

4.1. Multiple choice questions
1. B, 2.A. 3.B, 4.B, 5.B, 6.B, 7.B.

4.2. Structured questions
1. Because temperature increases the collision and the movement of particles.
2. i) A ii) B iii) A iv) B v) W = cytoplasm, Z = vacuole.
3. i) ii) iii)

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iv) Diffusion.

4. a) Tube A absorbed water from the beaker and become swollen. The liquid in the beaker was hypotonic to the one in tube A.
   Tube B lost water into the beaker and became soft. The liquid in the beaker was hypertonic to that in tube B.
   a) Liquid A.
   b) Cell membrane.
5. a) i. A
   ii. B
   b) i. $\frac{4-3}{3} \times 100\%$

   ii. $\frac{2.5-3}{3} \times 100\%$

   c) i. A
   ii. B
6. The salt forms a very concentrated solution on the slug's surface so water leaves its body by osmosis.

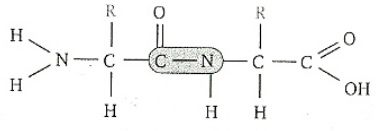
Unit 5. Answers for multiple choices and structured questions

5.1. Multiple choice questions

1. D, 2. A, 3.C, 4.D, 5.B, 6.B

5.2. Structured questions

1. i. in tube B contains glucose which is a reducing sugar.
   ii. $C_6H_{12}O_6$
   iii. in test tube A contains sucrose which is a non-reducing sugar.
2. a)

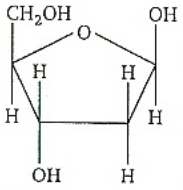


   c) Condensation reaction.
   d) Peptide bond.
3. a) Glucose
   b) Glucose and fructose
   c) Glucose and galactose

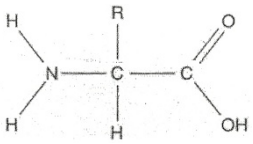
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4. a) i. glycogen ii. Cellulose iii. Amylose iv. Sucrose v. ribose

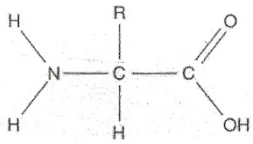
b)



c) i.



ii.



d) glycosidic bond. e) peptide bond. f) R-group.

5. a) i. Hydrolysis ii. Condensation b) Dipeptide c) Amino acid d) Peptide bond

6. i- A: Carbohydrate B: Amino acid

ii- a) Sweet b) Soluble in water c) Reducing sugar

iii- Amphoteric: protein

Hydrophobic: lipids

Unit 6. Answers for multiple choices and structured questions

6.1. Multiple choice questions

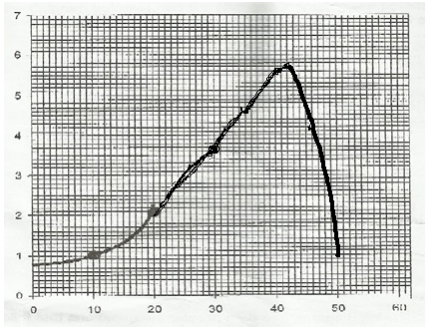
1.C, 2. A, 3. B, 4.A,

6.2. Structured questions

1.i. Because enzymes reduce activation energy, reduce time taken by the reaction; also reduce the heat of the reaction.

ii. Denaturation

2. a)



b) i. The reaction rate increased.

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ii. The enzyme stops its reaction.

iii. Beyond fourth point the reaction rate starts to decline and stops its function because of denaturation of the enzyme.

v. $41C^0$.

iv. Optimum temperature.

3. a) i. The reaction rate of the enzyme increases rapidly.

ii. The enzyme works at maximum rate and reached its optimum temperature.

b) i. PH and limiting food.

ii. Because food became limiting. The population reached carrying capacity because the death rate equals to the birth rate.

4. a) Because human enzymes work best at $37C^0$.

b) Because of lack of energy. Thus the person faints.

c) The maternal blood entering the placenta carries oxygen and nutrients to the fetus, but the maternal blood leaving the placenta carries waste products, such as urea and carbon dioxide from the fetus.

Unit 7. Answers for multiple choices and structured questions

7.1. Multiple choice questions

1.A, 2.C, 3.A, 4.B, 5.B, 6.C.

7.2. Structured questions

1. a) i. 4 teeth

ii. 8 teeth

b) i. 12.5%

ii. 75%

c) Because Yusuf lives where drinking water has natural fluoride which gives teeth more strength.

d) i) X= Horny pad

y= Diastema

I= Incisors

ii. Ruminant

iii. $2(I\frac{0}{3}\ C\frac{0}{1}\ P\frac{3}{3}\ M\frac{3}{3}) = 32$

2. a) There is no starch in the leaf because the plant used all its starch when it was placed in the dark place.

b) i. photosynthesis did not happen in the leaf enclosed in the flask with potassium hydroxide and has no any starch, because carbon dioxide which a necessary factor for photosynthesis is absorbed by potassium hydroxide in the flask.

ii. Because photosynthesis happens smoothly.

3. a) light

b) Starch

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c) i. Parts of the leaf covered by aluminium foil stains brown with iodine, but parts without aluminium foil turn blue.

i. Because parts covered by an aluminum foil did not receive light and photosynthesis did not occur, where as photosynthesis had occurred in the uncovered parts of the leaf and turned blue when iodine solution added.

d) To use all the starch present in the leaves (to destarch)

4. i. D

ii. Because pond weed uses all the carbon dioxide by photosynthesis.

5. i. $I\frac{1}{1} + c\frac{0}{0} + p\frac{3}{2} + m\frac{4}{4} = 30$

ii. Herbivore

iii. Because it has no canines.

6. i. parasite is an organism that lives on another living organism, called the host.

ii. Ectoparasite is an organism that lives on outside of the host, where as endoparasite is organism that lives inside the host.

7. i. $2(I\frac{0}{3}\ C\frac{0}{1}\ P\frac{3}{3}\ M\frac{3}{3}) = 32$

ii. Diastema

8. i. Root

ii. Molar

Reason 1: it has large surface area with cusps.

Reason 2: it has three roots.

iii. Because the upper part of the tooth is the very hard (the hardest part in the animal kingdom) where as the lower part of the tooth has soft tissue.

b) 1. It has sodium fluoride which hardens the teeth.
2. It has antiseptic agent which kills bacteria.
3. It has a PH 8.5 which neutralizes the acid produced by the bacteria.

c) 1. To avoid very sugary foods.
2. To drink water with fluoride.
3. To avoid biting with a hard material.

9. a) A: Photons / light energy / solar energy.
B: CO_2

b) C: O_2
D: Glucose / Sugar

c) ATP / NADPH

d) The light energy is absorbed in photosystem I to boost the energy electrons to a higher level. The excited electrons will be accepted by primary acceptor. As the electrons pass along the electron carrier system , the energy which is lost from the electrons is converted to ATP.

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Unit 8. Answers for multiple choices and structured questions

8.1. Multiple choice questions

1. B, 2.B, 3.C, 4.A, 5. D, 6. C.

8.2. Structured questions

1. $\text{Respiratory qauteint} = \frac{57}{80} = 0.7$

2. a)

Glucose	ATP
1. Acted by many enzymes	1. Acted by one enzyme
2. large molecule	2. small molecule
3. product of photosynthesis	3. product of respiration

b) i. Respiration
ii. Photosynthesis

3. a) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$.

b) $\text{Respiratory qauteint} = \frac{6}{6} = 1$

c) Glucose

4. It happens when more emery is needed and the O_2 which necessary cannot be provided

Unit 9. Answers for multiple choices and structured questions

9.1. Multiple choice questions

1. D, 2. B, 3. B, 4. D, 5. A, 6. D, 7. B, 8. C, 9. D, 10. C, 11. B, 12. D, 13. C, 14. D, 15. C, 16. C, 17. C, 18. D, 19. C, 20. C, 21. D, 22. C, 23. B, 24. D, 25. D, 56. B,

9.2. Structured questions

1. a) Suitable temperature, suitable amount of water and oxygen.
b) They develop leaves which make their own food by photosynthesis and they also develop roots which absorb water and mineral salts from the soil.

2. a) i) osmosis
ii) xylem
b) i) P = phosphorus
K = Potassium

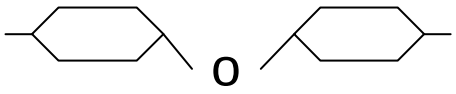
ii) To (trap) absorb light energy from the sun
iii) An increase in environmental temperature raises the temperature of the leaf. This causes an increase in the rate of evaporation of water from the mesophyll cells of the leaf and also on Windy days, the diffusion of water vapour from the leaf to the atmosphere will be rapid.

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3. a)

Description	Part of the cell
Black dot	Nucleus
Green spots	chloroplast
Pale yellow	cytoplasm
Space	vacuole

b) It has chloroplast (green spots) and vacuole

c) 

d) i) Food storage

ii) structural role

4. i) Active transport

ii) cohesion, adhesion, capillarity, root pressure

5.

Column A	Column B
A- Meristematic	1- To make food for the plant
B- Photosynthetic	2- To fill spaces between other tissues
C- Parenchyma	3- To protect inner more delicate tissue
D- Epidermal	4- To transport water an food substances
E- Vascular	5- To make new tissues

6.

*Column **A***	*Column **B***
1. cotyledon	A – attaches plumule to cotyledon
2. Radicle	B – attaches radicle to cotyledon
3. Hypocotyls	C – develops to form the root
4. Epicotyl	D – stores food for the seeds

7. a)

	Stimulus		
	Light	Gravity	Water
Shoot	+	–	–
Root	–	+	+

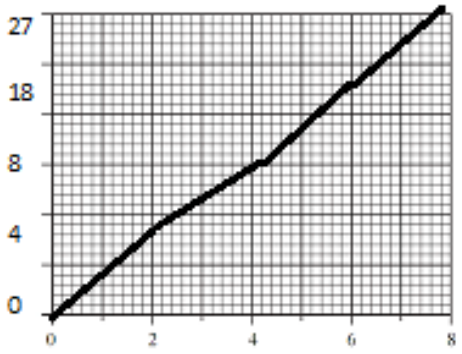
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b) i) positive phototropic ii) Negative phototropic

9. a)

Label	Name	Function
A	Cotyledon	Provides energy for growth
B	Seed coat	Protects the seed

b) i)



ii) 4 and 6

10. a) Carbon dioxide + water = glucose + oxygen

b) For energy, for making cell walls, for making stored starch.

11. a) Wind

b) To be carried by wind

12. a) As O_2 is being made in photosynthesis there will be higher concentration inside the leaf compared to the outside of the leaf. Therefore O_2 will diffuse out of the leaf.

b) To provide energy for active transport of minerals like nitrates into the root.

13. a) the diagram shows the force that transpiration pull is capable of exerting.

b) Cohesion, adhesion and transpiration pull.

c) Removal of Vaseline would make the mercury level not remain the same because the volume of water lost by transpiration is replaced with a column of air instead.

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14. a) A= Annular

B= Spiralled

C= Scalariform

E= Pitted

b) Xylem

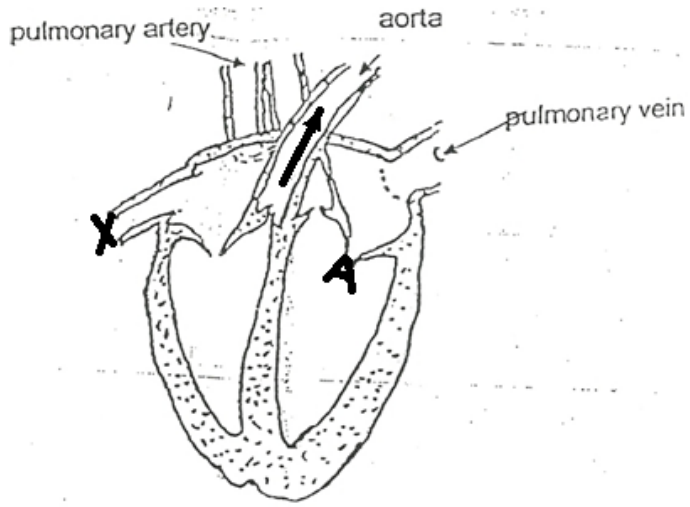
Unit 10. Answers for multiple choices and structured questions

10.1. Multiple choice questions

1. D, 2. C, 3. D, 4. B, 5. A, 6. C, 7. C

10.2. Structured questions

1. a)



b) Pulmonary circulation is between the lungs and the heart only, but systemic circulation is between the heart and the whole body, except the lungs.

c) Valves

e) Vena cava

2. a) i. C ii. A iii. B iv. D

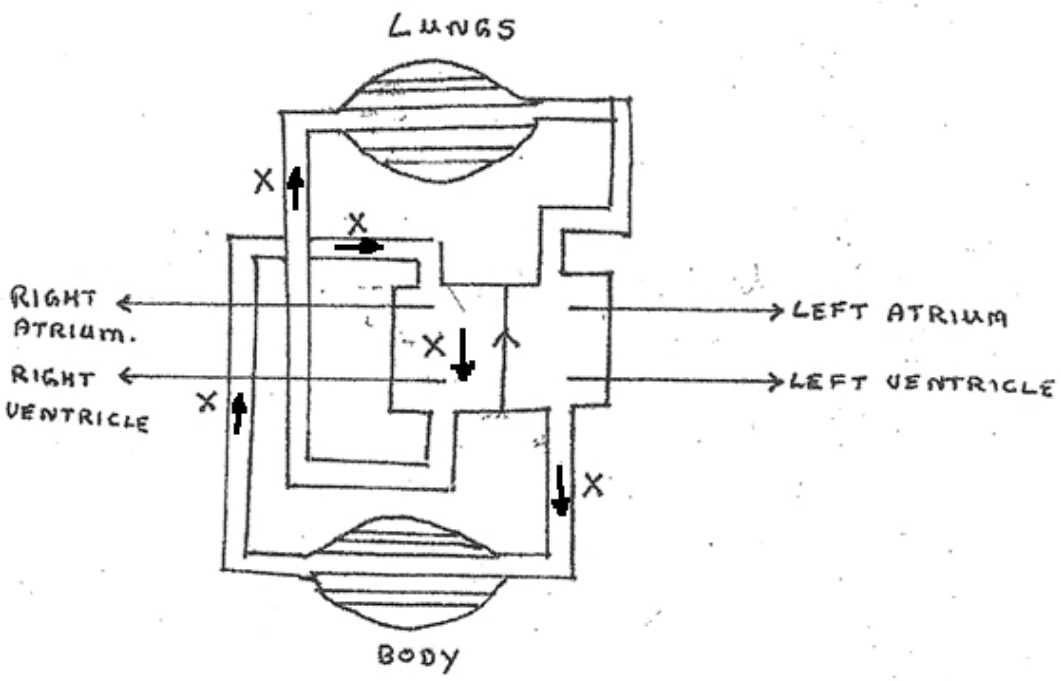
b) Because it has pulmonary circulation that is between the heart and the lungs only and systemic circulation that is between the heart and the whole body, except the lungs.

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c) Because it is oxygenated blood.

d) because it has very thin walls.

3. a)



b)

Arteries	Veins	Capillaries
B	A	
C	E	d
		f

c) i. $Hb + O_2 \longrightarrow HbO_2$

ii. $HbO_2 \longrightarrow Hb + O_2$

4. a) Blood is entering the ventricles or atria are pumping blood into the ventricles.

b) systole

c) i. The left ventricle is pumping blood to the aorta.

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ii. The blood is leaving from the heart. Because the left ventricle contracts and the pressure rises very high.

d) Atrioventricular valves close and produce the second heart sound.

5. Blood group O.

6. a) vitamin K and Ca^{2+}

b) X= Thrombin, Y= Fibrin

c)i- lack of blood clotting.

ii- Haemophilia

iii- inherited disease or genetic disease or genetic disorder.

7. a) 195

b) 12 years

c) 10%

8. a)

Systole of atria	**Systole of ventricles**
Blood flows into the ventricles	Blood is pumped into the aorta and pulmonary artery

9. a) The ventricles pump blood but atria simply receives the blood before it enters the ventricles.

b) Left ventricle has to pump blood around the whole body, except the lungs.

c) Veins have

i- valves

ii- thinner wall

iii- larger lumen

Unit 11. Answers for multiple choices and structured questions

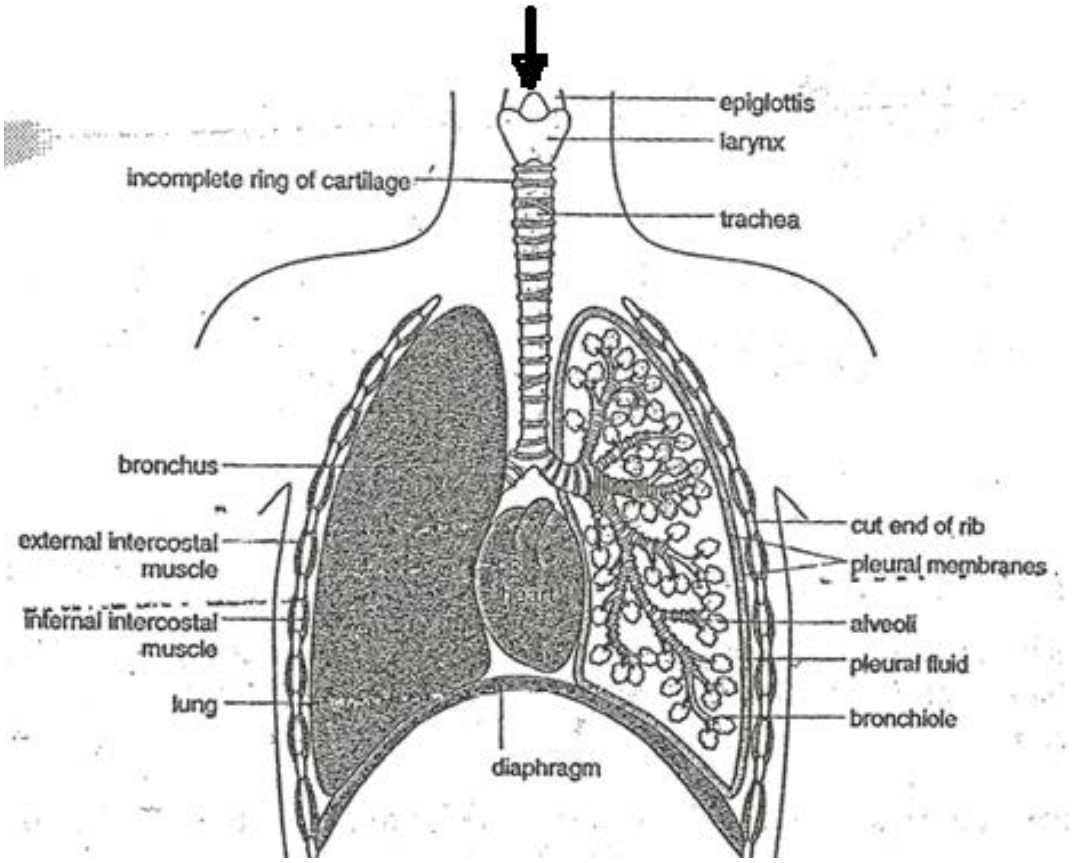
11.1. Multiple choice questions

1. B, 2. B, 3. D, 4. D,

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11.2. Structured questions

1. a)



b) Contraction

c) Relaxation

d) Contracts

e) Downwards

f) Increases

g) Decreases

2. 1. Nasal cavity, 2. Phyrnx 3. Larynx

4. Trachea 5. Bronchi 6. Lung

3. a) i- b, ii- g, iii- a, iv- h, v- f, vi. d.

b) i- $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + Energy$

ii- Exothermic

iii- Means oxygen is present in the reaction.

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4. a) two, the wall of the alveolus and the wall of the blood capillary.

b) To ensure that oxygen rapidly diffuses from the area of high concentration in alveoli to area of low concentration in the blood.

Unit 12. Answers for multiple choices and structured questions

12.1. Multiple choice questions

1. D, 2. D, 3. D, 4. D,5. A, 6. B.

12.2. Structured questions

1. a) i-Lipids

ii- it is released to the blood circulation

iii- Cholecystitis

vi- Yellowing eyes, lack of lipid digestion.

2. a) 1. It is highly folded with many villi which increases the surface area for absorption.

2. it has thin moist walls.

b) i- Salivary gland and small intestine

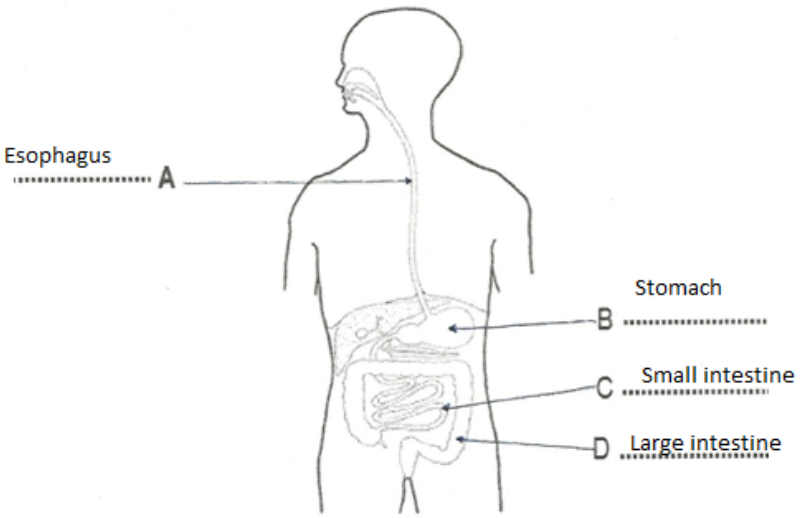
ii- Small intestine

iii- Maltase

3. a) Liver b) Gall bladder c) Small intestine d) Digests lipids

4. Large intestine

5. a)



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b) The process of digestion breaks down **insoluble** food molecules into smaller **soluble** ones. This process is speeded up by **enzymes.** The products can then be **absorbed** into the blood through the wall of the **small intestine**

6. -Both provide large surface area
   - Both have thin permeable walls
   - Both have good blood supply, causing concentration gradient.
   - Both are moist.

Unit 13. Answers for multiple choices and structured questions

13.1. Multiple choice questions

1. A, 2. A, 3. A, 4. B,5.

13.2. Structured questions

1. a) A- ligament
      B- Cartilage
      C- Synovial fluid
   b) Hinge joint or knee joint
   c) It has synovial fluid and cartilages which help it to move smoothly.
   d) It moves only one direction only.

2. a) A- Scapula (shoulder blade) B- Biceps C- Triceps D- Humerus E- Ulna F- Radius
   b) X= Ball and socket joint or shoulder joint
      Y= Hinge joint or elbow joint
   c) it moves all directions
   d) it straightens the lower arm

3. a) X= Cartilage Y= Hard bone (compact bone) Z= Fatty marrow
   b) To be light

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4.a)

Letter	Part of skeleton	Organ protected
A	Skull	Brain
B	Thorax	Lungs and heart
C	Lumbar vertebrae	Spinal cord

b) i- P

ii- Tendon

5. a) Scapula (shoulder blade)

b) Appendicular skeleton

c) Socket

d) Humerus

e) It has a socket in which the head of the humerus fits. It has synovial fluid and cartilage that allow the joint to move smoothly.

Unit 14. Answers for multiple choices and structured questions

14.1. Multiple choice questions

1. A, 2. B, 3. B, 4. D.

14.2. Structured questions

1. a) Nephron

b) i- 1.Pressure from the heart pump.

2. Both the capillary wall and the wall of the Bowman's capsule have tiny pores which allow the passage of filtrate.

3. The efferent arterioles are narrower than the afferent arterioles resulting in a buildup of pressure which causes the passage of filtrate from the glumerulus into the Bowman's capsule.

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ii- Bowman's capsule or renal capsule.

iii- Glucose, amino acids, urea, water, in-organic salts

iv- Glucose, amino acids

v- Proximal convoluted tubule (First coiled tube)

vi- they are very large and cannot pass through the small pores of the glomerulus.

2. a) Urinary system.

b) i- Because they are very large and cannot pass through the small pores of the glomerulus.

ii- Glucose. it is used for energy.

c) i- Liver.

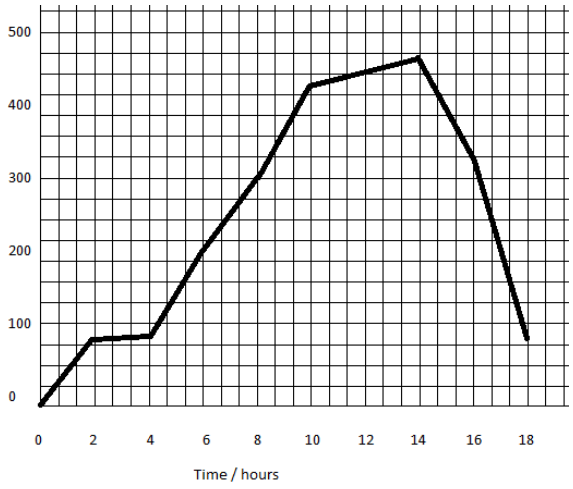
ii- Nitrogen

d) Homeostasis means: The maintenance of a constant internal environment of the body.

3. i- Because it is reabsorbed.

ii- They are very large and cannot pass through the small pores of the glomerulus.

4. i-



ii- 450

iii- They are directly proportional.

iv- 2 hours.

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Unit 15. Answers for multiple choices and structured questions

15.1. Multiple choice questions

1. A, 2. D, 3. D, 4. C, 5. B, 6. D, 7. A.

15.2. Structured questions

1. a) i) 1.23

2. 23

3. 46

b) Deep voice, more muscular, pubic and armpit hair, beard, moustache, big shoulders.

Unit 16. Answers for multiple choices and structured questions

16.1. Multiple choice questions

1. C, 2. D, 3. A, 4. B.

16.2. Structured questions

1.

Stimulus	**Sense organ**
Light	Eye
Chemical taste	Tongue
Sound	Ear
Chemical smell	Nose
Touch	Skin

2.

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Region of the tongue labelled	Type of substance it taste
A	Bitter
B	Sour
C	Salt
D	Sweet

3. Cold winters day.

4. a) Vasoconstriction occurs.

b) When the body temperature goes up sweat glands release sweat, drawing heat from the body, then the body cools.

c) The fur of hairy mammals serves as an insulation layer to conserve body heat and to keep the body warm. When hair is raised during cold weather, fur traps more air in the spaces between its hairs. Air is a poor conductor of heat and so prevents the loss of body heat to the surroundings.

5. Skin

6. A = Allows light into the eye
= Refracts light entering the eye
= Protection.

B = Refracts (focuses) light on the retina.

C = controls the amount of light entering the eye.
= Gives the eye its colour.

D = Changes light rays into nerve impulse.
= Sensitive to light intensity.

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Unit 17. Answers for multiple choices and structured questions

17.1. Multiple choice questions

1. B, 2. A, 3. C, 4. B,

17.2. Structured questions

1. a)

Column1 When blood glucose level rises above normal	**Column 2 Insulin**	**Column 3 Glucagon**
1) Increase glucose uptake of cells	√	
2) Converts stored glycogen to glucose		√
3) Converts glucose to glycogen	√	
4) Reduces metabolic breakdown of glucose		√

b) Islets of langerrhans
c) i) Endocrine
ii) They are released into the blood by ductless glands.
d) Diabetes mellitus

3. i) Increases, ii) Increases

4. a) 60mg/ cm^3, 30min
b) The injected insulin decreases the concentration of blood glucose.
c)
d) Glucagon
e) i) diabetes mellitus
ii) Hypoglycemia, the person faints by lack of energy.

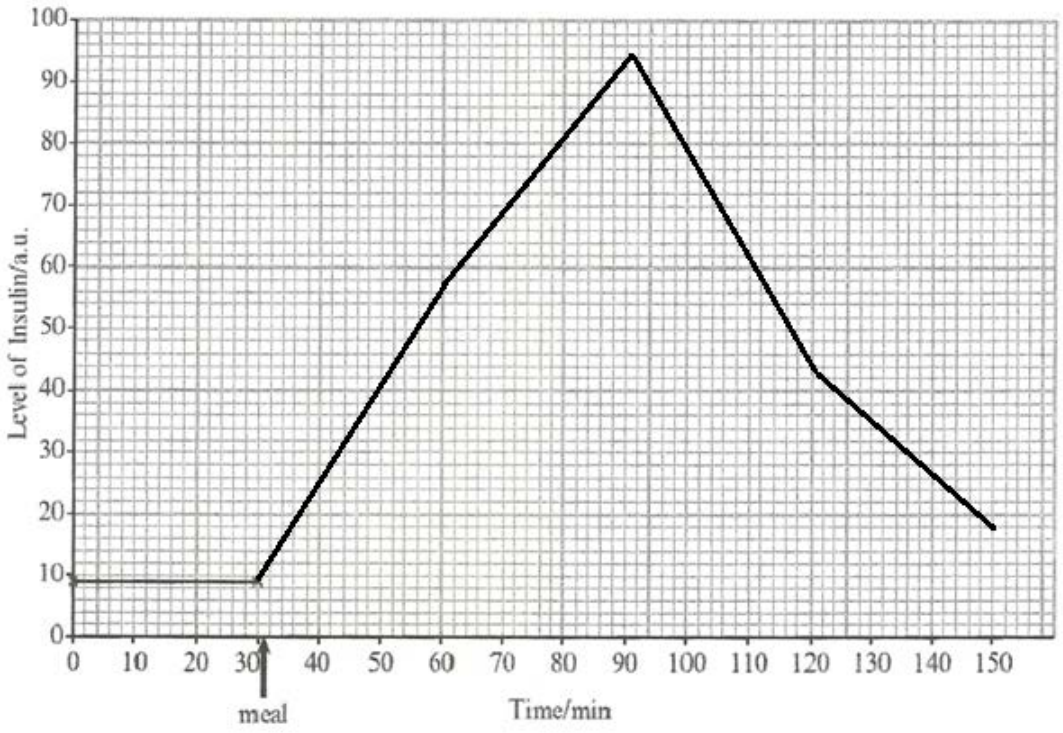
5. i) Serotonin
ii) Glucose
iii) Glycogen
iv) Insulin

6. a) P= Glucagon, T= Liver
b) Glucose

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c) Condensation
d) Too much blood glucose in the blood
e) Islets of Langerrhans
f) Lipase, protease, trypsin, pancreatic amylase.

7. a)



b) i) Increases
ii) 78
iii) 18
iv) Decreases
v) Diabetes mellitus

Unit 18. Answers for multiple choices and structured questions

18.1. Multiple choice questions

1. B, 2. C, 3. C,

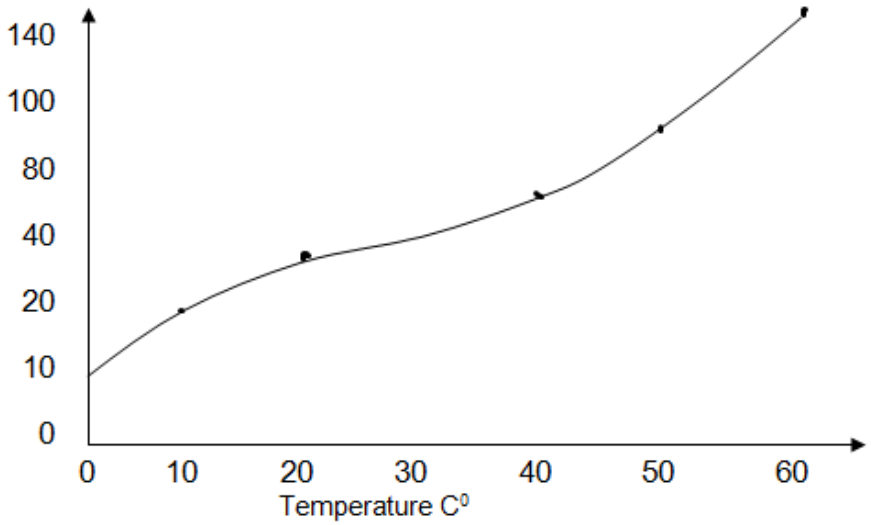
18.2. Structured questions

1. a) $37C^0$
b) Because human enzymes work best at $37C^0$

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2. Above $35C^0$ of that organism, the enzyme denatures and stops its function and below $0C^0$ the enzyme deactivates and stops its function but not denatured.

3. a)



b) i- At $24C^0$

ii- More blood flow in the blood vessels

c) i- sweating

ii- panting

d) At $40C^0$

Unit 19. Answers for multiple choices and structured questions

19.1. Multiple choice questions

1. C, 2. B, 3. C, 4. D, 5. A, 6. B. 7. C, 8. D.

19.2. Structured questions

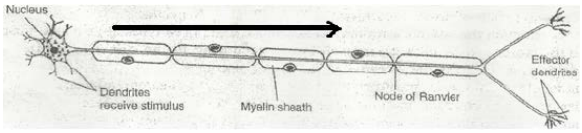
1. a)

Letter	Part of reflex arc
A	Receptor
B	Sensory neuron
C	Motor neurone
D	Effector

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b) The reflex action occurs instantly before the brain is aware of what has happened, this reduces the damage.

2.a) i-



ii- Dendrites pass the impulse to the cell body.

b) i- X

ii- Inside the axon

iii- Because the impermeability of the membrane helps to maintain the polarity of the membrane during restinfg potential.

iv) because it protects the axon, nourishes the axon, maintains Na^+ to be in their position, speeds up transmission of nerve impulse.

v) because nerve impulse leaps from node to node on the myelinated axons.

Unit 20. Answers for multiple choices and structured questions

20.1. Multiple choice questions

1. C, 2. B, 3. D, 4. A, 5. D, 6. B, 7. B, 8. A, 9. D, 10, A, 11. C.

20.2. Structured questions

1. a) Animal populations would die because the locust would eat up all the producers (Green plants) which are food for the animal populations.

b) i- Decreases

ii- Because eagle eats more guinea fowl

c) Eagle

d) Green→ vegetable→ Grasshopper→ Guinea→ fowl Eagle.

2. a) i- Sun light

ii- Green plants

iii- Hawk or owl

b) Green→ Caterpillar→ Blue tit→ Hawk

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c) i- To kill insects that devastate the crops.

ii- The insectcide kills caterpillars and the blue tits die out because of lack of food. Then all the other populations would decrease, except the green plant that will increase.

d) i- Autotrophic nutrition is the process by which an organism takes in simple in-organic material like carbon dioxide, water and mineral salts to make organic food materials like carbohydrate, lipids and proteins. Green plants are autotrophic.

ii- Heterotrophic nutrition involves taking coplex food materials like carbohydrates, proteins and lipids obtained from the bodies of plants and animals. Animals are hetrotrophic.

3. a) i- Primary consumer ii- secondary consumer iii- Tertiary consumer.

b) Trophic levels

c) Decreases

d) Green plants→ Deer → Lion

4. a) Plants→ Zebra→ Leopard→ Vultures

b) Antilope, Zebra, Giraffe.

c) i- Increase

ii- Decrease

iii- Because lions which are their source for food decrease.

d) Decrease

5. i- Primary consumer

ii- secondary consumer

6.a) i- Insectivores, hawk and snake.

ii- second trophic level.

b) i- Plant→ mice→ snake→ Hawk

ii- Plant→ slugs→ frogs→ snake → hawk

Or can be: Plants→ aphids→ Beetles → insectivores birds→ hawk

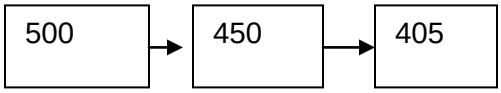
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7. Density = $\frac{10+3+5+4+6+8}{6} = 6$

Area of the field = 25 x 40 = 1000

Total population = 6 (25 x 40) = 600

8. a



b) respiration, growth, movement, reproduction, etc.

c) Green plants→ Goats→ man

d) To survive

9. a) i- Carbonic acid and nitric acid.

ii-corrodes raily ways, bridges, roofs of the houses and monuments. It acidifies water.it also reduces soil fertility.

iii- To reduce industries and outomobiles that produce toxic gases into the atmosphere.

- To use electricity as a source of energy instead of using fuels.

- To extract sulphur from sulphur containing fuels before use.

-Use of fuels that do not produce oxides

b) lung diseases

c) To reduce transpiration (To reduce water loss by the leaves during drough)

10. a) D

b) Rats which are their main source of food decreased.

c) The number of owls will decrease because much copetition for food sets in.

11. a) i- Green plants

ii- By photosynthesis

b) Plant→ slugs→ frogs→ snake → hawk

Or can be: Plants→ aphids→ Beetles → insectivores birds→ hawk

c) Decreasement

d) Decomposers

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e) Carnivores

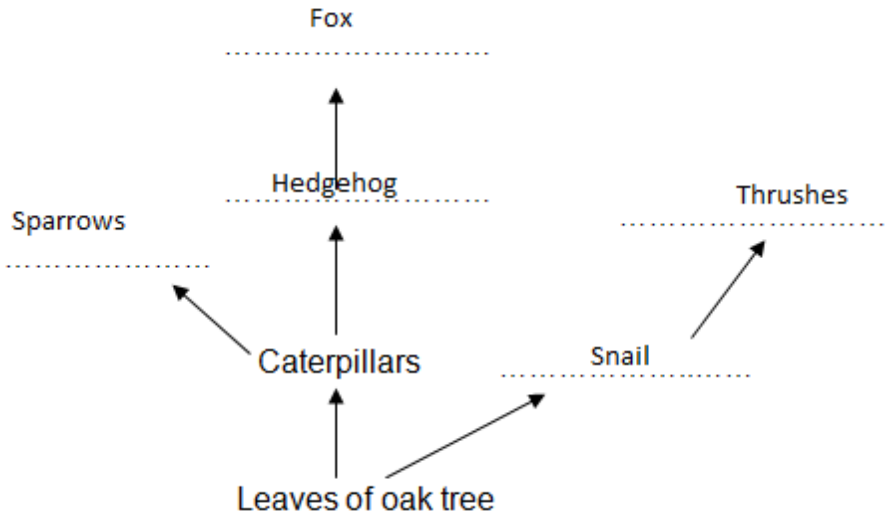
12. i- Zebra eats grass (grazer) but giraffe eats tall trees (browser)

ii- it has long roots that absorb water and minerals from the deeper layers of the soil.

- It has thorns and small leaves that reduce water loss.

iii- The sheep over grazes and competition sets in.

13. a)



b) i- oak trees ii- caterpillars or snails

14. a) Light energy b) Chemical energy c) i- Bacteria or fungi ii- Heat energy

15. a) i- P= Nitrogen fixation ii- Absorption iii- Eating or feeding.

b) i- Nitrifying bacteria ii- Decomposers iii- Denitrifying bacteria

16. a) Formula = $\frac{\text{Summation of number of throws}}{\text{Number of throws}}$

b) Density = $\frac{2+0+1+0+4+3+0+5+0+5}{10} = 2$

c) Approx. pop = 2 x 50 = 100

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d) 60%

17. a) i- 20-5=15 birds

ii- 25-10= 15 birds

b) i- The number of species in the forest is more than in the number in the savannah, hence higher change.

- Fruits are more abundant in forest than savannah.
- Selectivity reduces with forest birds because they are many and competition is stiffer than savannah.
- Seeds are more abundant in savannah than in forest. They are more exposed but seeds in forest plants are inside the fruit. Birds in savannah are less selective than forest birds.

c) i- B

ii- immigration in by numbers

- High death rate during unsuitable condition and disease
- Predation increases

d) - Bush fire.

- having high concentration of industries.
- Felling trees – replanting trees
- Use of fuels that do not produce oxides

Unit 21. Answers for multiple choices and structured questions

21.1. Multiple choice questions

1. B, 2. D, 3. B, 4. C, 5. B, 6. B, 7. D, 8. B, 9. B, 10, D, 11.C, 12. A, 13. C, 14. B, 15. A, 16. B, C, 17. B, 18. C, 19. A, 20. A, 21. B, 22. C, 23. C, 24. C, 25. B, 26. B, 27. A, 28. A,

21.2. Structured questions

1. a) A= Isolation of human gene

B= Preparation of vector

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C= Formation recombinant DNA

D= Manufacture

b) 1- It is not identical to human insulin

2- it has side effects

2. a)

	X^h	Y
X^H	X^HX^h	X^HY
X^h	X^hX^h	X^hY

b) 1 : 1 :1 : 1

3. a) Man = $\mathbf{I^A}i$

Wife = $\mathbf{I^B}I^B$

b)

	$\mathbf{I^A}$	$\mathbf{I}$
I^B	$\mathbf{I^A}I^B$	$\mathbf{I^B}i$
I^B	$\mathbf{I^A}I^B$	$\mathbf{I^Bi}$

c) Phenotypes: 2 blood group AB, 2 blood group B.

Genotypes: 2 $\mathbf{I^A}I^B$, 2 $\mathbf{I^Bi}$

4. i- X^c ii- X^CX^c iii- X^CY

iv.

	X^C	Y
X^C	X^CX^C	X^CY
X^c	X^CX^c	X^cY

Phenotypes: 1 normal girl, 1 normal boy, 1 carrier girl, 1 colour blinded boy.

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v- Because female belong a pair of alleles. If one is **recessive** the other may be **dominant**. But in males, if that on **X chromosome** becomes recessive there is no chance of their effects being masked by the dominant.

5. i- Male = Rh rh

ii- Female = Rh Rh

iii-

	Rh	Rh
Rh	RhRh	RhRh
Rh	Rhrh	Rhrh

Genotypic ratio: 2:2

Phenotypic ratio: 2:2

6. a) i- Tt

ii- tt

b)

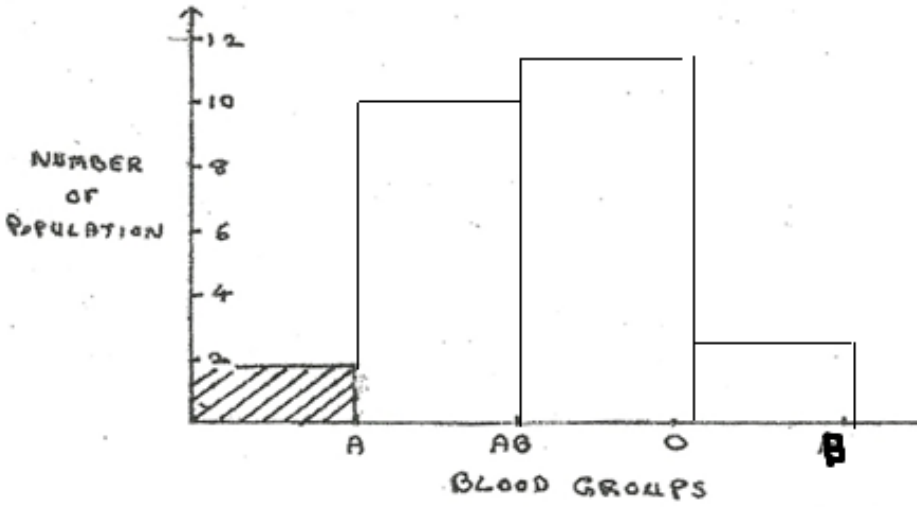
	T	T
t	Tt	Tt
t	Tt	Tt

Genotypic ratio : 2:2

Phenotypic ratio: 2:2

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7. a)



b) Discontinuous

c) The bar chart is not normal distribution curve. The figures could not be adjusted to fit a smooth curve (a bell shaped curve), because blood groups have no intermediate forms and are not influenced by the environment.

8. a) A= Meiosis, B= Mitosis

b) Diploid: i- Adult body cell

ii- Zygote

iii- embryo

Haploid: i- Sperm

ii- Egg.

9. Tissue

Cell

Nucleus

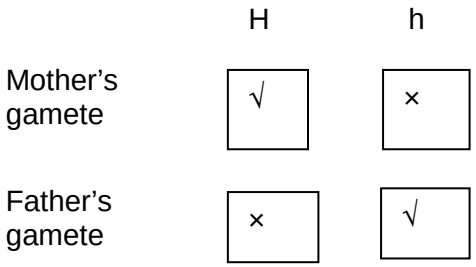
Chromosomes

Gene

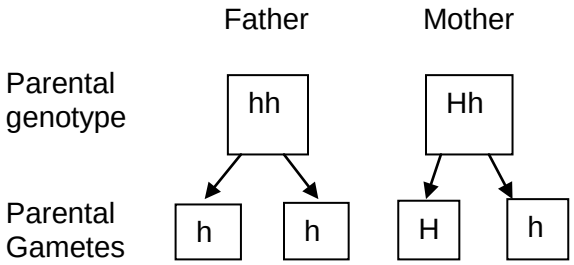
Chemical base.

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10. a)



b)



	H	H
h	Hh	Hh
h	Hh	Hh

Possible genotype of boys	2 Hh	2 hh
Possible phenotype of boys	2 white forelock	2 normal

11. a) GGG

b) Because it is a substitution. Only one amino acid changes and the protein doesn't become functionless protein. In most cases, replacement of one amino acid by another in a protein does not alter its biological activity. Therefore it doesn't have any effect the polypeptide of the protein.

12. a) Test cross

b) tt

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c) i-

	t	t
?	Tall	Tall
?	Tall	Tall

The genotype of the unknown plant is TT.

	t	T
?	Tall	Tall
?	Short	Short

ii- One of the parents is homozygous dominant because all the offspring are tall and the other unknown plant is heterozygous because half of the offspring are tall and the other half are short.

13. i-

	R	R
r	Rr	Rr
r	Rr	Rr

ii- Because the calves are neither red nor white

iii-

	R	R
R	RR	Rr
r	Rr	rr

Genotypic ratio : 1: 2: 1

Phenotypic ratio : 1: 2: 1

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14. a) i- Genetic engineering is the transfer of genes from one organism to unrelated organism with a special purpose.

ii- Bacteria or plasmid

15. a) X^HX^H

b) Because he inherited a recessive allele from his mother.

c) i- X^HX^h

ii- X^Hy

d) X^HX^H or X^Hy

16. i- Test cross or back cross

ii-

Abdi homozygous Genotype ?? X Short recessive tt

Law of segregation ? ? t t

	T	T
?	Tall	Tall
?	Tall	Tall

Abdi's genotype is TT.

Hassam Genotype ?? X Short homozygous recessive tt

Law of segregation ? ? t t

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	t	T
?	Tall	Tall
?	Short	Short

Hassan's genotype is Tt.

Unit 22. Answers for multiple choices and structured questions

22.1. Multiple choice questions

1. B, 2. B,

Unit 23. Answers for multiple choices and structured questions

23.1. Multiple choice questions

1. A, 2. B, 3. B, 4. D, 5. B, 6. D, 7. C, 8. B, 9. A, 10, D, 11.D, 12. A, 13. A, 14. C, 15. D, 16. B, 17. D, 18. B, 19. C.

23.2. Structured questions

1. i- Infectious diseases are the diseases caused by pathogens but non-infectious diseases are all the diseases not caused organisms.

   ii- Pathogens are the microorganisms that cause diseases but T – lymphocytes are white blood cells which attack germs or pathogens.

   iii- Active immunity is the immunity gained when an antigen enters the body but Passive immunity is a short lived defense against an antigen by antibodies introduced into the body from outside.

   iv- Antigen is a substance that is foreign to the body and stimulates an immune response but antibody is a chemical that fights and destroys any foreign matter into the body.

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2. a) 40

b) Because there are many memory cells in the body.

3. a)

Disease	Pathogen	Method of transmisions	symptoms	Control measure
Cholera	Vibrio Cholera	Water borne Food borne	Diarrhoae	Drinking water should boiled or chlorinated
Malaria	Plasmodium	By the bites of anopheles mosquito	Fever, anemia	Use treated nets, or insectcide

b) Because the pathogen has different strains of antigens

4. a)

Statement	**Malaria**	**Cholera**	**Aids**
1-causive agent is bacterium	×	√	×
2-causive agent is blood borne	×	×	√
3-sexually transmitted	×	×	√
4-transmitted by insect	√	×	×

b) Blood test for antibodies to HIV.

c) Because the immune system is destroyed by the HIV and the infected person cannot resist to the tuberculosis.

d) Because there are some bacteria that can resist to some antibiotics.

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5.

Disease	Pathogen	Mode of transmission	Symptoms
Tuberculosis	Mycobacterim	Air borne	Dry cough
Cough	Influenza virus	Air and food borne	Coughing
Malaria	Plasmodium	Bites of mosquito	Anemia

6.- Living inside cells. i.e. plasmodium enters liver cells and red blood cells.
- Covering their bodies in host proteins.
- Suppressing the immune system
- Living where is beyond the reach of many antibodies i.e. in the intestine.

7.

Column A	Answer	Column B
1. Obesity	F	A) Deficiency in vitamin C
2. Kwashiorkor	E	B) Deficiency in niacin
3. Goiter	G	C) Deficiency in vitamin B1
4. Anaemia	D	D) Deficiency in iron
5. Night blindness	H	E) Deficiency in protein
6. Beriberi	C	F) Deficiency in carbohydrates
7. Bellagra	B	G) Deficiency in iodine
8. Scurvy	A	H) Deficiency in vitamin A

8. i- It is a foreign tissue which contains a foreing antigens.

ii- The immune system recognizes it as foreign tissue. Killer or (cytotoxic) cells attack the transplanted tissue by releasing perforin which destroys it.

The End

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