KCSE PREDICTOR

SET 1

BIOLOGY

`

A SERIES OF KCSE PREDICTION BIOLOGY QUESTIONS!

FOR MARKING SCHEMES

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(PREDICTOR TRIALS 1-10)

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KCSE PREDICTOR 1

231/1
BIOLOGY
PAPER 1
TIME: 2 HOURS

1. Explain the term Binomial Nomenclature. (1mk)

   ……

   ……

2. Name **three** forces involved in transportation of water and mineral salts. (3mks)

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3. (a) Give **two** roles of DNA. (2mks)

   ……

   ……

   (b) State the difference between DNA and RNA. (1mk)

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   ……

4. Two strips A and B were cut from Tradescantia whose cell sap was 30% sugar. Strip A was placed in a solution of 10% sugar concentration while strip B was placed in 50% sugar concentration.

   (a) What change was expected in strips A and B? (2mks)

   Strip A:……

   ……

   Strip B:……...

   ……

   (b) Account for the results in strip A. (3mks)

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5. State the biological significance of each of the following:

(a) Thick muscular walls and narrow lumen in arteries. (1mk)

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(b) Narrow xylem vessels in flowering plants. (1mk)

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6. Suggest **three** reasons why green plants are included in a fish aquarium. (3mks)

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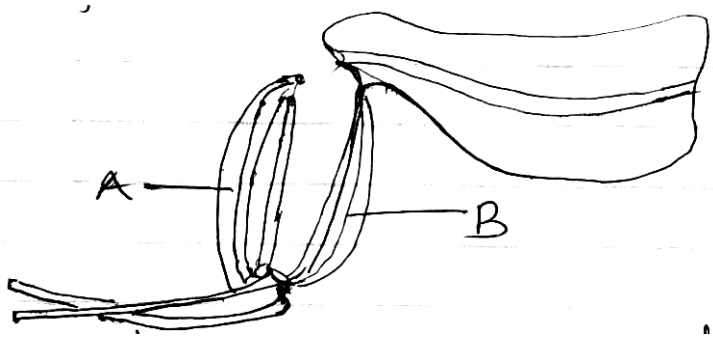
7. (a) Study the diagram below and answer the questions that follow.



(i) Name the muscle labelled: (2mks)

A:……..

B:……..

(ii) What happens to each muscle as the arm is straightened? (2mks)

……

……

8. The binomial name of housefly is MUSCA DOMESTICA.

(i) State **two** mistakes in the way the scientific name is written. (2mks)

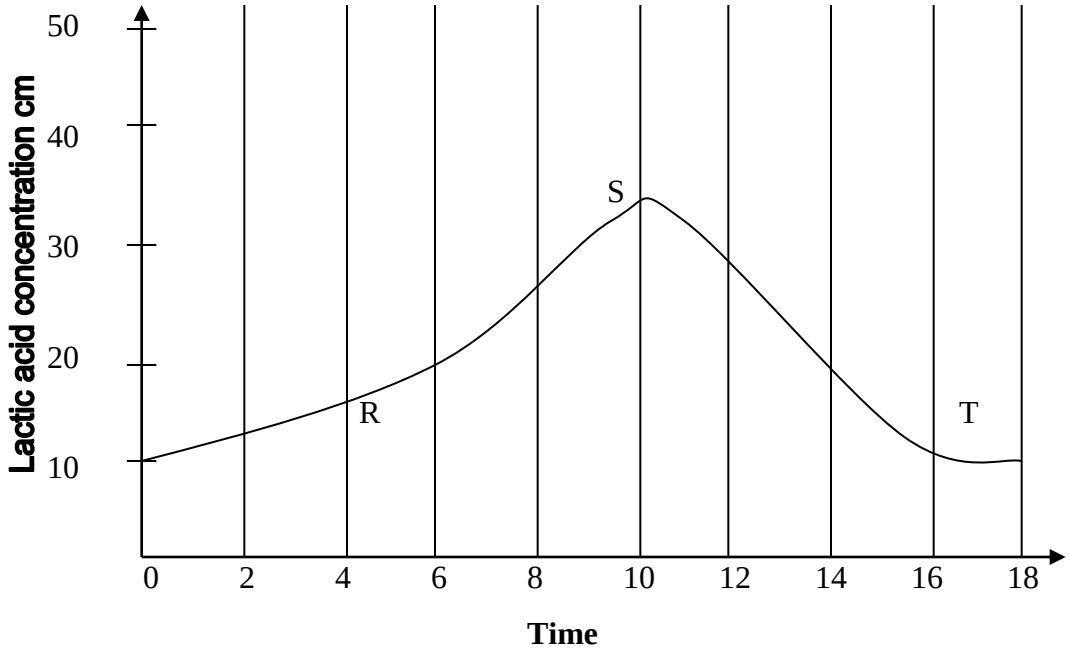
……

……

(ii) Re-write the name in correct manner following the rules of binomial nomenclature. (1mk)

……

9. The diagram below shows the general appearance of lactic acid in the blood of an athlete after an exercise. Study it carefully and answer the questions that follow:



(a) Name the physiological process represented by the above diagram. (1mk)

……

(b) Explain what happened in the body between points:

(i) R and S (1mk)

……

……

(ii) S and T (1mk)

……

……

10. State the use of each of the following apparatus:

(i) Bait trap (1mk)

……..

(ii) Specimen bottle (1mk)

……..

(iii) Pitfall trap (1mk)

……

11. (a) Define the term organic evolution. (1mk)

……

……

……

(b) Give **two** examples of vestigial structures. (2mks)

……

……

12. (a) Distinguish between epigeal and hypogeal germination. (1mk)

……

……

(b) Why is oxygen necessary in the germination of seeds? (2mks)

……

……

13. (a) Digestion in the stomach involves the gastric juice, which contains mucus as one of its components. State the role of mucus in the digestion process. (1mk)

……

……

(b) Give **two** adaptations of ileum to its functions. (2mks)

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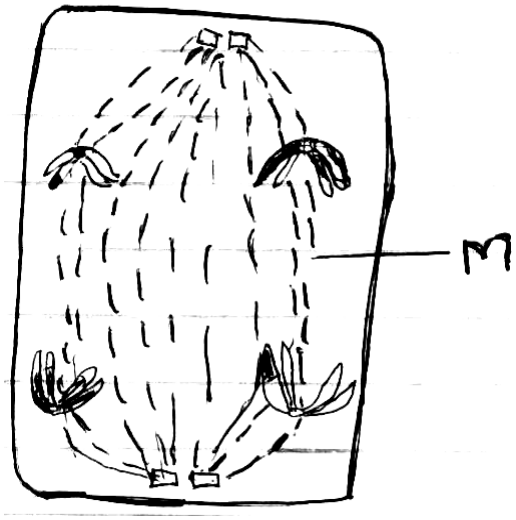
14. The diagram below represents a stage during cell division.



(a) (i) Identify the stage of cell division. (1mk)

……..

(ii) Give **two** reasons for your answer to (a) (i) above. (2mks)

……

……

(b) Name the structure labelled M. (1mk)

……

15. Explain why amoeba cannot burst when placed in hypertonic solution. (2mks)

……

……

……

16. (a) Name the organelle that is involved in each manufacture of Lipids. (1mk)

……

(b) State **three** functions of Golgi apparatus. (3mks)

……

……

……

17. Give the functions of the following parts of human eye:

(a) Lens (1mk)

……

(b) Ciliary body. (1mk)

……

(c) Cornea (1mk)

……

18. A shoot of seedling exposed to light on one side bends towards the source of light as it grows.

(a) Name the response exhibited by the shoot of the seedling. (1mk)

……

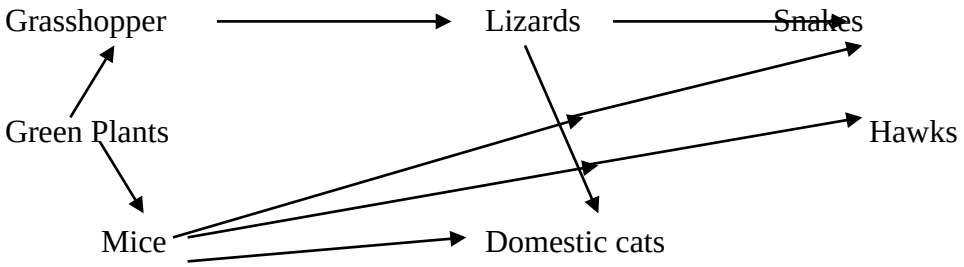
(b) Explain how the bending towards the source of light occurs. (3mks)

……

……

……

19. The chart below show s a feeding relationship in a certain eco-system.



(a) Construct **two** food chains ending with a tertiary consumer in each case. (2mks)

(b) Name **one** secondary consumers in the food web. (1mk)

……

20. State the functions of the following parts of a nephron.

(i) Loop of henle (1mk)

……

……

(ii) Distal convoluted tubule (1mk)

……

……

21. A flower was found to have the following characteristics:

- Inconspicuous petals
- Long feathery stigma
- Small, light pollen grains

(a) What is the likely agent of pollination of the flower? (1mk)

……

(b) What is the significance of the long feathery stigma in the flower? (1mk)

……

……

22. Explain how the following factors determine the daily energy requirement in humans.

(a) Age (1mk)

……

……

(b) Occupation (1mk)

……

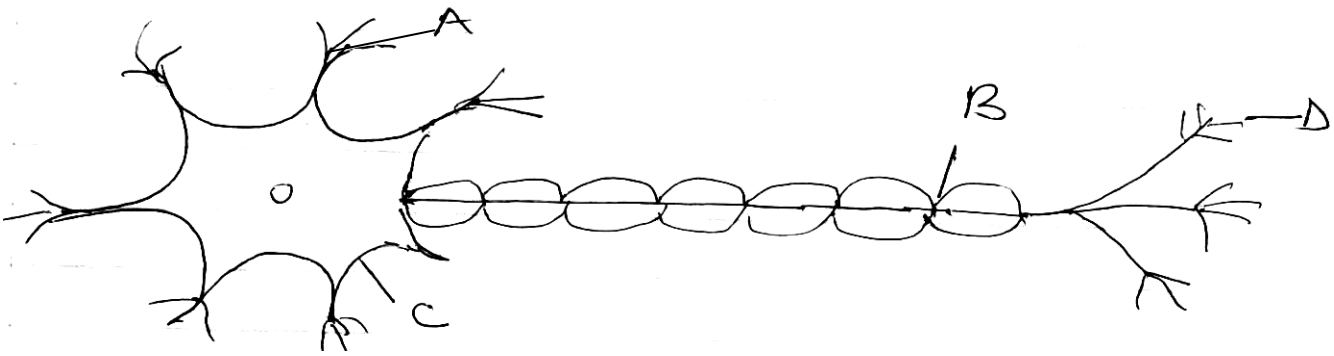
……

(c) Sex (1mk)

……

……

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



(a) Name the parts labelled:- (3mks)

A:……..

C:……..

D:……..

(b) State the function of part labelled B. (1mk)

……

……

24. Most terrestrial plants do not grow well in water-logged soils. Give a reason for this. (1mk)

……

25. State the mode of a sexual reproduction exhibited by the following organisms:

(i) Yeast (1mk)

……

(ii) Mushroom (1mk)

……

26. Give reasons for each of the following:

(a) Constant body temperature is maintained in mammals. (2mks)

……

……

(b) Low blood sugar level is harmful to the body. (1mk)

……

……

27. (a) Explain what is meant by a test-cross as used in genetics. (1mk)

……

……

(b) Determine the probability of a couple with blood group AB getting a child with blood group B. (Show your working).

28. Name the end products of the light stage of photosynthesis. (2mks)

……

……

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KCSE PREDICTOR 1

231/2
BIOLOGY
PAPER 2
TIME: 2 HOURS

1. (ii) What are the importance of tissue fluid?
(2mks)

……

……

……

(d) Name the blood vessel with the highest concentration of: (2mks)

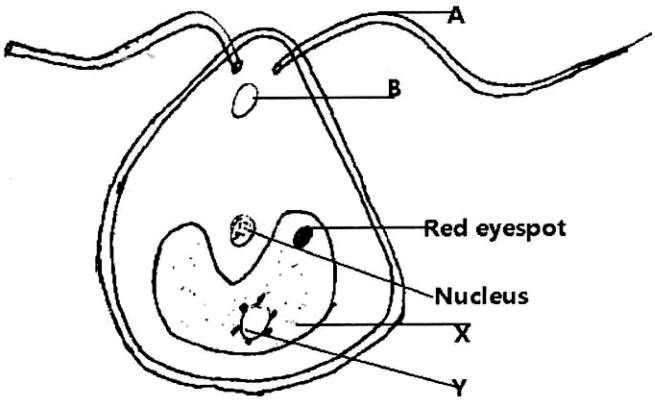
(i) Glucose

……

(ii) Carbon (iv) oxide

……..

3. Below is a diagram of an organism found in water. **Study** it and answer the following questions:



(a) **State** the kingdom in which the organism belongs. (1mk)

……

(b) **Name** the parts labeled:

B (1mk)

……

Y (1mk)

……

5

(c) State the functions of the following parts:

A (1mk)

……

……

X (1mk)

……

……

(d) Explain briefly why the organism is described as eukaryotic. (1mk)

……

……

(e) Give **two** other members that belong to the same kingdom with the above organism.

(2mks)

……

……

4. In an experiment, black mice were crossed and the offspring were black and brown. The gene for black colour is dominant over that of brown colour.
   Using letter B to represent the gene for black colour and b to represent the gene brown colour.
   (a) Work out the genotypes of the F1 generation. (4mks)

8

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

Temperature (^{0}C)	Rate of reaction in mg of products per unit time
5	0.2
10	0.5
15	0.8
20	1.1
25	1.5
30	2.1
35	3.0
40	3.7
45	3.4
50	2.8
55	2.1
60	1.1

   (a) On the grid provided, draw a graph of rate of reaction against temperature. (6mks)

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KCSE PREDICTOR 2

231/1
BIOLOGY
PAPER 1
TIME: 2 HOURS

1. (a) What is a teat pipette used for in Biology Laboratory Lesson? (1 mrk)

……
……..

(b) Give the name of a reagent that is used to test substances and at the same time used as a stain in the laboratory. (1mrk)

……
……..

2. A name of a certain garden plant is Duranta Repens

i. What is the meaning of repens? (1mrk)

……
……..

ii. Identify one mistake shown by the written name. (1 mrk)

……
……..

iii. Distinguish between a *genus* and a *Species* as Taxa used during classification of the Organism. (2mrks)

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……...……
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3. A form one student observing Onion epidermal cells under the low power objective counted 5 cells on a field of view measuring 5mm

(a) Estimate the size of one cell. (1 mrk)

(b) If the eye piece magnification used was × 10 and that of the objective lens was × 10. What was the magnification of the microscope? Show your working. (2 mrks)

(c) Estimate by approximation the Number of cells that would be observed if the objective lens magnification was changed to x 40 (1mrk)

……
……..

(d) What is the role of centriole in animal cells? (1mrk)

……

……..……

……..

4. Explain the following statements:

i. The action of ptyalin stops at the stomach. (1mrk)

……

……..……

……..

ii. The small intestines contain Villi. (1mrk)

……

……..……

……..

iii. High temperatures stop enzyme action. (1 mrk)

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……..……

……..……

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iv. Lack of magnesium leads to yellowing of leaves in plants. (2 mrks)

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……..……

……..

v. The thyroid glands swell, in some individuals (1 mrk)

……

……..

5. Name one cofactor and one co-enzyme required for a blood clotting process to be normal.

a) Co-factor - …… (1mrk)

b) co-enzyme - ……. (1mrk)

6. What is counter current Mechanism in a Tilapia fish? (2mrks)

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7. State three adaptations of the Red blood cell to its function. (3 mrks)

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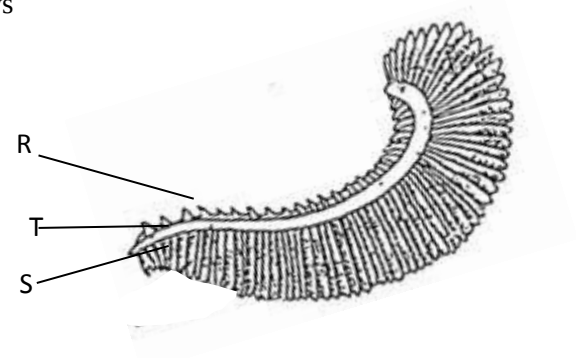
8. The diagram below represents an organ from a finned bony fish. Study it and answer the question that follows



S

i. Identify the organ. (1mrk)

……

……..

ii. State three adaptations of the part labeled **S** to its functions. (3 mrks)

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9. (a) State the importance of pleural fluid in the lung of a mammal. (2mrks)

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(b) What function does the cilia of the trachea play during gaseous exchange in a mammal? (1 mrk)

……

……..……

(c) What significance does mucus offer a mammal during gaseous exchange? (1 mrk)

……

…….

10. The equation below represents a process that take place in plants and animals

$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$

(a) Name the process. (1 mrk)

……

……..……

(b) State two requirements necessary for the process (a) above to process at maximum rate. (2 mrks)

……

……..……

……..……

……..……

(a) What is the role of Cristae in the process above? (1 mrk)

……
……..……

(b) In which part of the cell does glycolysis and Krebs cycle occur? (2 mrks)

Gycolysis -

.....

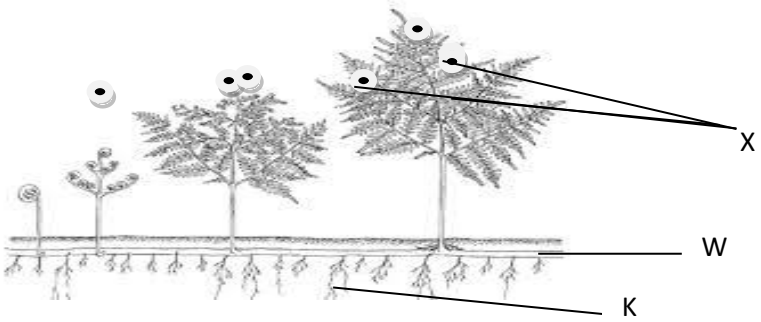
Krebs cycle -

……

11. State the role of each of the following components of the skin. (2 mrks)

Sebum……
……..……
……..……Melanin……
……..……
……..……

Study the diagram below and answer the questions that follows



i. Name parts. (2mrks)

W ……..

K ……..

ii. Name the division of Kingdom plantae the diagram represent. (1 mrk)

……
……

Iii. Give the identity of **X** and state its function (2 mks)

Identify of X -

……
……..

Function -

……

……..

12. State three Biotic factors in an ecosystem. (3 mks)

……

……..……

……..……

……..……

13. Name two specific bacteria involved in denitrification process in a Nitrogen cycle. (2 mrks)

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……..……

……..……

14. Define:

(a) Biosphere (1 mrk)

……

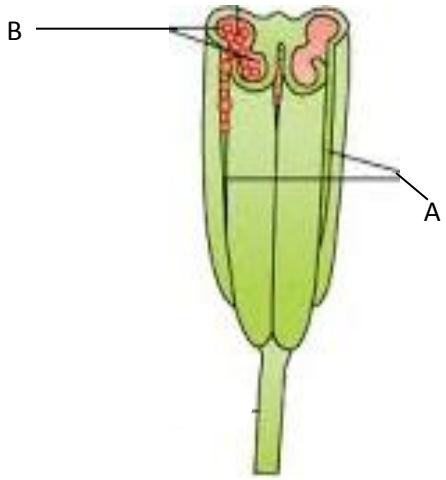
……..……

(b) Ecological Niche (1 mrk)

……

……..……

15. The diagram below represents a male reproductive transverse section structure in plant



i. Name structures (2mrks)

A - ……..

B- ……..

ii. Name the type of cell division taking place in structure A (1 mrk)

……

……..

iii. State Two significance of the named type of cell division in (ii) above in Sexual Reproduction. (2mrks)

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……..……
……
……..……
……..……

16. State Three applications of Genetic in our day to day life. (3 mrks)

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……..……
……..……
……..……

17. Give the full Name of the abbreviation. DNA (1 mrk)

……
……..……

18. State the Three theories advanced to support the origin of life. (3 mrks)

……
……..……
……..……
……..……

19. Name three types of Fossils (3 mrks)

……
……..……
……..……
……..……

20. Name a chemical substance required for transmission of impulse in a synapse. (1 mrk)

……
……..……

21. State the functions of the following structures in neuron.

i. Node of Ranvier (1 mrk)

.....

.....

ii. Myelin sheath (1 mrk)

……

……..

22. Name the chemical substances involved in thickening of the following support tissues in plants

i. ……

(1mrk)

ii. ……

(1mrk)

23. State the Number of the following vertebra in a mammal

i. Cervical Vertebrae (1mrk)

……

…….

ii. Lumbar Vertebrae (1mrk)

……

…….

24. State three functions of Obturator Foramen in the pelvic girdle in a mammal. (3mrks)

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……..……

……...……

……..……

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……..……

……...……

25. What is a

(i) tendon? (1mrk)

……

…….

(ii) ligament? (1 mrk)

KCSE PREDICTOR 2

231/2
BIOLOGY
PAPER 2

1. A true-breeding purple maize variety was cross-pollinated with true-breeding yellow maize variety. The offspring produced all purple fruits.
The plants grown from these F_1 grains were interbred among each other.
A typical cob of F_2 generation is shown bellow:
The yellow fruits are shaded while the purple ones are un-shaded.

a) i) In terms of flowers only, state why it is easier to work out genetic crossing using maize
(1mark)

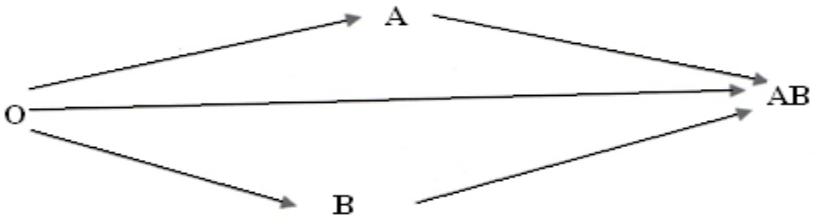
ii) Count separately the yellow and purple grains and therefore find the ratios of purple grains to yellow grains.
(1mark)

b) Using appropriate symbol, work out a genetic cross for F_2 generation.
(3marks)

From the above information, give the dominant gene.
(1mark)

c) State **two** practical applications of genetics in identity determination.
(2mark)

2. The flow chart below shows a blood transfusion pathway



a) What **three** conclusions can you draw from the flow chart?
(3marks)

b) State **two** precautions that must be observed during blood transfusion.
(2marks)

c) Explain how blood clot is formed once blood vessel is injured.
(3marks)

3. The data shown below was taken from Savannah grassland habitat. Examine it carefully and then answer the questions that follow:

Organism	Population
Grasses	1000
Caterpillars	500
Squirrels	300
Frogs	200
Gazelles	300
Elephants	100
Snakes	50
Hunting dogs	40
Vultures	40
Lions	40
Hawks	10

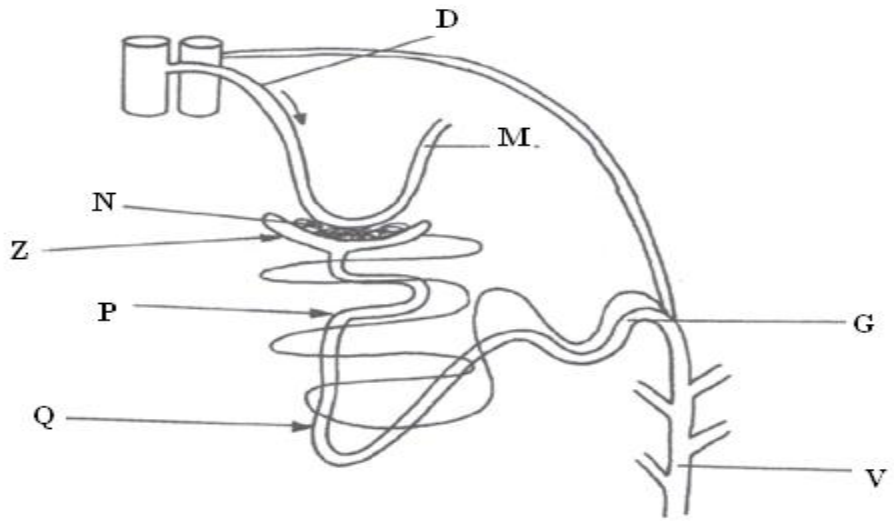
a) Draw **three** food chains.
(3marks)

b) Draw a pyramid of numbers for a food chain with four trophic levels and indicate the trophic levels at which each member feeds.
(2marks)

c) State the effect of removing the hunting dogs.
(1mark)

d) Why is it advisable to feed 100kg of grain to man instead of using it to fatten steers then supply beef to human population? (2marks)

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



a) Name the structure represented by the diagram.
(1mark)

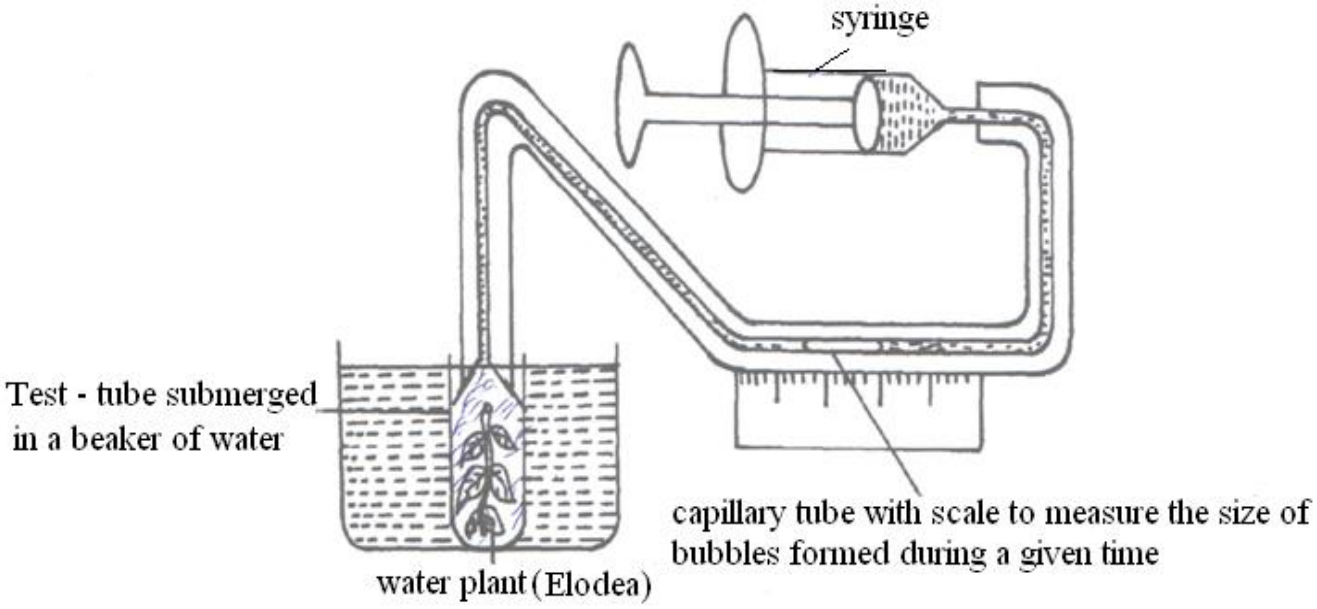
b) i) Name the parts labelled **D** and **M**
(2marks

ii) Name the hormones whose sites of action are:
(2 mark)

a) **Q**……..

d) The contents of part **V** were boiled with Benedict's solution and an orange precipitate was formed. Account for the results.
(2marks)

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



a) State the likely aim of the set up.
(1mark)

b) State the role of syringe in the set-up above.
(1mark)

c) i) Name gas **X.**
(1mark)

ii) Write an equation to show how gas **X** was formed in the set-up.
(1mark)

d) State **three** factors that increase the rate of enzyme activity.
(3mark)

e) Give a reason why the test tube is immersed in a beaker of water.
(1mark)

SECTION B-(40 MARKS)

Answer question 6(compulsory) and either question 7 or 8 in the spaces provided after question 8

6. In an investigation, two persons **A** and **B** drunk the same amount of glucose solution. Their blood sugar levels were determined immediately and thereafter at intervals of one hour for the next six hours. The results were as shown in the following table:-

Time (hrs)	**Blood glucose (Mg/100ml)**	
	Person A	**Person B**

0	90	120
1	220	360
2	160	370
3	100	380
4	90	240
5	90	200
6	90	160

a) Draw a graph of blood sugar levels of persons **A and B** against time on the same axis.
(7marks)

b) Explain each of the following observation:-

i) Blood sugar level increased in person **A** between 0 and 1hr.
(2mark)

ii) The blood sugar level dropped in person **A** between 1 and 4 hours.
(2marks)

c) From the graph, what is the normal blood glucose sugar level for human beings?
(1mark)

d) Suggest a reason for the high sugar level in person **B.**
(2marks)

e) How can high blood sugar level in person **B** controlled?
(1mark)

f) What is the biological significance of maintaining a relatively constant sugar level in a Human being?

(3marks)

g) Account for the decrease in the blood glucose level of person **B** after 4hours.
(2marks)

7. a) How is the structure of mammalian gaseous exchange system adapted to its functions.
(10marks)

b) Describe the mechanism of opening and closing of the stomata using the photosynthetic theory.
(10marks)

8. a) What is meant by the term natural selection.
(2marks)

b) Describe how natural selection brings about the adaptations of a species to its environment.
(8marks)

c) Distinguish between convergent and divergent evolution
(2marks)

d) Discuss four evidences to show that evolution has taken place.
(8marks)

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KCSE PREDICTOR 3

231/1
BIOLOGY
PAPER 1

1. Name the causative agent of the following diseases in man
(2mks)

(a) candidansis

.....
.....

(b) Syphilis

.....
.....

2. A student observed an organelle using an electron microscope at magnification of X600.Its diameter has 2 millimeters. Calculate the actual diameter of the organelle in micrometers. (2mks)

3. State two ways by which lactic acid formed in the muscles of an athlete is removed
(2mks)

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.....
.....
.....

4. (a) Name the blood vessels that connect arteries to veins
(1mk)

.....
.....

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

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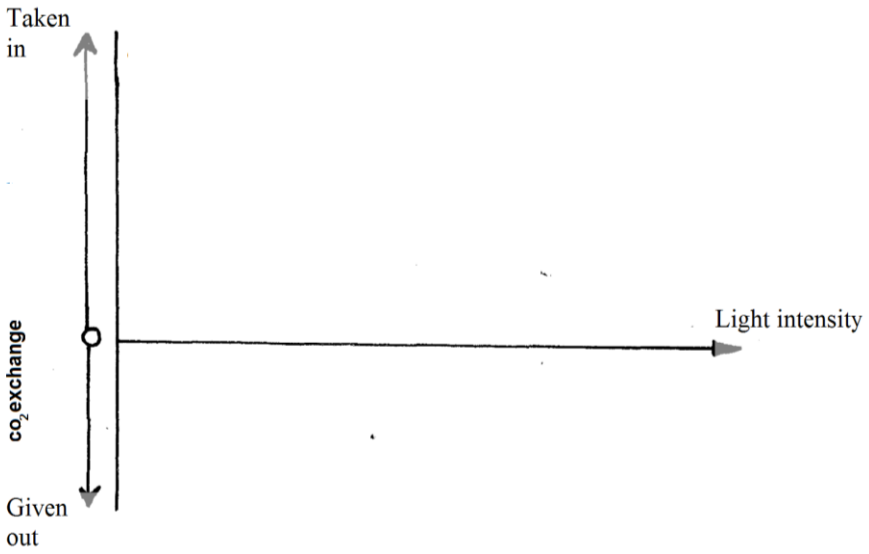
5. The figure below shows the effect of light intensity on the exchange of carbon (IV) oxide between a plant leaf and the atmospheric air.



(a) What name is given to point X?
(1mk)

.....
.....

.....

.....

(b) Name two physiological processes in which carbon (IV) oxide is involved at point X

(2mks)

.....

.....

.....

.....

6. State where each of the following is found in the human skeleton

(2mks)

(a) Olecranan

.....

.....

(b) Glenoid cavity

.....

.....

7. Explain why people living at high altitude have higher concentration of red blood cells and haemoglobin than people who live at lower altitude

(2mks)

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8. State the survival valve of ;

(a) Negative phototaxis in fly larvae

(2mks)

.....

.....

(b) Thigmotropism

(1mk)

.....

.....

9. Using the symbol 'B' for black for allele in mice and 'D' for grey coloured for allele, write down the genotype of a mouse that is:

(a) Heterozygous for colour

.....

.....

.....

.....

(b) Homozygous recessive

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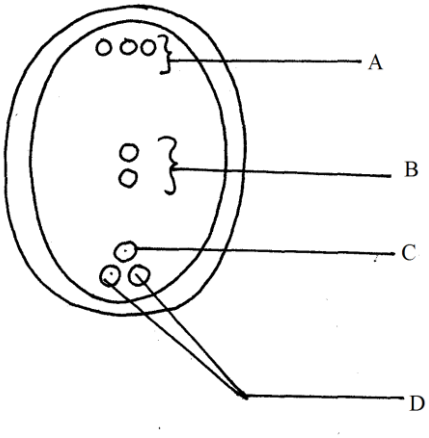
10. The diagram below shows a mature embryo sac of a flowering plant



(a) Name the parts labelled

(3mks)

(i) A. .....

(ii) D. .....

(b) What is the function of structures labelled B?

(1mk)

.....

.....

11. (a) State two ways in which the human body is naturally protected against harmful bacteria

(2mks)

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.....

(b) State one way in which the composition of blood in the pulmonary artery and that in pulmonary vein

(1mk)

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12. Describe how the following parts of the mammalian ear are adapted to their functions

(a) Pinna

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(b) Tympanic membrane

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13. State the necessity of support in plants

(3mks)

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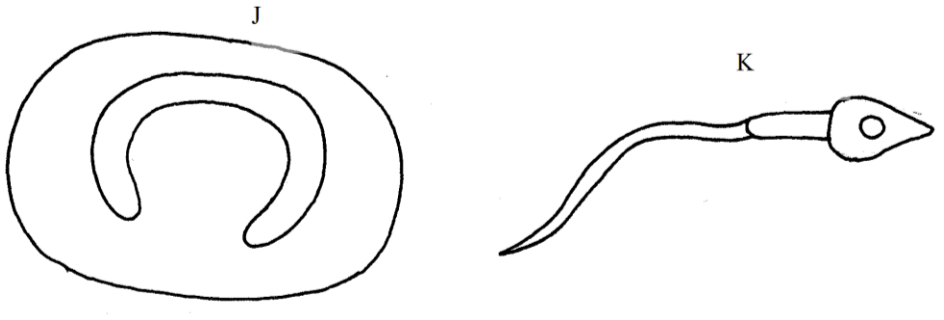
14. Below are diagrams of specialised cells in mammals



(a) Identify each of the cells

(2mks)

(i) J. .....

(ii) K .....

(b) Explain how cell specialization has enabled cell K to be effective in its functions (2mks)

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15. (a) State one similarity between diffusion and osmosis (1mk)

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(b) State two roles of active transport in higher plants (2mks)

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16. (a) Alight microscope is an important apparatus in a laboratory. State two precautions which should be taken when storing (2mks)

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(b) State functions of the following parts on a microscope (2mks)

(i) Fine adjustment knob

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(ii) Condenser

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17. (a) Name the hormone responsible for moulting in insect

(1mk)

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(b) Where is the hormone named in (a) above secreted in insects

(1mk)

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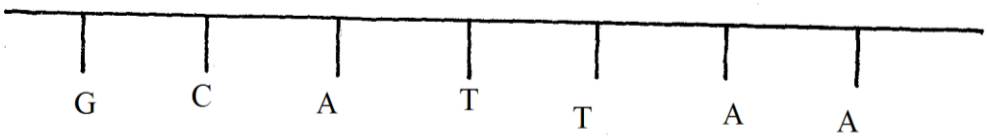
18. The figure below represents a section of a certain nucleic acid



(a) (i) Identify the type of nucleic acid from which this strand was obtained.

(1mk)

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(ii) Give a reason for your answer in a (i) above

(1mk)

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(b) State two structural differences between the RNA and DNA

(2mks)

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19. What assumptions are made while using capture and recapture method in estimating population

(2mks)

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20. A count for osmoregulatory changes that would take place in a marine amoeba if it was transfered to a fresh water environment

(3mks)

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21. (a) What is metamorphosis

(1mk)

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(b) What is the biological importance of the larval stage during metamorphosis

(2mks)

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22. A solution of sugar cane was boiled with dilute hydrochloric acid. Sodium hydrogen carbonate was added and then heated with Benedicts' solution .An orange precipitate was formed

(a) Why was the solution boiled with dilute hydrochloric acid

(2mks)

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(b) To which class of carbohydrates does sugar cane belong?

(1mk)

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23. (a) What is organic evolution

(1mk)

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(b) State two ways through which fossils serve as evidence for organic evolution

(2mks)

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24. (a) State the advantage of desert animals excreting their nitrogenous waste in form of urea and

not ammonia

(3mks)

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(b) State two modifications on the kidney nepron of desert mammals

(2mks)

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25. Consider the characteristics of the following organisms: bee, tick, lobster, cockroach, millipede, moth and mosquito.

(a) Give the name of the phylum to which all these organisms belong.

(1mk)

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.....

(b) State three distinctive features of members of the phylum named in (a) above

(3mks)

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26. Explain how the following lower the rate of transpiration in plants

(2mks)

(a) Hairs on the leaf

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(b) Folding of the leaf

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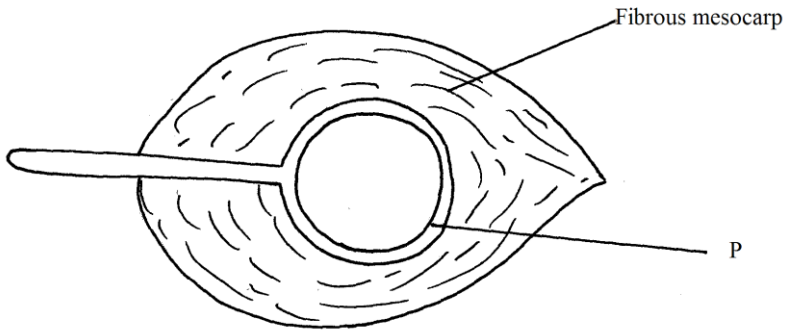
27. The diagram below represents a longitudinal section of a fruit



(a) Name structures labelled P

(1mk)

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(b) Describe two adaptations of the fruit for its mode of dispersal

(3mks)

(i) Mode of dispersal

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(ii) Adaptation

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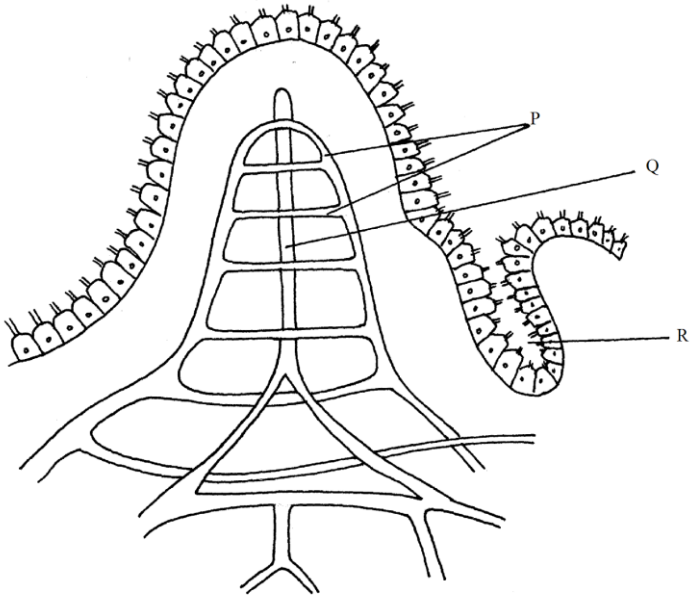
KCSE PREDICTOR 3

231/2
BIOLOGY
PAPER 2

SECTION A (40 MARKS)

Answer all the questions in the spaces provided.

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



(a) Identify the structure and state its functions

(2mks)

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(b) (i) Name the parts labelled P and Q

(2mks)

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(ii) State the role of the part labelled R

(1mk)

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(c) How is the structure stated in (a) above adapted to its function

(2mks)

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(d) What is the role of enzyme enterokinase in digestion?

(1mk)

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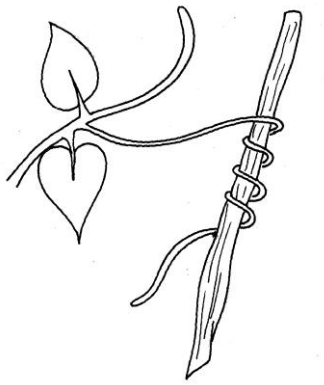
2. (a) The diagram below illustrates a response exhibited by a certain plant tendril. Study and

answer the questions that follow.



(i) Identify the type of response exhibited above.

(1mk)

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(ii) Explain how the response in (a) above occurs

(3mks)

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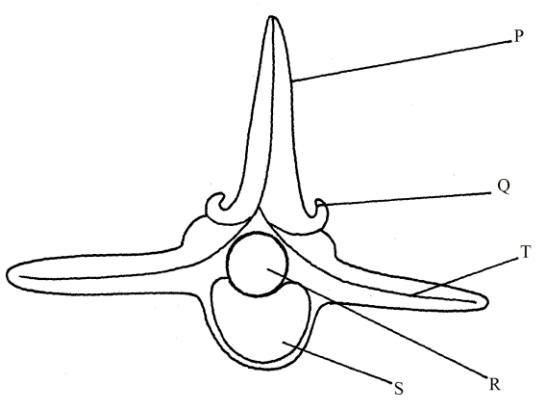
(b) The diagram below represents the anterior view of a certain mammalian vertebra



(i) With a reason, identify the type of vertebra shown above

(1mk)

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.....

(ii) State the role of the parts labelled

R

(1mk)

.....

.....

.....

Q

(1mk)

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3. (a) Define the following terms as applied in genetics

(i) Genetic engineering

(1mk)

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(ii) Polyploidy

(1mk)

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(b) When pure breeding red-flowered Mirabilis jalapa plant was crossed with a pure breeding white flowered plant, the resulting plants produced pink flowers only. Using letter R to represent the gene for red flowers, and W for white flowers;

(i) Work out the genotypes of the F2 generation

(4mks)

(ii) State the phenotypic ration of the F2 plants

(1mk)

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.....

(iii) Account for the occurrence of the pink flowered plants in the F1 generation

(1mk)

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4. (a) Name the type of circulatory system found in members of the class insecta

(1mk)

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.....

(b) Name the blood vessels that transport blood from:

(i) Small intestines to the liver

(1mk)

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(ii) Lungs to the heart

(1mk)

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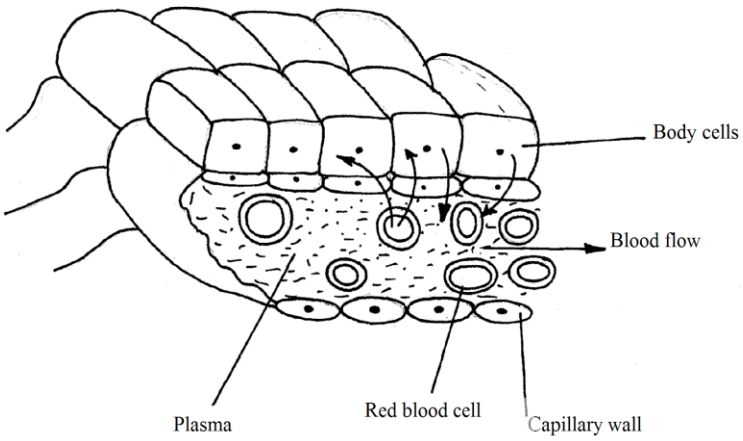
(c) The diagram below shows gaseous exchange in tissues



(i) Name the gas that diffuses

(I) To the body cells

(1mk)

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(II) From the body cells

(1mk)

.....

.....

(ii) Which compound dissociates to release the gas named in (a)(i) above

(1mk)

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(d) What is tissue fluid

(2mks)

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5. (a) Explain how the following abiotic factors affect plants

(i) Wind

(2mks)

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(ii) Humidity

(2mks)

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(b) Explain how heavy metals in industrial effluences may accumulate in the bodies of humans to toxic levels

(2mks)

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(c) Only a small amount of food energy in herbivores is passed onto secondary consumers. Explain

(2mks)

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SECTION B (40 MARKS)

Answer question 6(compulsory) and either question 7 or 8

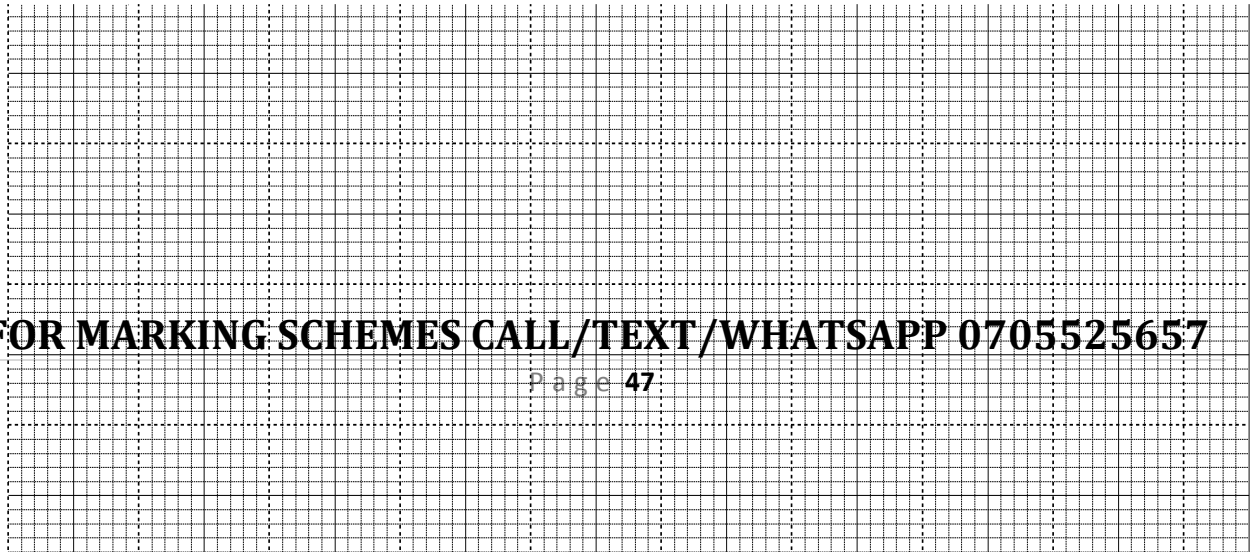
6. The mean dry weight (mg) of germinating wheat grains was worked out for a whole grain(total dry weight),endosperm and embryo.

The means were determined at two days interval for fourteen days. The results are as tabulated below.

Time(days)	Dry weight(mg)		
	Endosperm	Embryo	Total
0	47	5	52
2	44	5	49
4	39	8	47
6	22	17	39
8	10	28	38
10	4	35	39
12	2	42	44
14	2	44	46

(a) Using the same axis ,draw graphs for dry weight of endosperm, embryo and total against time

(8mks)



(b) What was the average dry weight of embryo on day II?

(1mk)

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(c) Account for the shape of the curve for

(i) Embryo from day 2 to day 12

(2mks)

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(ii) Total dry weight (gm) from day 0 to day 14

(2mks)

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(d) After how long was the dry weight of

(i) Endosperm 30g?

(1mk)

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(ii) Embryo 35g ?

(1mk)

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(e) (i) Explain the role of water in seed germination

(3mks)

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(ii) Other than water, what two environmental factors are required for seed germination?

(2mks)

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7. (a) Describe how natural selection brings about the adaptation of a species to its environment

(10mks)

(b) Discuss the economic importance of bacteria

(10mks)

8. (a) Describe the methods of excretion in plants

(5mks)

(b) Explain the role of hormones in the human female menstrual cycle

(15mks)

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KCSE PREDICTOR 4

231/1
BIOLOGY
PAPER 1

Answer ALL questions in the spaces in this paper

1. Name two components of blood that are not present in glomerular filtrate. (2mks)

   i).....

   .....

   ii).....

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2. State the difference between photosynthesis and chemosynthesis. (2mks)

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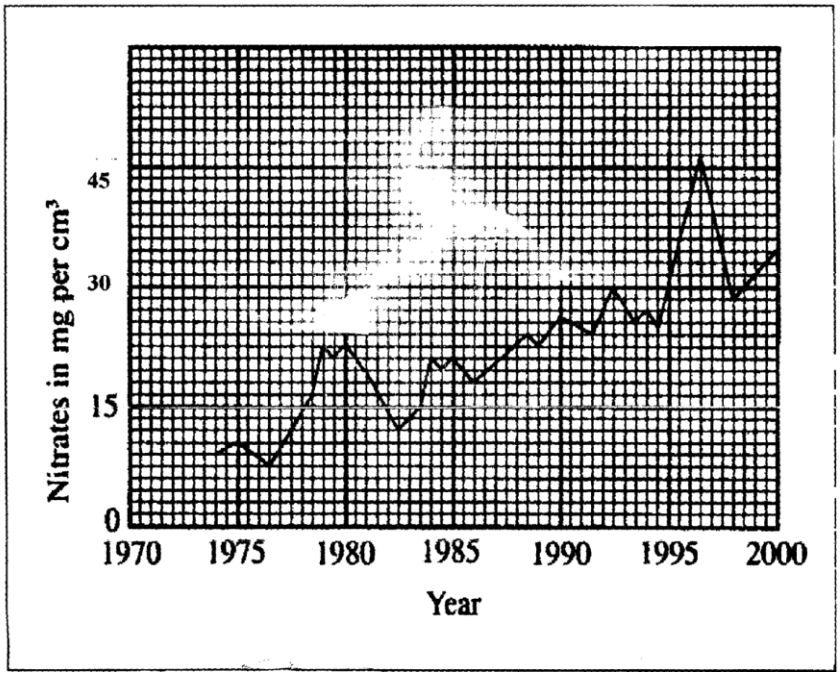
3. Use the graph below to answer the question that follow.



a) Calculate the difference in nitrate concentration between the highest and lowest. (1mk)

b) How can increase in nitrate concentration in the river lead to death of fish? (2mks)

c) Suggest two possible sources of nitrate that lead to the pollution in river.

4. a) What is meant by the term binomial nomenclature. (1mk)

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b) A dog is called Canis familiairis. Name the taxonomic unit represented by canis. (1mk)

5. a) State the phylum where all members have open circulatory system. (1mk)

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b) Explain the advantages of closed circulatory system over open circulatory system.

(2mks)

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6. The following is an equation representing a type of respiration

$C_6H_{12}O_6 \longrightarrow 2C_3H_6O_3 + \text{Energy}$

a) Identify the type of respiration.
(1mk)

.....

.....

b) Suggest one industrial application of the process name in (a) above.
(1mk)

.....

.....

7. State two features of leaves which enable a plant to reduce the loss of water.
i)

.....
..

ii)

.....
..

8. Name the cell organelles responsible for :
i) Protein synthesis

.....

.....

ii) Destroying worn – out organells and cells

.....

.....

9. a) Lietego school biology student used a microscope with x40 objective lens and x5 eye piece lens which had 2mm radius. Calculate the area of the field of view in micrometers.

(2mks)

b) What is the average size of the cell in micrometers
(2mks)

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10. Give two functions of the exoskeleton in arthropods.
(2mks)

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11. a) Name the site of gaseous exchange in mammals.
(1mk)

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b) State one characteristics of the site named in (a) above.
(1mk)

i) .....

ii) .....

iii) .....

12. The chemical equation below represents a physiological process that takes in living organisms

Name $C_6H_{12}O_6 + C_6H_{12}O_6 \xrightarrow{\text{Q}} C_{12}H_{22}O_{11} +$

i) the process R

(2mks)

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.....

ii) substance Q

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13. a) Distinguish between homologous and analogous structures in evolution

(2mks)

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b) Give an example of a vestigial structure in human beings.

(1mk)

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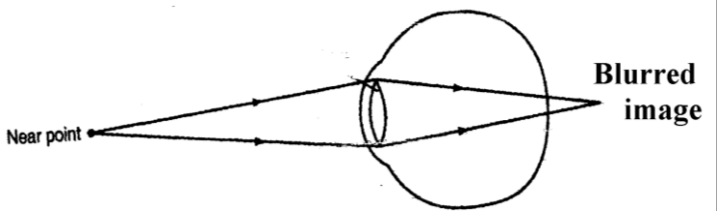
14. The illustration below represents an eye defect.



a) Name the eye defect

(1mk)

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.....

b) How can the defect be corrected?
(1mk)

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15. Name two classes of phylum arthropoda with cephalothor.

i) .....

ii) .....

iii) .....

16. State three roles of placenta during pregnancy.
(3mks)

i) .....

ii) .....

iii) .....

17. Name the part of an ovule that develops into each of the following parts of a seed after fertilization.
(2mks)

i) **Testa**

.....

ii) **Endosperm**

.....

18. Explain how the following tissues are adapted to provide mechanical support in plants

a) Collenchyma
(2mks)

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b) Sclerenchyma

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

a) What change was expected in strips A and B?
(2mks)

A

.....

B.....

b) Account for the change in strip A.
(2mks)

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20. When shoots of young plants were exposed to unidirectional source of light, they bend towards light.

a) Name the type of response exhibited by the young shoots.
(1mk)

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b) Explain the cause of the observation above.
(3mks)

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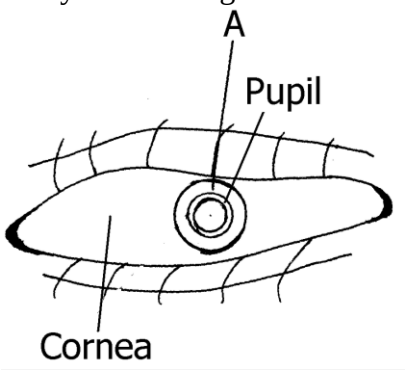
21. Study the drawing and answer the questions below.



a) Name the part labelled.A
(1mk)

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.....

b) Describe the changes that occur in the structure A in dim light.
(2mks)

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c) What is mean by the term accommodation with reference to the eye?
(1mk)

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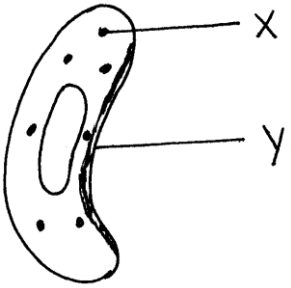
22. State any three factors that can influence reduction in the population of herbivores in a national part.

i) .....

ii) .....

iii) .....

23. The diagram below represents a cell



a) Name the parts labelled

X .....

Y .....

b) State the role of the cell (1mk)

.....

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.....

.....

25. Name the hormone responsible for: (2mks)

i) osmoregulation

.....

ii) reabsorption of mineral salts.

.....

26. A man of blood group A (heterozygous) marries a woman of blood group O. What are the possible blood groups of their children?
(2mks)

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27. The diagram below represents a bone obtained from the hind limb of a goat.

a) Identify the bone
(1mk)

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.....

b) Name the type of joint formed at the part labelled T. (1mk)

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28. During germination and early growth the dry weight of endosperm decreases while that of the embryo increases. Explain.
(2mks)

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29. State one structural different between the sensory neurone and motor neurone.
(1mk)

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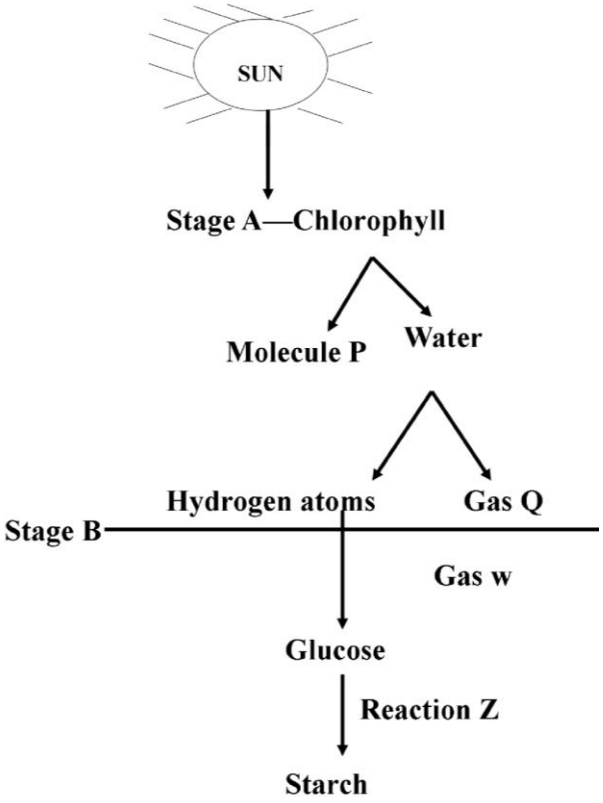
30. Below is a diagrammatic summary of the main biochemical events in photosynthesis. Study it carefully and answer the questions that follow.



a) Suggest the identify of molecule P.
(1mk)

.....

.....

b) Name the gases represented by the letters

Q
.....

W
.....

c) Name the specific site for the reactions in stage B
.....

d) Name reaction Z.
(1mk)

Z .....

i) Give two examples of gene mutation traits in human beings .
(2mks)

i) .....

ii) .....

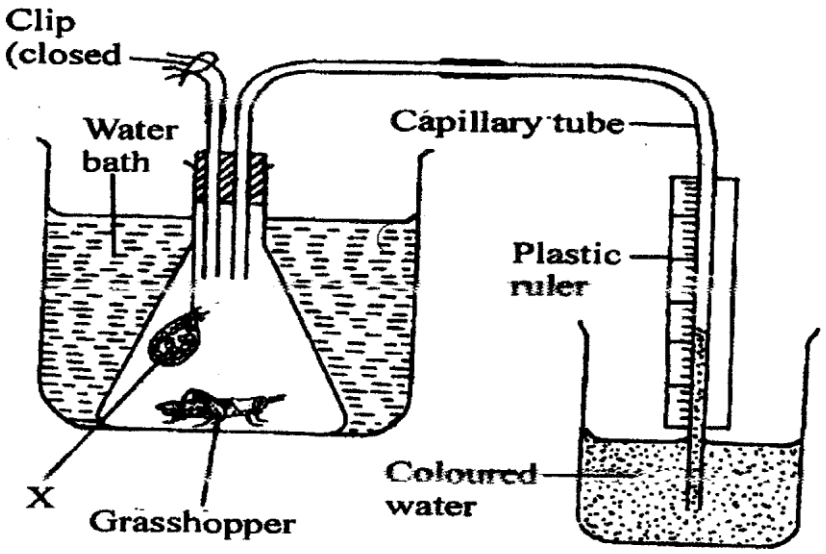
KCSE PREDICTOR 4

231/2
BIOLOGY
PAPER 2

SECTION A(40 MARKS)

Answer ALL questions in this section in the spaces provided.

1. The diagram below illustrates and experiment to determine the rate of respiration in a small insect.



a) Name the chemical compound labelled X and state its function. (2mks)

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b) Why is it necessary to place the flask in a water bath. (3mks)

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c) What changes would you expect to observe in the level of coloured water in the capillary tube after the experiment has run for five minutes.
(1mk)

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d) Explain the changes you have started in (c) above.
(3mks)

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e) State how you can set up a control experiment .
(1mk)

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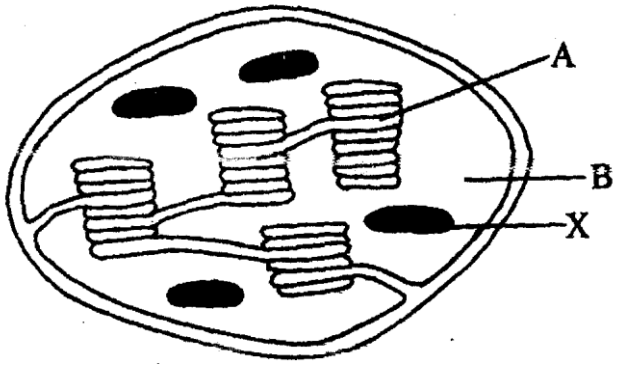
2. The diagram below represents a plant cell organelle



a) Name the organelle.
(1mk)

.....

.....

b) In which of the labelled parts does carbon (IV) Oxide fixation occur?
(1mk)

c) Name the parts labelled A and B and state how each is adapted to its functions.
(4mks)

A.....

.....

.....

B.....

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.....

d) Explain what would have happened to the structures labelled X had the plant been kept in darkness for 48 hours.
(2mks)

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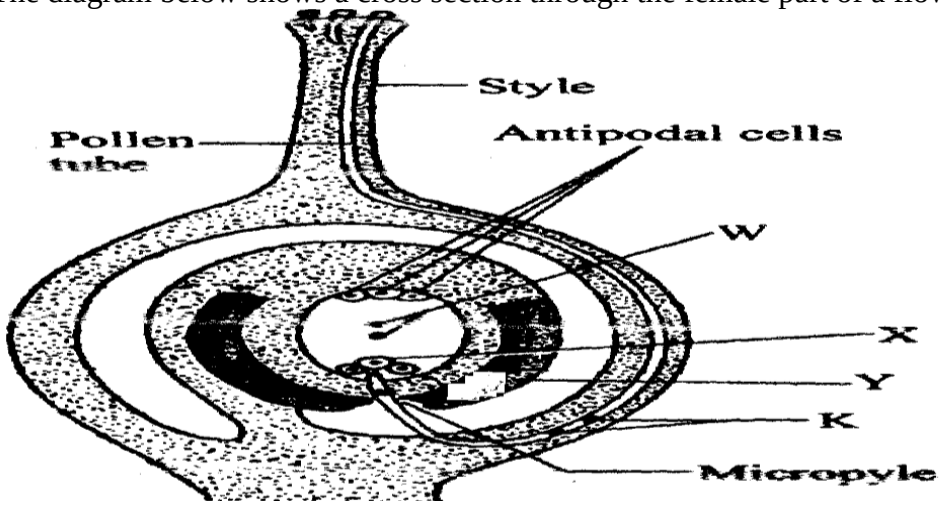
3. The diagram below shows a cross section through the female part of a flower.



a) Name the structures labelled W,X, and Y.
(3mks)

. X .....

Y .....

Z .....

b) State two functions of the pollen tube.

(2mks)

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c) What happens to antipodal cells after fertilization.

(1mk)

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d) Name the structure labelled K and state their role.

(2mks)

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4. a) Name any three defects of the circulatory system in humans.

(3mks)

.....

.....

b) How are leucocytes adapted to their function.

(2mks)

.....

.....

c) Name the blood vessel with the highest ionic extraction of

i) Glucose

(1mk)

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ii) Carbon (IV) Oxide.

(1mk)

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d) What is the importance of tissue fluid.

(1mk)

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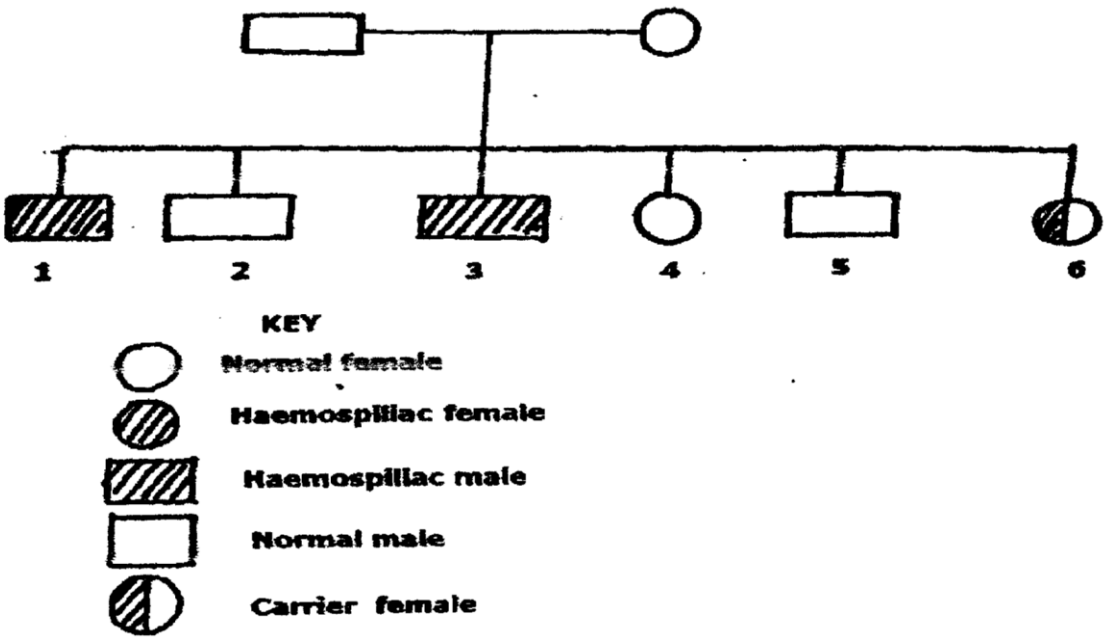
5. Below is a pedigree chart showing the incidences of colour blindness trait linked to the X – chromosome transmitted through a recessive gene. Study the diagram and answer the following questions.



a) Gives the genotypes of person 1 and 2

1 .....

2 .....

b) Explain why there are no male carriers for this conduction. (1mk)

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.....

6. Explain why there are more colour blind male than female in a population. (3mks)

SECTION B(40 MARKS)

Answer questions 6 (compulsory)and either questions 7 or 8 in the spaces provided questions 8

7. The glucose level in mg per $100cm^3$ of blood was determined in two person Y and Z. Both had stayed for six hours without taking food. They were fed on equal amount of glucose at the start of the experiment .The amount of glucose in their blood was determined at intervals .The results are shown in the table below.

Times in minutes	Glucose level in blood in mg /$100cm^3$	
	Y	Z
0	85	78
20	105	110
30	105	110
45	130	170
60	100	195
80	93	190
100	90	140
120	90	130
140	88	120

a) On the grid provided, plot graphs of glucose levels in blood against time on the same axes.

(7mks)

b) What was the concentration of glucose in the blood of Y and Z at the 50th minute?

(2mks)

Y .....

Z .....

c) Account for the level of glucose in present Y

i) During the first 45 minutes.

(2mks)

ii) After 45th minute to the end.

(4mks)

d) Account for the decrease in glucose level person Z after 60 minutes.

(2mks)

e) Low blood sugar level in harmful to the body .Explain.

(3mks)

7. a) What assumption are made when using the captured recapture method in estimating

population of animals. (5mks)

b) Describe how you would use the capture – recapture method to estimate the population of fish in the school pond.

(15mks)

8. Describe the structure and function of the various parts of the mammalian brain.

(20mks)

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KCSE PREDICTOR 5

231/1
BIOLOGY
PAPER 1

1. ***Explain*** the following terms.

a) Taxonomy

(1mrk)

……

……

……

…

b) Species

(1mrk)

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…

2. State ***three*** features used in classifying arthropods into classes.

(3mrks)

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…

3. a) ***Name*** the substance that accumulates in muscles when respiration occurs with insufficient

Oxygen.

(1mrk)

……

……

b) Give the ***three*** end products of anaerobic respiration in plants.

(3mrks)

……

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4. a) State ***three*** characteristics of a wind pollinated flower. (3mrks)

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…

b) ***Explain*** why sexual reproduction is important to organisms.

(1mrk)

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…

5. ***State*** the functions of the following organelles.

a).Lysosomes

(1mrk)

……

……

b).Golgi apparatus

(1mrk)

……

……

6. What is the role of vascular bundles in plant nutrition?

(3mrks)

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7. Haemophilia is a genetic disorder which is transmitted through a recessive gene linked to the X chromosome. Using ***H*** to represent the normal gene and ***h*** for haemophilia, work out the genotypic ratio of the offspring of a marriage between a woman who is carrier for haemophilia gene and a normal man.

(4mrks)

8. a) In what form does energy enter the earth's ecosystem? (1mrk)

……

……

b) What is the main source of energy in an ecosystem

(1mrk)

……

……

c) In what form does energy transferred from one trophic level to another? (1mrk)

……

……

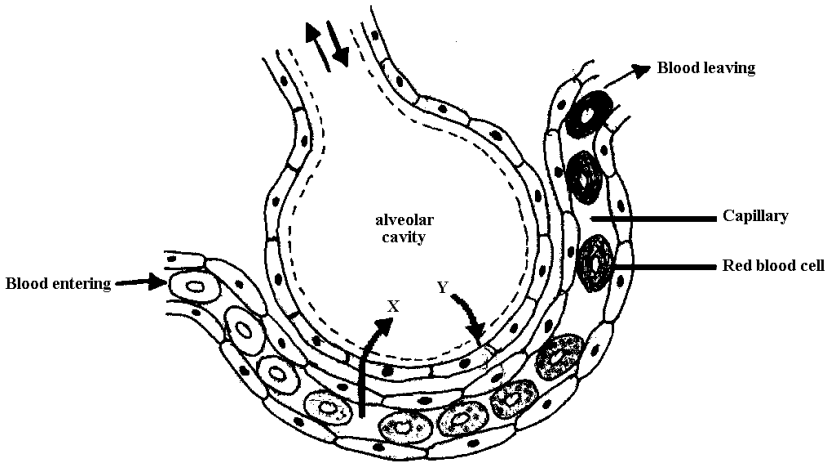
d) If only a small fraction of energy is transferred from one trophic level to another, what happens to the rest of the energy?

(1mrk)

……

……

9. The diagram below represents gaseous exchange in the alveolus.



a).Indentify the gases labeled X and Y.

(2mrks)

……

……

……

…

b).Trace the path followed by gas Y from alveolar space until it reaches the red blood cells.

(3mrks)

……

……

……

…

c). ***Name*** the part of the brain that controls breathing movement in humans.

(1mrk)

……

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……

…

10. The table below shows the energy use per day in kilojoules

Age(years)	Male	Female
2	5,500	5,500
5	7,000	7,000
8	8,800	8,000
11	10,000	9,200
14	12,500	10,500
18	14,200	9,600
25	12,100	8,800

a).From the table, explain why after age 8 males require more energy than females.

(1mrk)

……

……

……

…

b). Other than sex and age, name ***three*** other factors that determine energy requirements in human beings

(3mrks)

……

……

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11. a) Define organic evolution.

(1mrk)

……

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…

b). Give the role played by variation in the process of evolution.

(2mrks)

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…

12. a) What are halophytes?

(1mrk)

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…

b) ***State three*** adaptations of halophytes to their habitats.

(2mrks)

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…

13. a) ***Name*** the causative agent of the following diseases in humans.

(2mrks)

Syphilis……..

Herpes……..

b). State the functions of the following structures.

(2mrks)

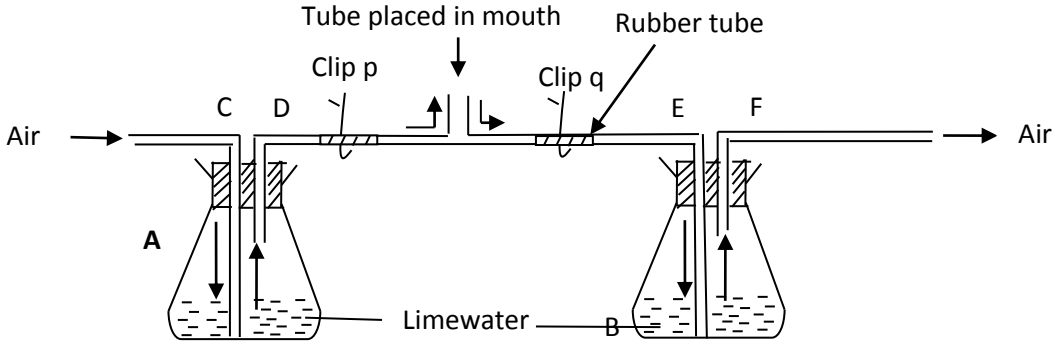
Fallopian tube……

……

Amniotic fluid……

……

14. An experiment was set up as shown below to compare the amount of carbon (iv) oxide in expired and inspired air.



a). ***State*** the purpose of the clip

(2mrks)

i).

P……

……..

ii).

Q……

……

b). Compare the observations in flask A and B after the experiment. Give reasons for your answer.

(2mrks)

……

……

……

……

15. ***Name*** the form in which carbohydrates are stored in.

(2mrks)

i). Plants tissues

……

…….

ii). Animal tissues

……

…….

16. ***Explain*** how water is gained from the soil by root hairs in plants.

(3mrks)

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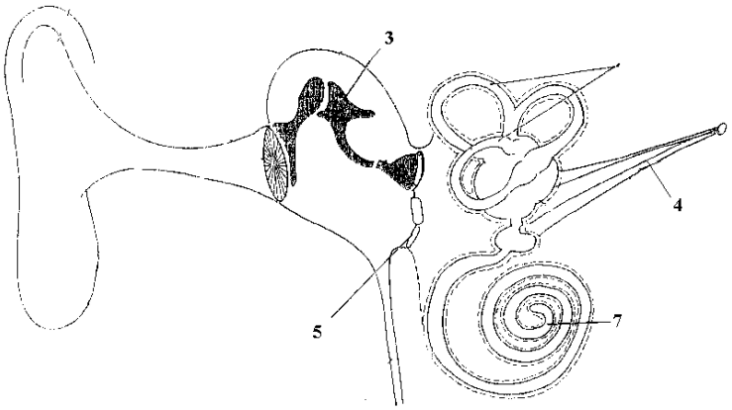
17. The diagram below shows the human ear.



a).Name the structures labeled 3, 4

(2mrks)

……

……

……

……

……

b).***State*** the function of the parts labeled 5 and 7.

(2mrks)

……

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…

18. Give the survival value of the following tropic responses

a). Geotropism (1mrk)

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……

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b). Haptotropism

(1mrk)

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…

c). Chemotropism

(1mrk)

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…

19. Distinguish between ***single*** and ***double*** circulatory systems.

(1mrk)

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…

20. Name ***one*** disorder caused by a dominant gene.

(1mrk)

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…

21. Name the spore producing structures in pteridophytes.

(1mrk)

……

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……

…

22. a). Define transpiration.

(1mrk)

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…

b). State ***two*** environmental factors that decrease the rate of transpiration. (2mrk)

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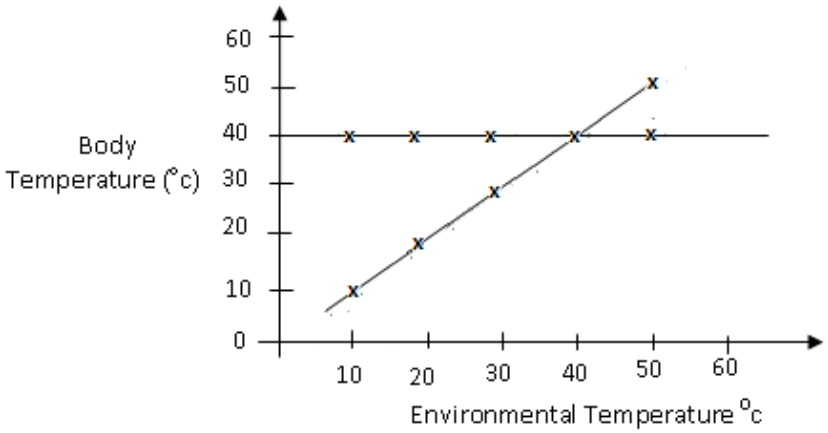
…

23. The graph below shows the relationship between environmental temperature and the body temperature in two different animals A and B.



a). ***State*** the relationship between the body temperature of animal A and external environmental temperature.

(1mrk)

……
……
……
…

b). Give the term used to describe;

i). Animals of type A

……(1mrk)

ii). Animals of type B

……..(1 mrk)

24. Nitrogen in the atmosphere cannot be directly utilized by plants. ***State two*** ways by which this Nitrogen is made available for plant use.

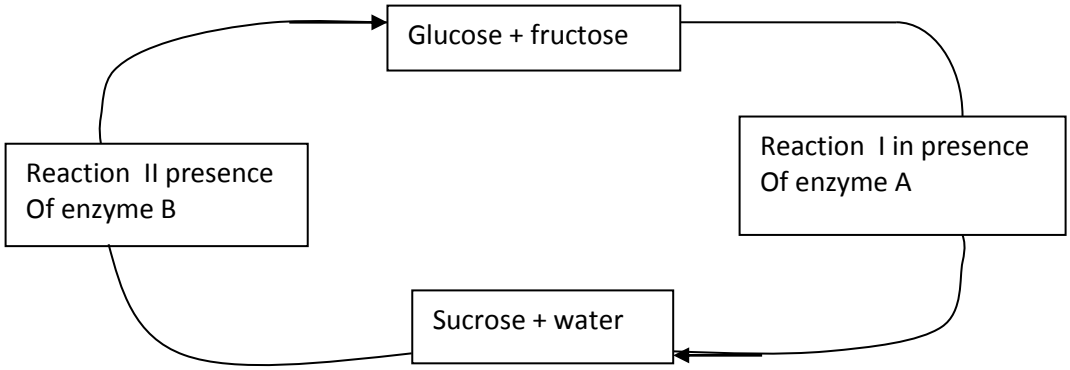
(2mrk)

……

……

……

25. The diagram below shows chemical reaction I and II which are controlled by enzyme A and B.



Name the reaction I and enzyme B

(2mrks)

Reaction

I……..……

……

Enzyme

B……

……..

26***. State two*** main functions of a microscope.

(2mrks)

27. in what form is carbon (IV) oxide transported in blood.

(2mrks

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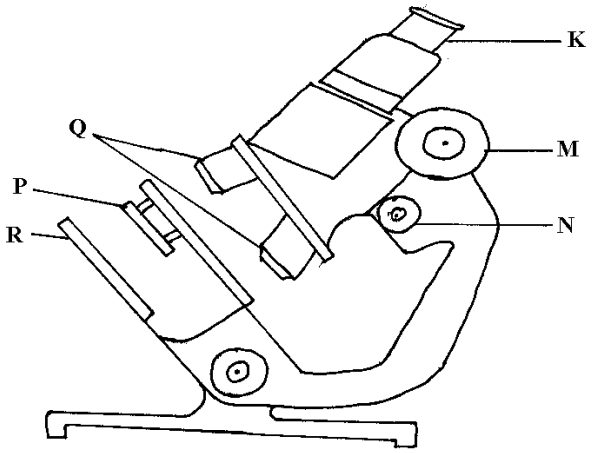
KCSE PREDICTOR 5

231/2
BIOLOGY
PAPER 2

SECTION A

Answer all questions in the spaces provided

1. The diagram below shows some components of a light microscope.



a) Name the parts labeled (2mrks)

K

……

……

M

……

…….

b) State the functions of (2mrks)

P

……

……..

Q

……

……..

c) A student was viewing a prepared slide of a plant cell under high power microscope. The features of the cell were blurred. Which one of the labelled parts of the microscope would the student use to obtain:-

(i) a sharper outline of the features. (1mrk)

……

……..

(ii) Give the formula used to calculate magnification in a light microscope. (1mrk)

……

……

d) A student was preparing a section of a plant cell to be viewed on a light microscope. Give a reason for each of the following steps:-

(i)Cutting a very thin section (1mrk)

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……

……

(ii)Staining the section

(1mrk)

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……

……

(iii)Putting the section in water

(1mrk)

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2. a) Explain what happens to excess amino acids in the liver of humans. (4mrks)

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b).i) What would happen if a person produced less anti-diurectic hormone? (1mrk)

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……

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

(1mrk)

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……

c) State ***two*** portions of the human nephrone found only in the cortex of the kidney. (2mrk)

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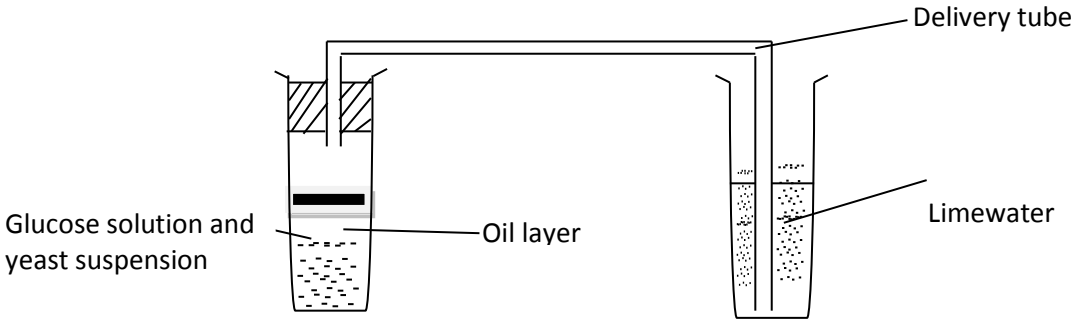
3. The diagram below shows a set up that was used to demonstrate fermentation.



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

a) Why was the glucose solution boiled before adding the yeast suspension? (1mrk)

……

……

……

b) What was the importance of cooling the glucose solution before adding the yeast suspension?
(1mrk)

……

……

……

c) What was the use of the oil in the experiment?
(1mrk)

……

……

……

d) Give ***two*** reasons why accumulation of lactic acid during vigorous exercise lead to an increase in heart beat. (2mrks)

……

……

……

e).Other than carbon (iv) oxide, ***name*** the other products of anaerobic respiration in plants. (2mrks)

……

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4. In an experiment, a black mouse was mated with a brown mouse; all the off-springs were black. The off-springs grew and were allowed to mate with one another. The total number of (F2) generation off-springs was 96.

a) Using the letter symbols capital letter B for the gene of black colour and small b for brown colour, Work out the genotype of the F1 generation. (3mrks)

b) From the information above, work out the following for the F2 generation.

i) Genotypic ratio.

(2mrks)

……

……

ii) Phenotypic ratio.

(1mrk)

……

……

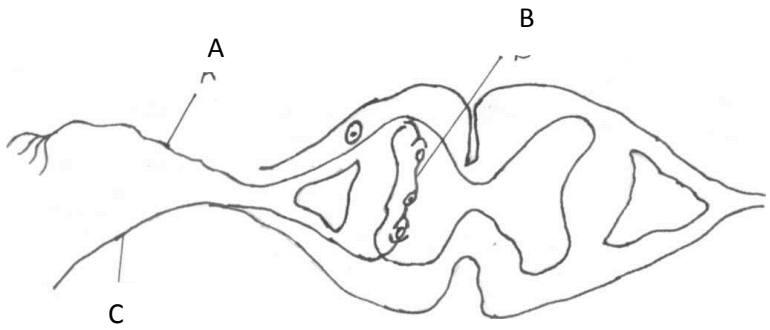
iiii) The total number of brown mice (2mrks)

……

……

……

5. When a person's hand accidentally touches a hot object it is quickly withdrawn, below is the diagram showing how response occurs



a).Describe a reflex action that will lead to the withdrawal of hand from an object. (7mrks)

b).Name the substance responsible for the transmission of an impulse across the synapse.

(1mrk)

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SECTION B

Answer question <u>six</u> and any other one question from this section in the spaces provided.

6. (Compulsory)

An investigation was carried out between 1964 and 1973 to study the changes in fish population in a certain lake. Four species of fish A, B, C and D were found to live in the lake. In 1965, a factory was built near the lake and was found to discharge hot water in the lake raising the temperature from 25^{o} c to 30^{o} c. In 1967, sewage and industrial waste from a nearby town was diverted into the lake. In 1969, discharge of hot water, sewage and industrial waste into the lake was stopped. The fish populations during the period of investigation are shown in the table below.

Fish population during the period of investigation

Fish species	1964	1966	1968	1970	1971	1971	1973
A	6102	223	20	106	660	4071	7512
B	208	30	11	22	63	311	405
C	36	100	0	0	0	0	0
D	4521	272	23	27	79	400	617

a) (i) In which year was the fish population lowest? (1mrk)

……

……

(ii)***State*** the factors that might have caused the lowest fish populations during the year you have stated in (a) (i) above. (3mrks)

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(iii)Explain how each factor you have stated in (a) (ii) above could have brought about the changes in the fish populations. (11mrks)

(iii)Why did fish species C remain 0 after 1969? (1mrk)

……

……

……

b).Other than the factors stated in (a) (i) above, state other four that may affect the population of fish in the lake. (4mrks)

7 (a). What is meant by the term digestion? (2mrk)

b) Describe how the mammalian small intestine is adapted to its function. (18mrks)

8. Discuss the various evidences which show that evolution has taken place. (20mrks)

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KCSE PREDICTOR 6

231/1
BIOLOGY
PAPER 1

1. Some form one students wanted to collect the following animals for study in the laboratory. State the suitable apparatus they should use.

   i) Flying insects (1 mark)

   ……
   ……

   ii) Crawling stinging insects (1 mark)

   ……
   ……

   iii) Small animals from tree barks (1 mark)

   ……
   ……

2. a) State the role of enzyme catalase in living cells (2 mark)

   ……
   ……
   ……

   b) Which factor inactivates enzyme action? (1 mark)

   ……
   ……
   ……

3. State the transport and synthetic roles of endoplasmic reticulum

   i) Transport role (1 mark)

……

……

……

ii) Synthetic role (1 mark)

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4. a) What is test cross? (1 mark)

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b) What are homologous chromosomes? (1 mark)

……

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……

5. a) What is the significance of diffusion to plant pollination (1 mark)

……

……

……

b) Explain why movement of air molecules is not energy driven process(1 mark)

……

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6. a) Name two products of anaerobic respiration in animals (2 mark)

……

……

……

b) Define the term respiratory quotient (1 mark)

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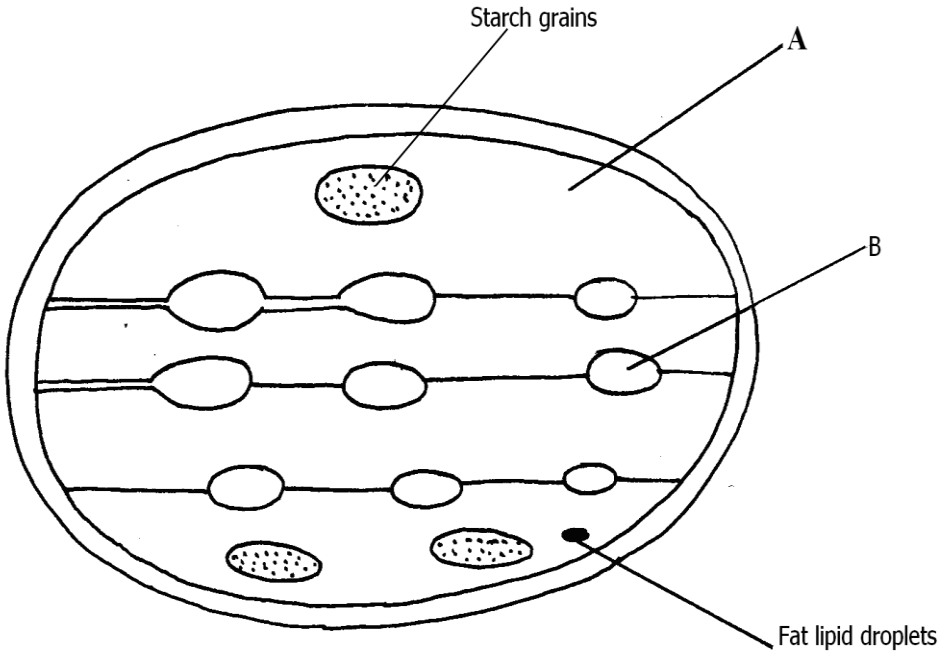
……

7. Study the diagram below and answer the questions that follows (1 mark)



a) Identify the structures labeled A and B (2 mark)

A

……..

B

…….

b) What process takes place in the parts labeled A and B (2 mark)

……

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8. State two distinguishing characteristics of members of division Bryophyta (2 mark)

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9. Name the organisms that cause: (2 mark)

i) Malaria

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ii) Sleeping sickness

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……

10. a) Differentiate between transpiration and guttation (2 mark)

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b) State two conditions that are necessary for opening of the stomata (2 mark)

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11. State two functions of smooth muscle along alimentary canal in mammals.(2 mark)

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12. List the three modes of expressing food relationship in an ecological syste(3 mark)

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13. a) What is eye accommodation? (1 mark)

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b) Explain how the iris muscle controls the size of pupil when exposed to bright light. (2 mark)

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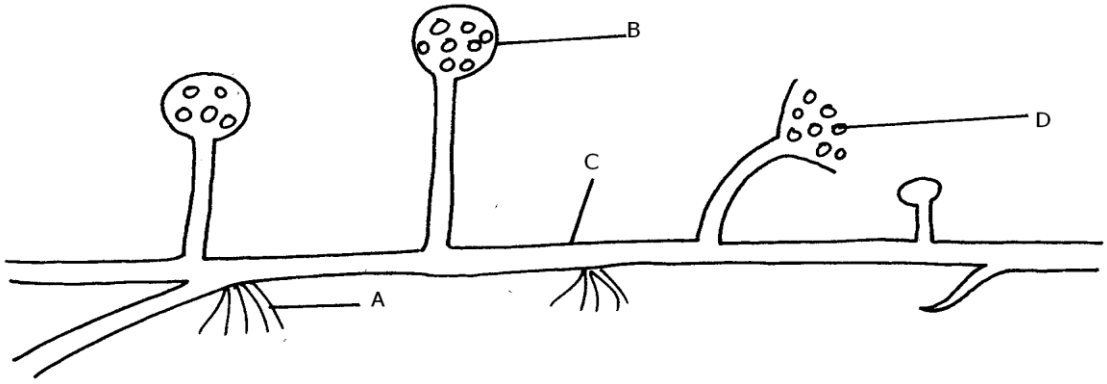
14. The figure below shows part of a mould growing on a cubstrate



a) Name the kingdom to which it belong (1 mark)

……

……

……

b) Name the parts labeled B, C, and D (3 mark)

……

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c) State the function of part A (1 mark)

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……

15. Explain the effects of vigorous exercise on

a) Breathing rate (1 mark)

……

……

……

b) Pulse rate (1 mark)

……

……

……

c) Arterioles of a person (1 mark)

……

……

……

16. a) Distinguish between pyramid of numbers and pyramid of biomass (2 mark)

……

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……

b) Briefly describe how the belt transect can be used in estimating the population of a shrub

in a grassland (2 mark)

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……
……
……
……

17. a) State two advantages which a constant body temperature gives mammals and birds over the animals (2 mark)

……
……
……
……
……

b) How does the body size affects heat loss in an animal (1 mark)

……
……
……

18. A cross between a black bull and a white cow produces a calf which has black and white spots.

a) State the type of dominance shown. (1 mark)

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……
……

b) Suggest the possible genotypes of the calf if the genes for white and black trait are B and

W respectively. (1 mark)

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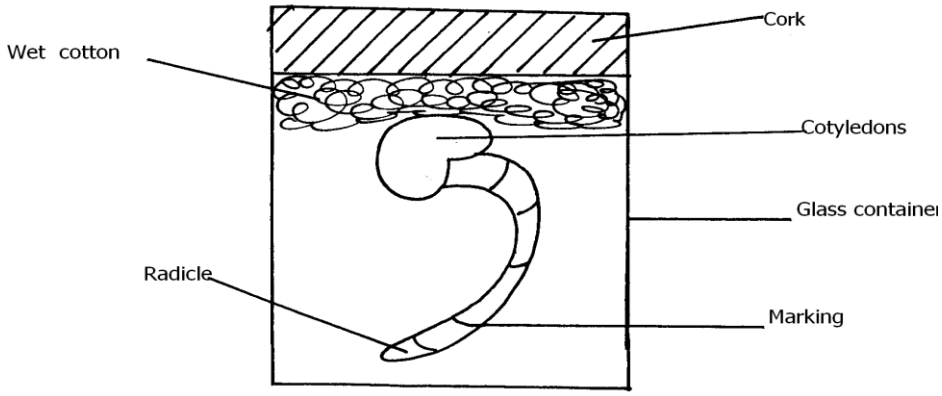
19. A student set up an experiment as shown in the diagram below.



a) What was the aim of the experiment? (1 mark)

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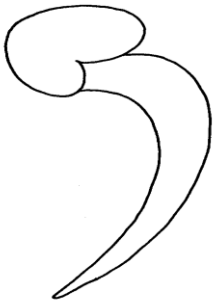
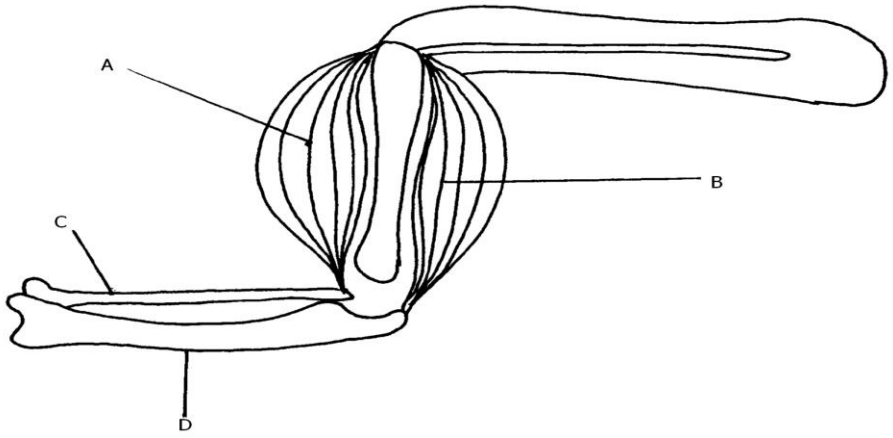
b) On the diagram below indicate the expected results after three days.(2 mark)



20.



a) Name the bones labeled C and D. (2 mark)

……

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……

……

b) What happens to structure A and B as the arm is straightened (1 mark)

……

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……

21. a) What are the vestigial structures? (1 mark)

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……

……

b) Give two examples of the structures above in man. (2 mark)

……

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22. a) What is seed dormancy? (1 mark)

……

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……

b) Name a growth inhibitor in seeds (1 mark)

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c) Differentiate between hypogeal and epigeal germination in seeds (2 mark)

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23. The diagram of the Nucleolus of a liver cell of a rat in an electron micrograph was 8.0 mm. Calculate the actual diameter of the Nucleolus in micrometers given the magnification was X16000.

(2 mark)

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24. a) Explain why tracheids are not efficient in transporting water up the plant.(1 mark)

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……

b) What is the advantage of xylem vessels being dead? (1 mark)

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25. An accident victim was found to pass large volumes of dilute urine.

a) What part of the brain was injured? (1 mark)

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……

b) Explain how injury of the part mentioned in 25(a) above brought about release of large

volume of urine. (3 mark)

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26. The following nucleoticle sequence was AGCCT on a segment of DNA strand.

i) Write down the sequence in corresponding segment of DNA strand(2 mark)

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……

……

……

ii) Find the complementary strand from the original sequence of RNA.(1 mark)

……

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……

27. a) Define the term active transport (1 mark)

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……

……

b) Name two environmental factors that influence the rate of active transport. (2 mark)

……

……

……

28. State three unique features of a class insect. (3 mark)

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KCSE PREDICTOR 6

231/2
BIOLOGY
PAPER 2

1. In a garden with plants of the same species, 705 plants had red flowers while 224 had white flowers.

   a) Work out the ratio of red to white flowered plants (1mark)

   ……

   ……

   ……

   ……

   b) i) Using letter R to represent the dominant gene , work out a cross between F1 offspring and a white flowered plant. (4 marks)

   ii) What is the genotypic ratio from the cross in b)(i) above?

   Genotypic ratio (1 mark)

……

……

……

……

Phynotypic ratio (1 mark)

……

……

……

……

c) What is meant by the term allele? (1 mark)

……

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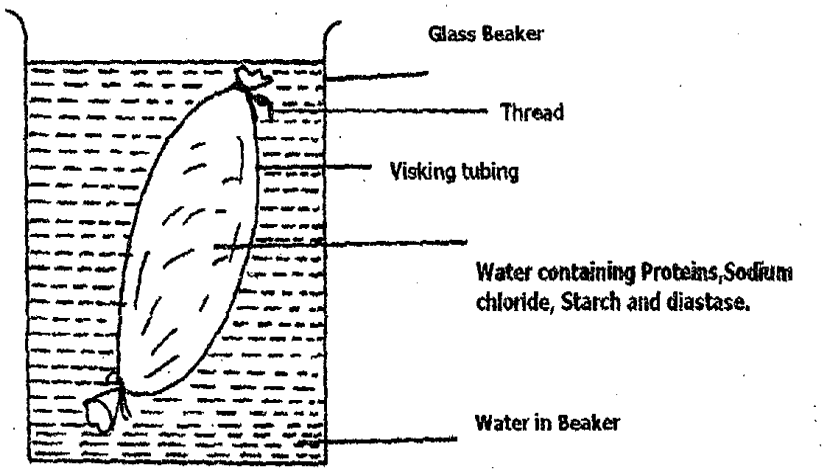
……

……

2. In a physiological experiment, starch, protein, diastase and sodium chloride were added to water and put inside a visking tubing. The visking tubing was then placed in a water bath maintained at a temperature between *35* 40°C. The set up was as shown in the diagram below.



The following observations were made after the procedures indicated.

Contents in	At the start of experiment	After 1 hour
Visking tubing	i) Solution tastes salty	Solution tastes salty
	ii) Visking tubing is not firm	Visking tubing is firm
	iii) After boiling with Benedicts solution, solution remains blue	After boiling with Benedicts solution the solution turns brown
	iv) On addition of solution hydroxide followed by copper sulphate solution to the solution, the colour changes to purple	On addition of sodium hydroxide followed by coppers sulphate to the solution, the colour changes to purple
Beaker	i) Water is tasteless	Solution tastes sweet/salty
	ii) After boiling solution with Benedicts solution, Blue colour remains	After boiling solution with Benedicts solution, colour turns to brown
	iii) On addition to sodium hydroxide followed by copper sulphate solution, colour remains blue	On addition of sodium hydroxide followed by copper sulphate solution, colour remains blue

a) Name the process by which salt moved into the water in the beaker from the visking tubing.

(l mark)

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……

……

b) i) Name the food substance responsible for the brown colour observed after 1 hour both in

the beaker and visking tubing when solutions are boiled with benedicts solution. (l mark)

……

……

……

ii) Account for the observation in (b i) above. (3 marks)

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……

c) i) Name the food substance tested with sodium hydroxide followed by copper sulphate solution(s)
(1 mark)

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……

ii) Account for the absence of the food substance named in (c i) above in the beaker after 1 hour.
(l mark)

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d) After one hour the visking tubing was firm. State the term used to describe this state. (1 mark)

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3. a) Distinguish between natural and acquired immunity
(l mark)

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b) Define the term allergy
(l mark)

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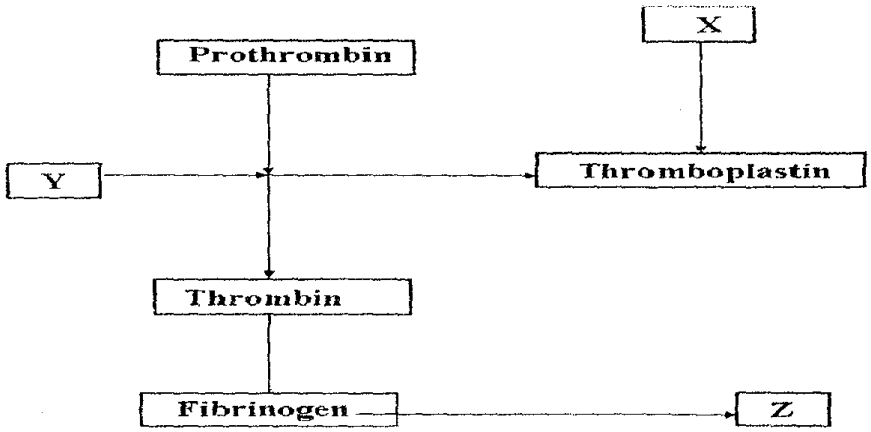
c) The chart below shows the blood clotting mechanism



i) Name the blood cells represented by X (1mark)

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ii) The end product of the mechanism represented by Z (1 mark)

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d) Explain how the following environmental factors increase the rate of transpiration.

i) Temperature (2 marks)

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ii) Humidity (1 mark)

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iii) Atmospheric pressure (1 mark)

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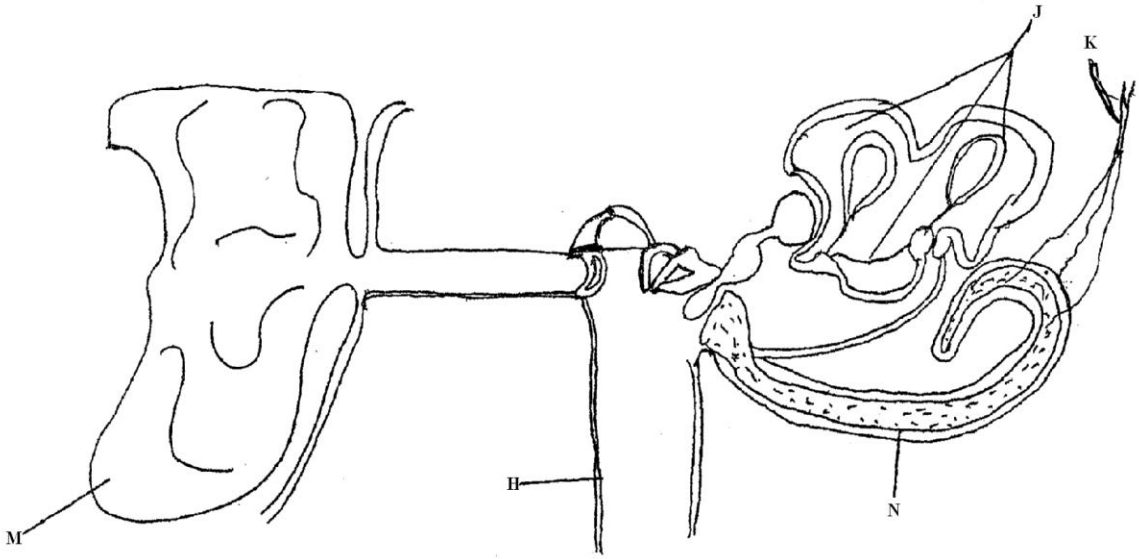
4. The diagram below represents a section through the mammalian ear. Study it and answer the questions that follow.



a) Name the structures labeled H and J (2 marks)

H

……..

J …….

b) State how the structures labeled H, M and N are adapted to their functions.(3 marks)

H

……

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M

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N

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c) State *what* would happen if the structure labeled K was completely damaged.(1 ma

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d) Name the fluid contained in structure N. (1 mark)

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e) Apart from hearing, state the other role performed by the human ear. (1 mark)

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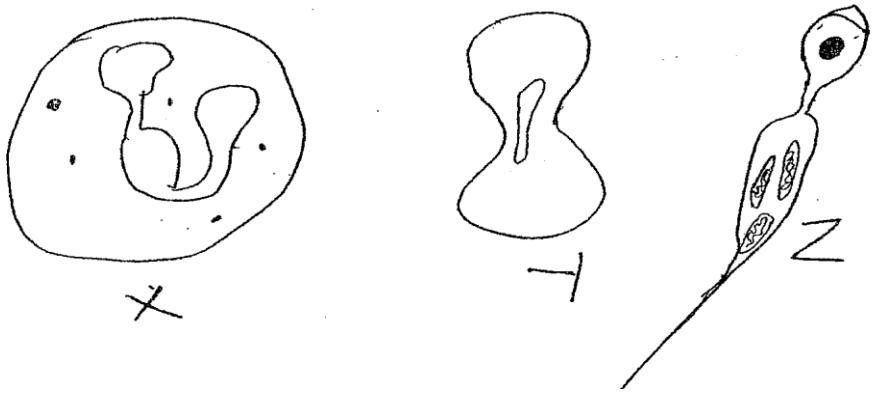
5. The structures below represent specialized cells in man.



a) Identify structure X, Y and *Z.*

X ……(l mark)

Y ……(1 mark)

Z …… (1 mark)

b) Give a reason for your answer for X in (a) above. (1 mark)

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c) Give two adaptation of *Z* to its function. (2 marks)

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d) What is tissue fluid? (2 marks)

SECTION B(40 MARKS)

Answer question 6(Compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

6. The table below shows the population of a housefly *musca domestica* which is parasitized by wasps of species Nasonia spp. The investigation of their population growth pattern was carried out for 70 weeks. In these experimental space and physical factors were assumed to be limiting.

Time in weeks	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Musca domestica	40	70	110	260	350	480	400	395	350	40	60	140	250	240	230
Nasonia Spp.	10	20	30	45	100.	200	300	380	410	250	60	20	40	200	280

a) Using the readings in the table, plot graphs on the same axis of population growth of organisms against time. (8 marks)

b) Account for the growth of

i) *Musca domestica* between 10th week — 25th week. (1 mark)

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ii) Nasonia species between 40^{th} week –50^{th} week. (1 mark)

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c) What is the population of?

i) Nasonia spp. on the 62^{nd} week? **(**1 mark)

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ii) *Musca doniestica* on the **4th** week? (1 mark)

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d) Bemex, another parasite of housefly was introduced into the ecosystem. Giving a reason; what will be the effect on the population of

i) Housefly *Musca domestica.* (2 marks)

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ii) Nasonia Spp. (2 marks)

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e) In estimating the population of *Musca domestica* in the experiment above. Capture-mark release recapture method was used. Describe the procedure which was followed.

(4 marks)

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7. a) What is natural selection? (2 marks)

b) Describe how natural selection brings about adaptations of a species of a living organism to its environment

(18 marks)

8. a) Describe how urea is formed (5 marks)

b) Describe the path followed until it is eliminated from the body (15 marks)

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KCSE PREDICTOR 7

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BIOLOGY
PAPER 1

1. What components of blood are absent in the tissue fluid (2mks)

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2. (a) What is a cell. (1mk)

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(b) Define the meaning of the following terms

(i) Entomology (1mk)

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(ii) Genetics (2mks)

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3. (a) Name the association between leguminous plant and rhizobium bacteria (1mk)

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(b) (i) State the population estimation method of grasshoppers in your school compound.

(1mk)

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(ii) Suggest the name of the formula used to calculate population of the grasshoppers.

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4. State the organelles that would be abundant in

(a) Palisade cell (2mks)

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(b) Skeletal muscle cell

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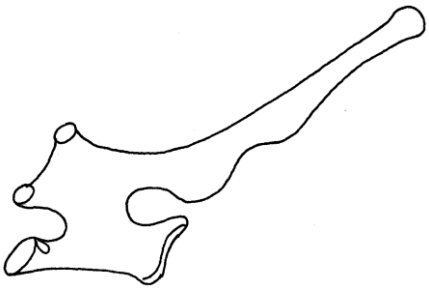
5. The diagram below represents a mammalian vertebra.



(a) Identify the vertebra represented above. (1mk)

……

……..

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……..

(b) Give a reason for your answer. (1mk)

……

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……..

6. State the functions of;

(a) Rough Endoplasmic Reticulum (1mk)

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(b) Centrioles (1mk)

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7. State any three theories that explain the mechanism of opening and closing of stomata. (3mks)

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8. The following are characteristics of a certain animal dentition; large curved and sharply Pointed canines, small closely fitting incisors, narrow molars and premolars with cusps

(i) Identify the likely mode of feeding in this animal (lmk)

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(ii) State three adaptations of the three types of teeth to the mode of feeding identified in

(i) above (3mks)

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9. A student visiting a game park observed that an adult elephant flapping its ears twice as much as

its calf in order to cool its body when it is hot. Explain (2mks)

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10. Name one function of,

(a) Progesterone (1mk)

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(b) Luteinizing hormone (1mk)

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11. (a) Distinguish between the terms transpiration and Guttation (2mks)

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(b) State the structures through which each of the process named in (a) above occurs (2mks)

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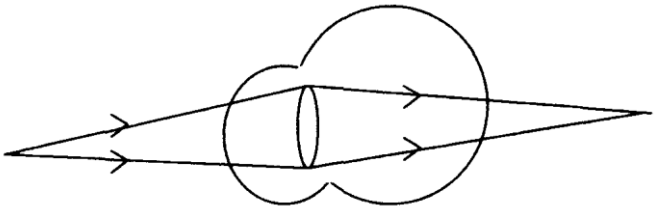
12. The diagram below shows the position of an image formed in a defective eye.



(a) Name the defect……

(1mk)

Explain how the defect name in (a) above can be corrected

(1mk)

……

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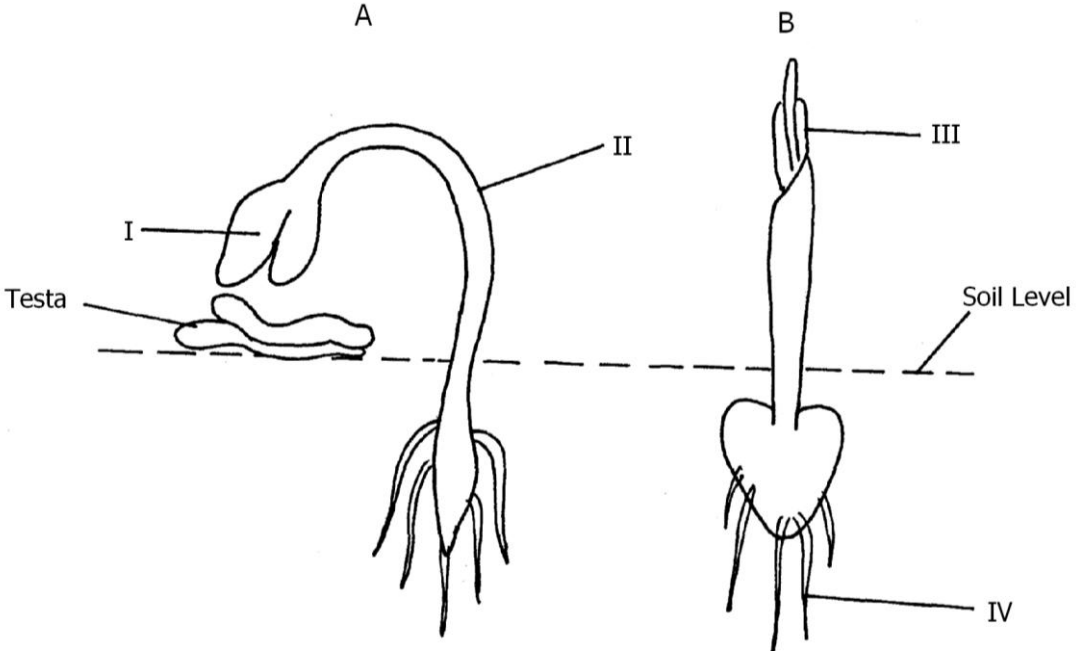
13. The diagram below represents a stage of growth in two different seedlings.



(a) Identify the type of germination exhibited B. (1mk)

……

……..

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……..

(b) State the functions of part labeled I and IV. (2mks)

I

……..

IV

……...

14. (a) State the part of the brain that controls breathing movements in man (1mk)

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(b) Explain how the aquatic plants are adapted to gaseous exchange (4mks)

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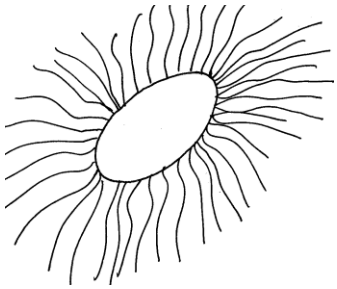
15. The diagram below shows a seed of a certain plant.



(a) Name the likely agent of dispersal. (1mk)

……

……..

(b) Give a reason for your answer. (1mk)

……

……..

16. (a) Distinguish between taxon and taxonomy (2mks)

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(b) Name two classes of the phylum Arthropoda that have cephalothorax (2mks)

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17. (a) Name the source of hydrochloric acid in the mammalian stomach. (1mk)

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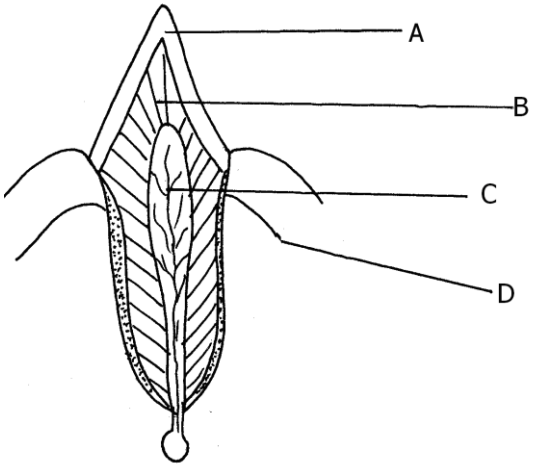
(b) The diagram below represents internal structure of a mammalian tooth.



(c) Name part labeled B and D (2mks)

B……..

D…….

18. Distinguish between gene and chromosomal mutation. (2mks)

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19. Differentiate between intracellular and extracellular enzymes.

(2mks)

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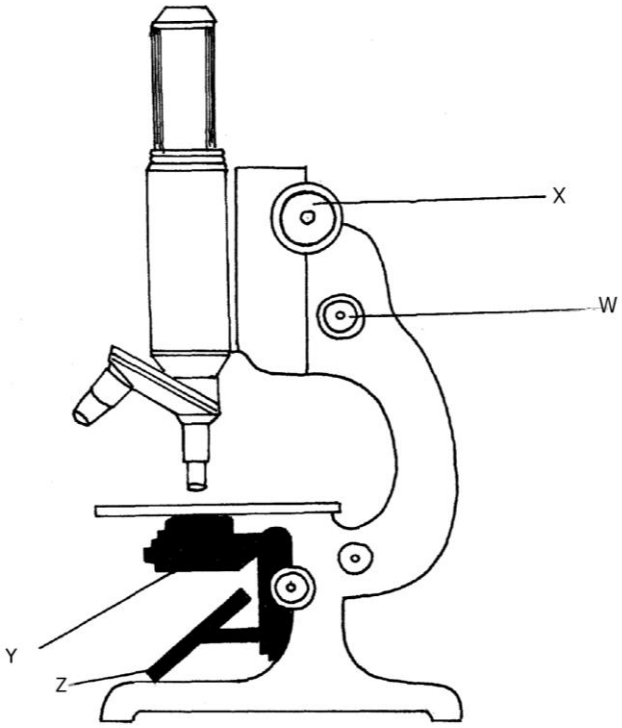
20. The diagram below represents a common laboratory equipment.



(i) Label the parts labeled X and Y. (2mks)

X ……..

Y…….

(ii) Using arrows show how the object is illuminated.

(2mks)

21. What is the main functions of vascular bundles. (2mks)

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the stage in meiosis where the following take place

(a) Disappearing of nucleolus (1mk)

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(b) Formation of new spindle fibres (1mk)

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(c) Formation of separate cells each with haploid number of chromosomes (1mk)

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23. Explain the following genetic terms

(a) Turner's syndrome (2mks)

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(b) Deletion (2mks)

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……..

(c) Name one sex-linked trait carried in they chromosome (1mk)

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24. (a) What is meant by organic evolution (1mk)

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(b) State three limitations in use of fossil records in retracting the evolutionary history of all modern day organisms (3mks)

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25. Differentiate between monoecious and dioecious plants (2mks)

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26. State three advantages of metamorphosis to the life of insects (2mks)

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27. State the function of the following apparatus

(a) a pooter (1mk)

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……..

(b) a pit fall trap (1mk).

……

……..

28. (a) Distinguish between Natural and acquired immunity (1mk)

……

……..

(b) (i) Define the term Allergy (1mk)

……

……..

(ii) List two causes of allergy in humans (2mks)

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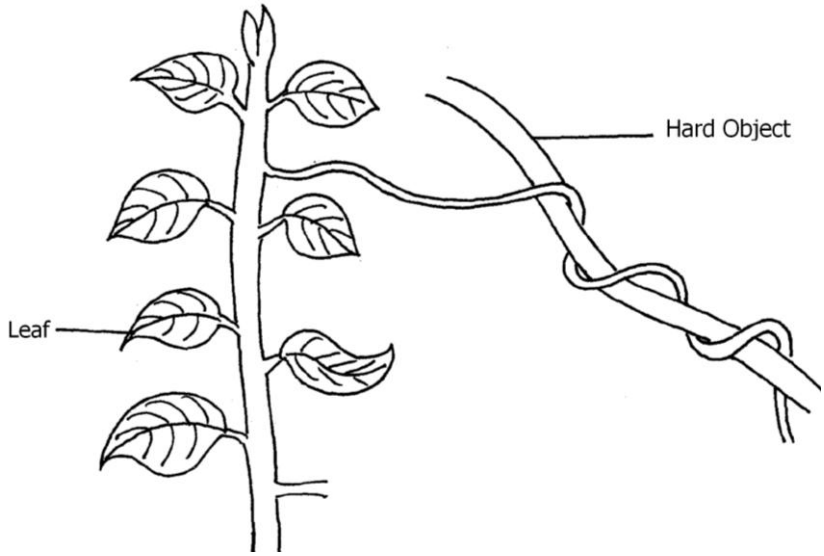
KCSE PREDICTOR 7

231/2
BIOLOGY
PAPER 2

SECTION A (40 MARKS)

1. The figure below illustrate a response in plants.



(a) State the type of response illustrated (1mk)

……

……..

(b) Explain how the response occurs. (4mks)

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(c) State two importance of phototactic response in termites. (2mks)

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(d) State hormone used in agriculture that breaks breaking seed dormancy.
(1mk)

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……..

2. (a) (i) Define sex linkage. (1mk)

……

……..

……

(ii) In a marriage of Jane and Otieno who are both normal for hemophiliac condition,
gave birth to four children Susan, Grace, Tom and Peter. Tom the second born
child was hemophilic. Later in life Tom married Alice who was normal. Their first
born child was hemophiliac.
Let H represent gene for normal condition.

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(b) (i) What was the genotype of Alice. (1mk)

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(ii) Work out the phenotypic ratio of F2. (5mks)

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(c) How does the police force use knowledge on genetics. (1mk)

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(d) What is the name given to points of contact in a pair of homologous chromosomes.

(1mk)

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……..

3. A student observed feeding relationship while on a tour in a coastal Island.

Eagles feed on small fish.

Small fish feed on sea grass

Insect larvae and molluscs feed on sea grass.

Insect larvae fed on by small fish, while crabs feed on insect larvae and molluscs.

(a) From the above information , construct a food web.

(3mks)

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(b) In which trophic level is small fish found.

(1mk)

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……..

(c) Extract a food chain where the Eagle is a tertiary consumer.

(1mk)

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……..

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……..

(d) Suppose all the crabs were poisoned, what would be the immediate effect in the ecosystem. Give a reason.
(1mk)

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……..

(e) Give a reason why pyramid of biomass is a better representation of energy flow in an
eco system than pyramid of numbers.
(1mk)

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……..

4. A student wanted to observe human red blood cells under a light microscope. He put l0ml of
solution X,Y and Z in three boiling test tubes. The solutions were of different concentration .In
each of the test tubes he put three drops of blood sample. The experiment was left to stand for 30
minutes. He placed one drop of solution X on glass slide and observed under the microscope.
The same procedure was repeated for solutions Y and Z.
He made the following observation.

Solution	**Observation**
X	Normal Cells
Y	Wrinkled Cells
Z	No cells observed

(a) What was the physiological process observed.

(1mk)

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……..

(b) Explain why red blood cells observed in solution Y were wrinkled.

(3mks)

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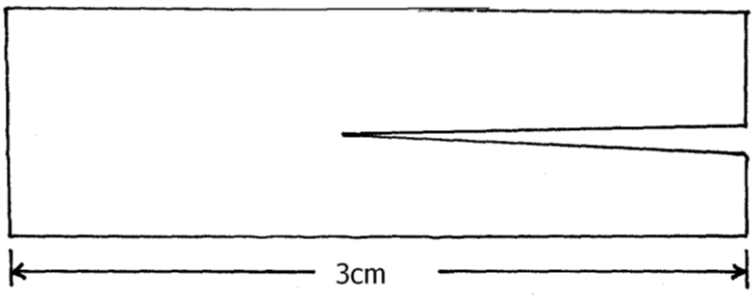
(c) A 3cm long piece of kale (sukuma wiki) stem was cut halfway along its length as shown below.



(i) If the piece was placed in solution Z for 30 minutes, its shape changed . Using a pencil

draw a diagram in the space provided to show the expected change.

(1mk)

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(ii) Explain the results obtained in C(i) above.

(3mks)

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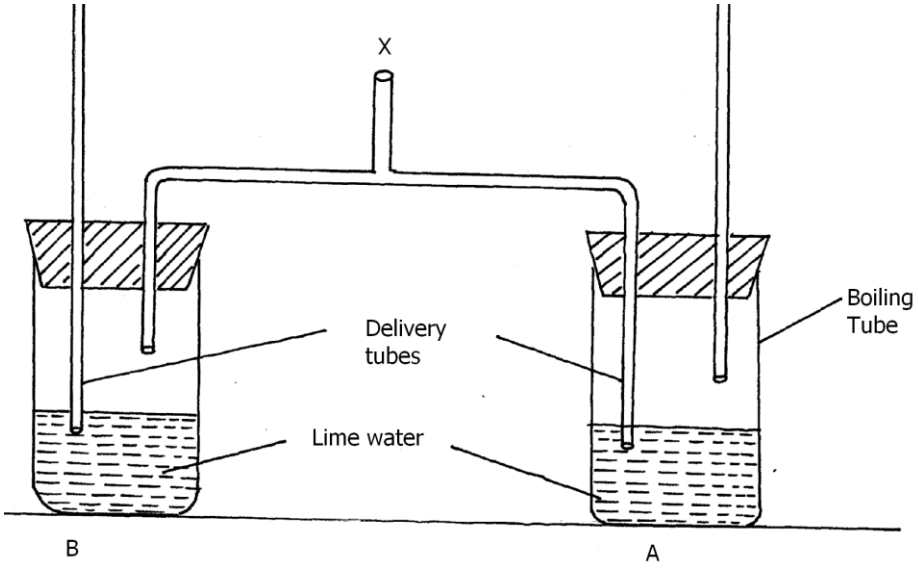
5. An experiment was set up as shown below.



(a) A student blew air in and out through point X. Using arrows indicate on the diagram how

air gets in and out of the set up.

(2mks)

(b) (i) In which of the test tube would lime water turn milky first. (1mk)

……

……..

(ii) Give a reason. (1mk)

……

……..

(c) What is the effect of lactic acid in the thigh muscles of an athlete after a short fast race.

(2mks)

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(d) Identify the type of muscle in human being where formation and effect of lactic acid is

not felt. (1mk)

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……..

(e) What is the biological significance of boiling milk /ultra heat treated milk.

(1mk)

……

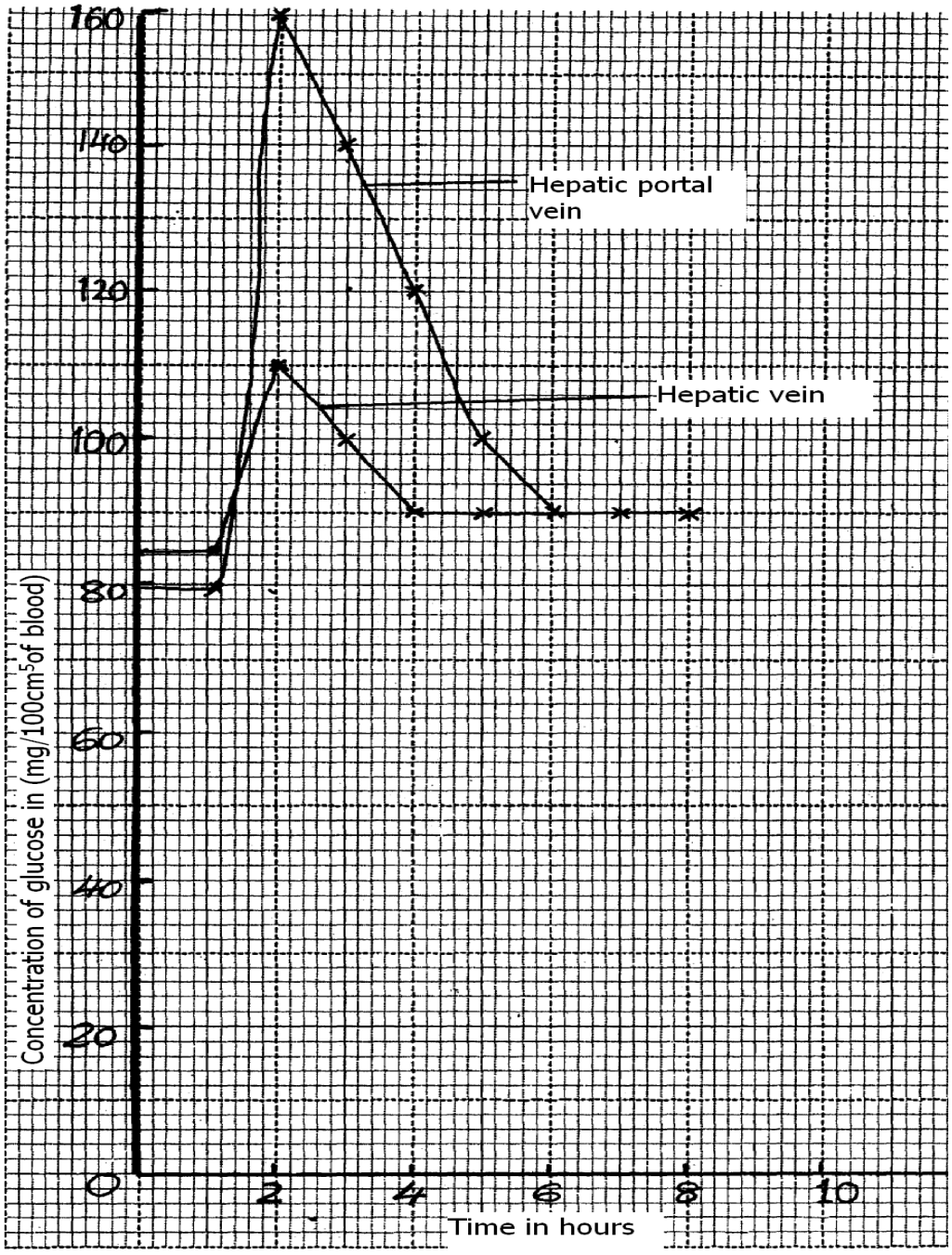
SECTION B

COMPULSORY QUESTIONS.

6. A man was starved for 24hours.He was then served with a balanced diet after which the concentration of glucose in the hepatic and hepatic portal veins were determined at interval of 1

hour for the next 8 hours after the meal.

The results were as shown in the graph below.



(a) From the graph state the normal concentration of glucose in man.

(1mk)

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……..

(b) Determine the concentration of glucose after 2 ½ hrs.

(2mks)

……

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(c) Calculate the rate of glucose between 1 - 2 hours in hepatic portal vein.

(2mks)

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(d) Account for the blood sugar level in hepatic portal vein and hepatic vein between;

(4mks)

(i) 0- 1hour

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(ii) 2 - 4 hours.

(6mks)

(e) A patient was found to produce urine that tasted sweet. Name the disease he was likely

to be suffering from.

(1mk)

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(f) How would you test for the disease in your school laboratory.

(3mks)

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(g) What advice would you give to a patient whose blood contains abnormal high levels of urea.

(1mk)

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ANSWER EITHER QUESTION 7 OR 8 IN THE SPACES PROVIDED AFTER THE QUESTIONS.

7. Describe how human skin is adapted to its function.

(20mks)

8. (a) Describe the adaptation of floating water lily leaf to its photosynthetic function.

(10mks)

(b) Describe the activities that take place in the chloroplast of growing plants.

(10mks)

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KCSE PREDICTOR 8

231/1
BIOLOGY
PAPER 1

1. State the functions of the following points of a light microscope.

   (a) Diaphragm (1mk)

   .....

   .....

   (b) Condenser (1mk)

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   .....

2. State the functions of the following organelles.

   (a) Nucleolus (1mk)

   .....

   .....

   (b) Ribosomes (1mk)

   .....

   .....

3. The reaction represented by the equation below occurs in the body.

   Hydrogen peroxide $\xrightarrow{\text{Enzyme Y}}$ Oxygen + Water

   (a) Name enzyme Y.

   (1mk)

   .....

   .....

   (b) Name an organ in the body where the reaction occurs. (1mk)

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   (c) What is the significance of the reaction (1mk)

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4. (a) Name two disorders in man that occur through gene substitution (2mks)

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

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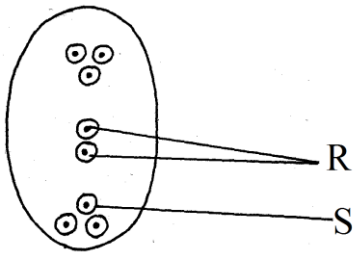
5. Study the diagram of the embryo sac below and answer questions that follow.



(a) Name the type of fertilization that occurs in the embryo sac. (1mk)

.....

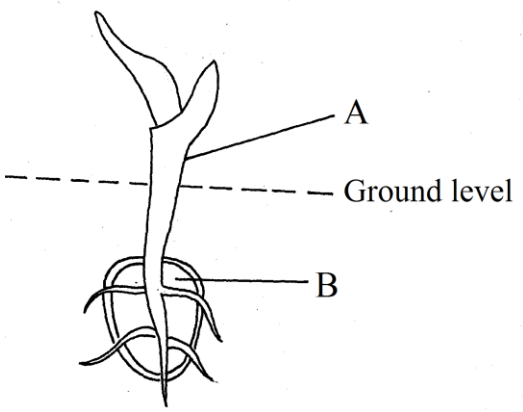
.....

(b) What do the structure labelled R and S develop into after fertilization. (2mks)

R.....

S.....

6. The diagram below represents a maize seedling



(a) (i) Name the type of germination exhibited by maize. (1mk)

.....

.....

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

.....

.....

(b) State the functions of the parts labelled A and B.

(2mk)

A.....

B.....

7. (a) Explain how the following factors control population

(i) Predation (1mk)

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(ii) Competition (1mk)

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(iii) Parasitism (1mk)

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(b) A cat was used to control the population of rats.

(i) What term is used to refer to this method. (1mk)

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.....

(ii) State one advantage of using the method you named in (i) above.

(1mk)

.....

8. State the role played by the following substance in digestion.

(i) Hydrochloric acid (2mks)

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(ii) Bile salts (2mks)

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9. The chemical equation below represent a reaction that occurs in cels.

$2C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102CO_2 + 98H_2O$

(i) Calculate the respiratory quotient (RQ)

(2mks)

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(ii) Identify the substrate used in the reaction. (1mk)

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(iii) Give two reasons why the substrate you have identified in 9. (ii) above is not the not the main respiratory substrate. (2mks)

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10. Explain what happens in humans when the concentration of glucose in the blood decreases below normal level. (4mks)

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11. State two adaptations of the alveolus to its functions.

(2mks)

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12. (a) Explain the role of oxygen in Active transport (1mk)

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(b) Name two processes that depend on Active transport in animals (2mks)

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13. Name support tissues in plants thickened with:

(a) Cellulose (1mk)

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(b) Lignin (1mk)

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14. State three biological importance of tropisms in plants (3mks)

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15. (a) What are Analogous structures? (1mk)

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(b) Give two examples of Homologous structures (2mks)

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16. State three limitations of fossil records as an evidence of organic evolution (3mks)

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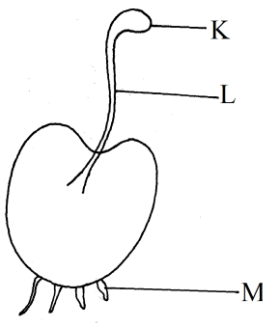
17. Study the diagram below and answer questions that follow



(a) State the division the organism belongs (1mk)

.....

.....

(b) Name the parts labelled K and L (1mk)

K.....

L.....

(c) What is the function of the part labelled M. (1mk)

M.....

18. Explain the role of the following hormones in reproduction

(a) Progesterone (2mks)

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(b) Oestrogen (2mks)

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19. State two factors that hinder self-pollination and fertilization. (2mks)

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20. A mango tree is known as mangifera Indica

(a) Identify two mistakes made in the writing of the name (2mks)

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(b) What is the scientific naming called? (1mk)

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21. State three methods that could be used to determine the diet of wild animals in an ecosystem (3mks)

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22. State two ways in which chloroplasts are adapted for photosynthesis (2mks)

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23. Name joints formed between the:

(a) Humerus and scapula (1mk)

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(b) Cranial bones (1mk)

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24. State the role of the following chemicals in a test for non-reducing sugar.

(i) Hydrochloric acid

(1mk)

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(ii) Sodium hydrogen carbonate (1mk)

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25. Name two chemical compounds that are protein in nature that regulate metabolic activities in the body (2mks)

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26. State three environmental factors that increase the rate of transpiration. (3mks)

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27. Carbon (II) oxide is a respiratory poison. Explain (3mks)

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KCSE PREDICTOR 8

231/2
BIOLOGY
PAPER 2

SECTION A (40 MARKS)

Answer all questions in this section.

1. During an ecological study, students collected and marked 120 ants and released them. After 48 hours, the students captured another 90 ants, 20 of which had been marked previously.

(a) How many ants were there in the compound? Show your working. (3mks)

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(b) What are the limitations of this method in sampling animal populations. (4mks)

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(c) State two other methods which could be used to determine the population. (1mk)

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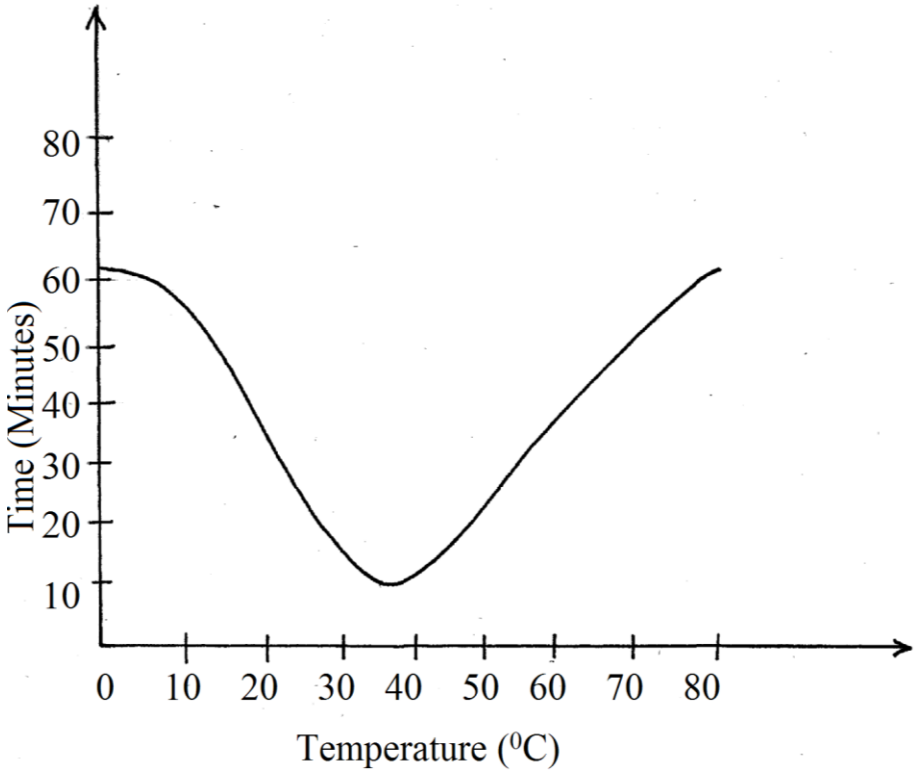
2. In an experiment to investigate the action of pepsin on egg albumen, equal amount of paper were added to equal amount of egg albumen in different test –tubes. The test-tubes were placed in water bath at different temperature. The graph below shows the time taken for the enzymes to digest protein at each temperature.



(a) What is the optimum temperature for enzymes?
(1mk)

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(b) Account for the time taken to digest egg albumen at 60^0C.
(2mks)

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(c) With reasons name the form in which the enzyme pepsin is secreted.
(2mks)

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(d) State three other factors that affect enzyme controlled reactions.
(3mks)

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3. The chart below represents the results of successive cross, starting with red-flowered Plants and write flowed plants and in which both plants are pure breeding.

Parental genotype: Red Flowers x White Flowers

↓

First filial generation

↓

Selfed

Second filial generation

3 Red flowers : 1 White flower

(a) What are the parental genotypes? Use letter R to represent the gene for Red flower colour and r for white colour.

(2mks)

.....

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(b) (i) What was the colour of the flowers in the first filial generation?

(1mk)

.....

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(ii) Give a reason for your answer

(1mk)

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(c) If 480 red flowered plants were obtained in the second filial generation, how Many F_2 plants had white flowers? Show your working. (4mks)

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4. (a) State the meaning of apical dominance in plants (1mk)

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(b) Name the hormone associated with apical dominance. (1mk)

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(c) What is the importance of apical dominance? (1mk)

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.....

(d) Briefly describe the effects of the following plant growth hormones

(i) Gibberellins (2mks)

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(ii) Abscisic Acid (3mks)

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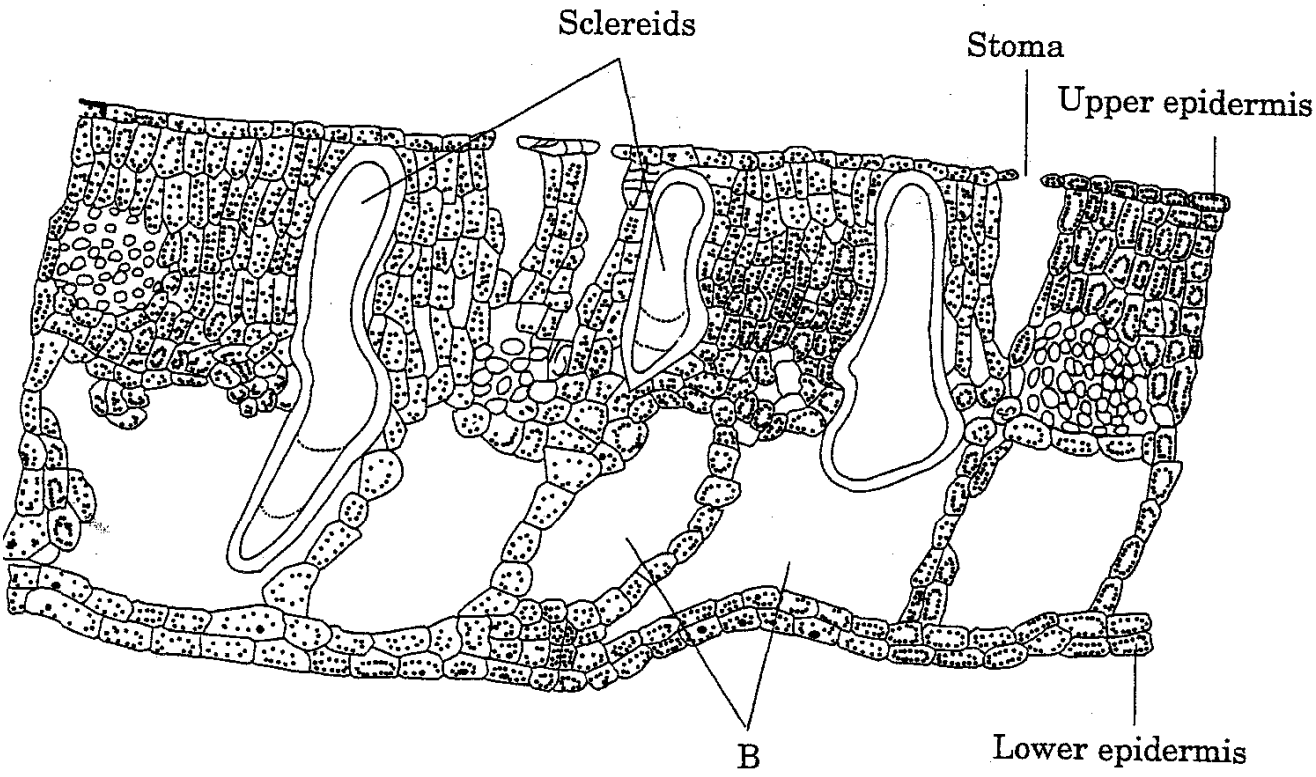
5. The diagram below represents a transverse section of a leaf.



(a) (i) State the habitat of the plant from which the leaf was obtained. (1mks)

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

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(b) How does the part labelled B adapt the plant to its habitat (1mk)

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(c) Smokers are always at a high risk of suffering from respiratory infections. Explain (3mks)

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(d) What structures are used for gaseous exchange in plants found in marine water? (1mk)

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SECTION B (40 MARKS)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

6. Carbohydrates used during respiration and those formed during photosynthesis by a certain plant was measured over a period of 24 hours at an interval of 3 hours

Time of day	12AM	3AM	6AM	9AM	12PM	3PM	6PM	9PM	11PM
Carbohydrates formed during photosynthesis (mg)	0	0	5	30	60	30	5	0	0
Carbohydrates used during respiration (mg)	10	10	10	10	10	10	10	10	10

Using the same axes,

(a) Plot a graph of carbohydrate formed during photosynthesis and carbohydrate used during respiration against time. (7mks)

(b) Calculate the net carbohydrate formed by the plant. (2mks)

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(c) At what time of the day do the light compensation points occur?

(2mks)

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(d) Account for the shape of graph on carbohydrates.

(i) Between 12.00a.m and 3a.m. (2mks)

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(ii) Between 3.00a.m to 12.00 noon.

(2mks)

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(e) How could foggy weather influence the net amount of carbohydrates formed over the 24 hour period?

(1mk)

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.....

(f) Give other external factors apart from temperature and light intensity that influence the rate of photosynthesis. (2mks)

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(g) In which form are carbohydrates stored in

(i) Plant bodies. (1mks)

.....
.....

(ii) Fungi (1mk)

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.....

7. (a) Define natural selection.
(2mks)

(b) Natural selection brings about adaptation of a species to the environment. Discuss.
(18mks)

8. Discuss the adaptations of seeds and fruits to dispersal.
(20mks)

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KCSE PREDICTOR 9

231/1
BIOLOGY
PAPER 1

1. State the function of the following cell organelle

   (a) Ribosome (3mks)

   ……

   ……

   ……

   (b) Smooth endoplasmic reticulum

   ……

   ……

   ……

   (c) Golgi apparatus

   ……

   ……

   ……

2. List any distinguishing features of the class arachnida (2mks)

   ……

   ……

   ……

3. (a) (i) Name the hormone responsible for moulting in insects (1mk)

   ……

   ……

   (ii) Where is the hormone in a(i) above secreted

   ……

   ……

   ……

(b) State the role of juvenile hormone in the development of insect (1mk)

……

……

4. State three functions of the mammalian blood other than transport (3mks)

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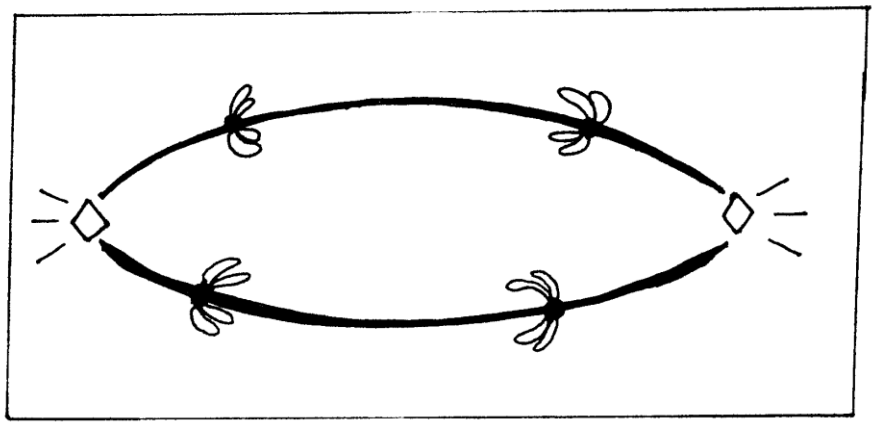
5. Below is a stage in cell division



(a) Identify the stage (1mk)

……

……

(b) Give reasons for your answer (2mks)

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6. Industrial wastes may contain metallic pollutants. State how such pollutants may indirectly reach and accumulate in the human body if the wastes were dumped into rivers. (3mks)

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7. Name parts of the brain which control

(a) Involuntary activities e.g breathing (1mk)

……

……

(b) Control voluntary body movement (1mk)

……

……

8. During a strenuous exercise, the chemical process represented by the equation below takes place in human muscles

$C_6H_{12}O_6 \longrightarrow 2CH_3CH(OH)COOH + 150KJ$

(Glucose) (substance x) (energy)

(a) What is the name of this process (1mk)

……

……

(b) Name the substance X (1mk)

……

……

(c) What happens to the muscle if x accumulates to critical level (1mks)

……

……

9. (a) What is meant by (a) organic evolution
(1mk)

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……

(b) Adaptive radiation (1mk)

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……

10. Identify the type of mutation represented by the following pairs of words

(i) Shirt instead of skirt (1mk)

……
……

(ii) Hopping instead of shopping
(1mk)

……
……

(iii) Eat instead of tea (1mk)

……
……

11. State the function of the following in reproduction

(a) Umbilical cord (3mks)

……
……
……

(b) Aerosome

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……

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(c) Follical stimulating hormone

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12. (a) Explain why a person discharges urine more frequently when environment temperatures

are low than when they are high. (2mks)

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(b) Name the nitrogenous wastes excreted by a fresh water fish (1mks)

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13. Explain why individuals with smaller sizes requires more energy per kg of body weight than those with large sizes (3mks)

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14. List three types of muscles (3mks)

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15. Describe the path taken by carbon (iv) oxide released from the tissues of a cockroach into the atmosphere (3mks)

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16. Name the blood vessels that transport blood from (3mks)

(a) Small intestines to the liver……

(b) Heart to the kidney……

(c) Heart to the lungs……

17. The number and distribution of stomata on three different leaves are shown in the table below

Leaf	Number of stomata	
	Upper epidermis	Lower epidermis
A	300	0
B	150	200
C	02	13

(a) Suggest the possible habitat of the plant from which the leaves were obtained

Leaves Habitat

A ……..

B ……..

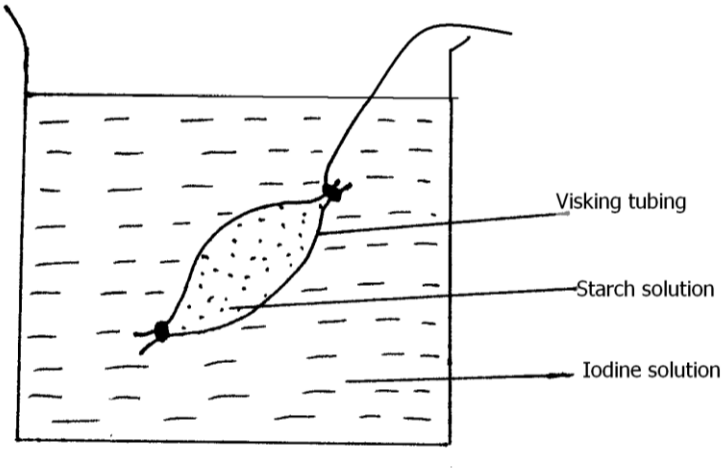
(b) State one modification found in the stomata of leaf C

(1mk)

……

……

18.



The set-up above was prepared by form one students and left for 1 hour
They made the following observations

	At the start	After one hour
In visking tubing	White solution	Blue-black
In beaker	brown	brown

(a) Identify the physiological process being investigated (1mk)

……
……

(b) Explain the observation made (3mks)

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19. In a field study a student came across a plant whose leaves quickly folded when touched, he gave the name as <u>Mimosa Pudica</u>

(a) Identify the mistake he made when writing the scientific name (2mks)

……
……

(b) Name the type of response (1mk)

……

……

(c) State the possible advantage of this response to the plant. (1mk)

……

……

20. State three characteristics features of an efficient respiratory surface (3mks)

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21. State three environmental factors that affect the rate of stomatal transpiration (3mks)

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22. (a) What is the importance of Adenosine triphosphate (ATP) in mammals (1mk)

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(b) State two functions of respiratory Quotient (RQ) (2mks)

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23. Give two functions of the exoskeleton in insects (2mks)

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24. State four ways of breaking seed dormancy (4mks)

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25. Other than sexual intercourse name the other ways by which HIV/AIDS is spread (3mks)

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26. The diagram below represents a bone in a mammal

(a) Identify the bone (1mk)

……

……

(b) Name the bone that articulate with the above bone at part A (1mk)

……

……

(c) Name the joint formed at the part labeled B (3mks)

……

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27. An animal has the following dental formula,

1=0/2 C=0/2 pm 3/3 m=2/3

(a) Suggest the type of diet for this animal (1mk)

……

……

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

……

……

(c) How many teeth does the animal have in total (1mk)

……

……

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KCSE PREDICTOR 9

231/2
BIOLOGY
PAPER 2

SECTION A (4OMKS)

Answer ALL the questions in this section in the spaces provided.

1. (a) Define

i) Osmosis (lmk)

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ii) Haemolysis (lmk)

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(b) State the role of active transport in plants. (2mks)

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(c) Why is oxygen important in the process of active transport? (lmk)

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(d) State three properties of the cell membrane (3mks)

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2. In a family with four children, three were found to have normal skin pigmentation while one was an albino. Using letter A to represent gene for normal skin pigmentation and a to represent the gene for albinism.

(a) What are the genotypes of the parents? (2mks)

……

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……

(b) Work out the genotypes of the normal pigmented children and the albino child (5mks)

(c) What is the probability that the fifth child will be an albino? (lmk)

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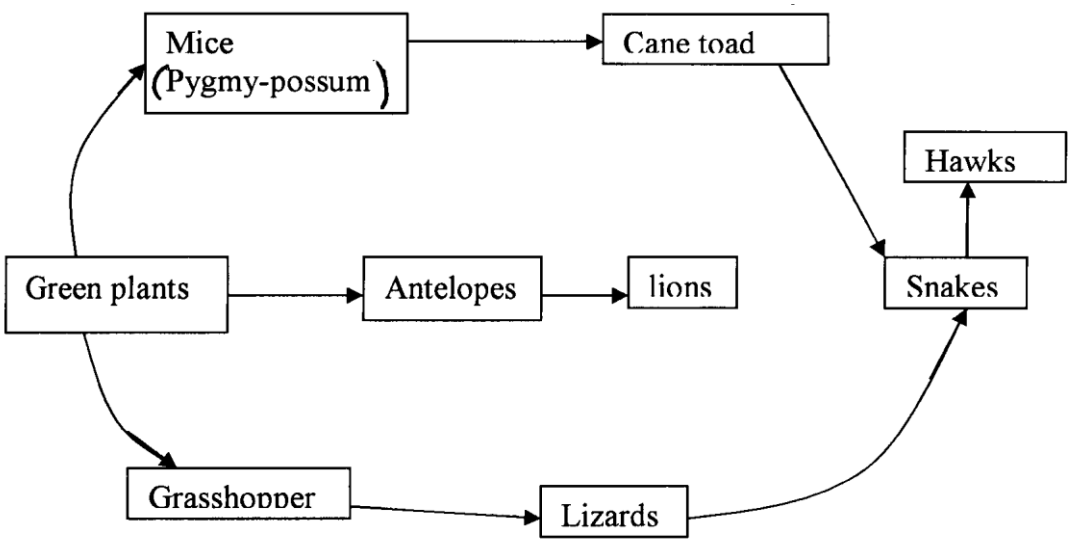
3. The diagram below represents a food web in a terrestrial ecosystem.



(a) Which organism has the highest number of preys (lmk)

……

……

(b) Construct food chains with snakes as tertiary consumers (2mks)

……

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(c) State the trophic level occupied by hawks in the food chains constructed in b) above (lmk)

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(d) Describe how capture — recapture method can be used in estimating the population of

fishes in a lake. (4mks)

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4. (a) Differentiate between the mode of fertilization in higher plants and in mammals (2mks)

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(b) Explain the role of the following hormones in the female menstrual cycle

(i) Oestrogen (2mks)

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(ii) Luteinizing hormone (2mks)

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(c) Give two functions of the placenta during pregnancy (2mks)

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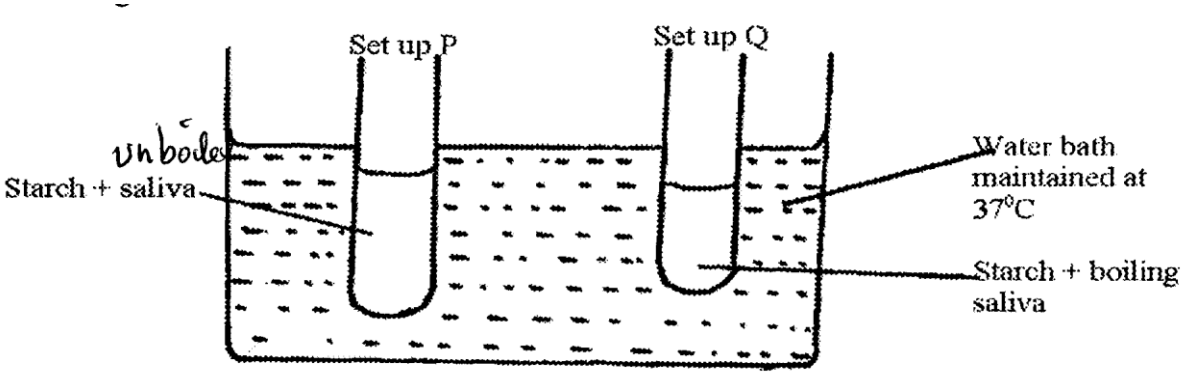
5. In an experiment to investigate an aspect of digestion, two test tubes P and Q were set up as show in the diagram below.



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

(a) What was the aim of experiment? (1mk)

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(b) What results were expected in test tube P and Q (2mks)

P……

…….

Q……

……..

(c) Account for the results you have given in b above in test tube P and Q (2mks)

P

……

……

……

……

Q

……

……

……

……

(d) Why was the set up left at 37°C (1 mk)

……

……

……

……

(e) Name the carbohydrate stored in (2mks)

i. Mammalian liver

……

……

ii. Potato tuber

……

……

SECTION B

Answer question 6 (Compulsory) and either question 7 or 8

6. Two sets of a pea seeds were germinated, set A was placed in normal daylight conditions in the laboratory while set B was placed in a dark cupboard. Starting a few days later the shoots lengths were measured twice daily and their mean lengths recorded as shown in the table below.

Time in hours	0	12	24	36	48	60	72	84
Set A length (mm)	12	14	20	23	28	31	47	54
Set B length (mm)	17	23	28	35	48	62	80	94

(a) Using suitable scale draw the graphs of the mean lengths in set A and B against time.

(b) From the graph state the mean shoot length of each set of seedling at the 66th hour (2mks)

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(c) Account for the difference of curve B and A (3 mks)

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(d) Explain what would happen to set up B if it were allowed to continue to grow under conditions of darkness (4mks)

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……

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……

……

(e) State three external conditions which should be constant for both set ups (3mks)

……

……

……

7. (a) What is reflex action (lmk)

(b) Describe what happens in the nervous system of a person who withdraws a finger from a very hot object. (14mks)

(c) Explain what happens to a young growing seedling when exposed to unidirectional source of light. (5mks)

8. (a) Outline the characteristics of the meristematic tissues. (5mks)

(b) Explain how different meristematic tissues contribute to growth higher plants. (l5mks)

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KCSE PREDICTOR 10

231/1
BIOLOGY
PAPER 1

Answer all the questions in the spaces provided

1. State two feature common in mammals and bird (2 marks)

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2. Name the causal organism of the following diseases in humans; (2 marks)

a) Bilharzi

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...

b) Syphilis

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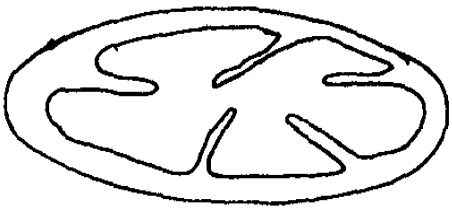
3. i) Identify the organelle shown below (1 mark)



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...

ii) How is the organelle you have identified in a(1) above suited to its function (2 marks)

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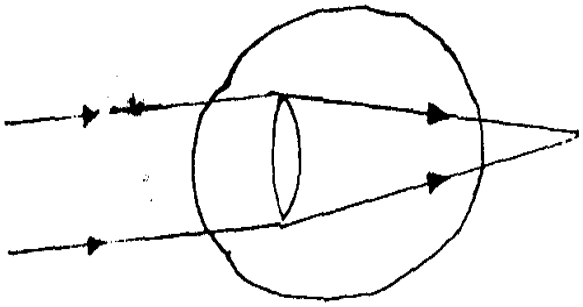
.....

4 Use the diagram below to answer the questions that follow



i) Name the eye defect represented above (1 mark)

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...

.....

...

ii) What is the cause of this defect (1 mark)

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...

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...

iii) How can the defect you have named (a) (i) be corrected? (1 mark)

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5. Name the components of the blood that do not enter the renal tubule in mammals.(2 marks)

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6. Give two factors affecting the rate of respiration. (2 marks)

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7. State three structural differences between muscles alimentary canal and biceps muscles.(3 marks)

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8. a) Name the micro-organism found in the root nodules of legumes (1 mark)

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b) State the association of the micro-organisms named in (a) above (1 mark)

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c) What is the role of the micro-organism you named in (a) above. (1 mark)

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9. a) Name the stage in mitosis where chrornatids collect together at the two opposite ends of
the spindle fibres. (1 mark)

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...

b) State two functions of centrioles (2 marks)

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10. a) State two functions of large intestines in man. (2 marks)

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...

b) Name the disease caused by lack of each of the following in human diet. (3 marks)

Vitamin D

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...

Iodine

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...

.....
...

Iron

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...

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...

11. a) In a blood test, a few drops of anti-B serum were added to two samples of blood. It was noted that agglutination occurred. What were the possible blood groups of the two blood samples? (2 marks)

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b) Why would carboxyhaemoglobin lead to death? (2 marks)

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12. The figure below is a structural diagram of a portion from a nucleic acid strand.

```
--S - - P - - S - - P - -S - - P - - S

  C   G       U       C
```

a) Giving a reason, name the nucleic acid to which the portion belongs. (2 marks)

Name

.....

...

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Reason

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b) Write down the sequence of bases of a complimentary strand to that(1 mark)

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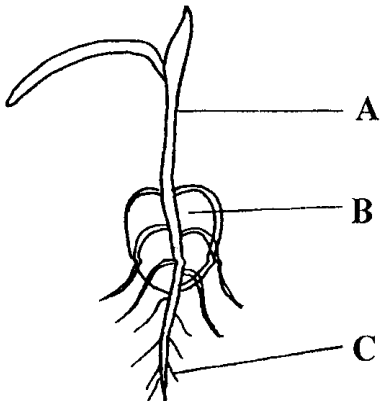
13. The diagram below represents a maize seedling.



a) Name the structure labeled A and C (2mks)

A

.....

...

.....

...

C

.....

...

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...

b) i) State the functions of parts labeled B and C (2 marks)

B

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...

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...

.....

...

C

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...

ii) Name the type of germination exhibited by maize. (1 mark)

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14. What is meant by the following terms? (2 marks)

a) Carbon (IV) oxide fixation

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...

.....

...

b) Compensation point

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15. a) State two ways in which floating leaves of aquatic plants are adapted to gaseous exchange

(2 marks)

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...

b) Name two structures for gaseous exchange in aquatic plant. (2 marks)

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16. Outline three roles of active transport in the human body.

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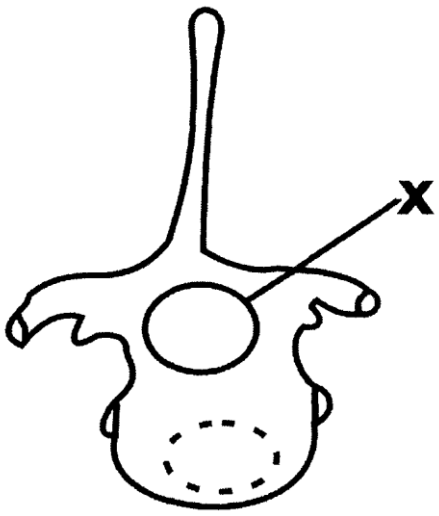
17. The diagram below shows a bone from a mammal.



a) Name the structure that passes through part labeled X. (1 mark)

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b) What function does the vertebra provide for structure X (1 mark)

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c) In which region of the vertebral column is:

i) The bone found? (1 mark)

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ii) Give a reason for your answer in c (i) above. (1 mark)

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1 8. a) Explain how the following parts of a mammalian reproductive system are adapted to their

functions. (2 marks)

i) Testis

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ii) Uterus

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b) Explain why removal of the ovary after four months of pregnancy does not terminate pregnancy.

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19. State the role of the following hormones in homeostasis

i) Antidiuratic hormone (vasopressin) (1 mark)

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ii) Aldosterone hormone (1 mark)

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20. Distinguish between plasmolysis and haemolysis (2 marks)

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21 . Give two reasons why pressure of blood is greater in arteries than in the veins of mammals.

(2 marks)

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22. a) What is meant by

i) Autecology (1 mark)

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ii) Synecology (1 mark)

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23. An organelle was magnified 800 times by an electron microscope. Its diameter was 2 millimetres.
Calculate the actual diameter in micrometres. (2 marks)

24. Give two advantages of natural selection to organisms. (2 marks)

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25. a) State two ways in which some fungi are harmful to man (2 marks)

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b) List the main characteristics that are used to sub- divide arthropods into classes(2 marks)

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26. Euglena is positively phototactic. Of what biological significance is this characteristics(1 mark)

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27. What is the role of the vascular bundles in plant nutrition? (3 marks)

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28. Study the diagram below which shows part of a mammalian tooth and answer the questions that follow

a) With a reason, identify the tooth ((2 marks)

Identity

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...

Reasorn

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b) State one adaptation of the tooth to its function (1 mark)

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29. a) What is co-dominance? (l mark)

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b) Name two disorders in human blood that are caused by gene mutation. (2 marks)

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30. Plants relatively have less waste to excrete than animals. Giving two reasons to explain this
Observation. (2 marks)

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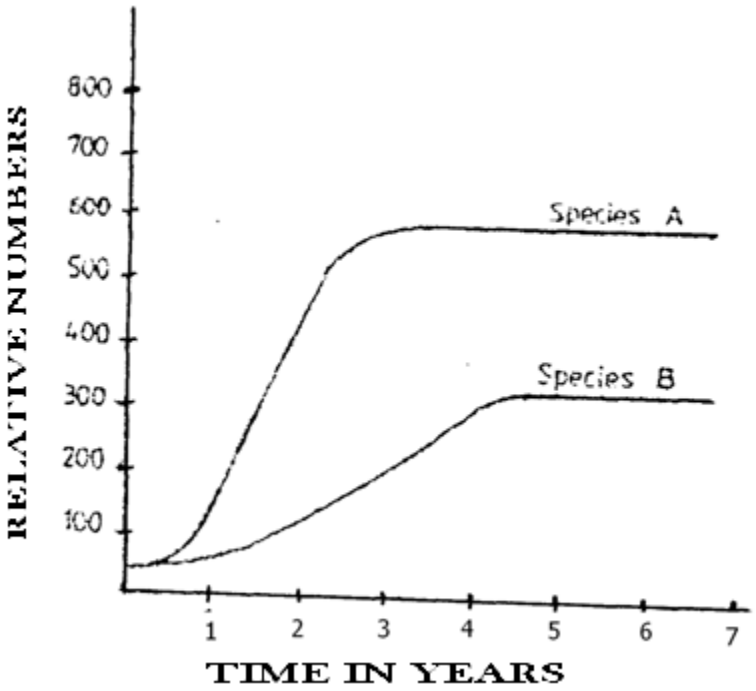
KCSE PREDICTOR 10

231/2
BIOLOGY
PAPER 2

SECTION A (40 MARKS)
Answer All questions in this section

1. Two herbivorous mammalian species were introduced into an ecosystem at the same time and iin equal numbers. The graph below represents their populations during the first seven years. Study the graph and answer the questions that follow.



a) i) Which species has a better competitive ability? (1 mark)

.....

.....

ii) Give reason for your answer (l mark)

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.....

b) Account for the shape of the curve of species A between

i) One year and three years (2 marks)

.....

.....

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.....

ii) Three years and seven year (2 marks)

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c) A natural predator for species A was introduced into the ecosystem.

With a reason state how the population of each species will be affecte(2 marks)

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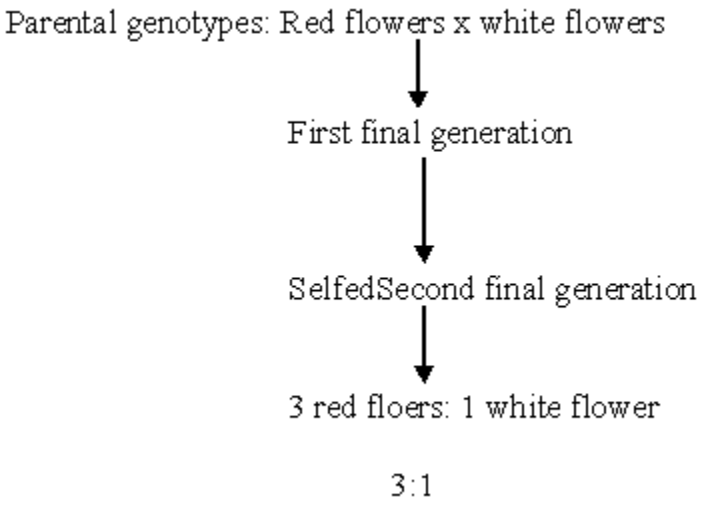
2 The chart below represents the result of successive crosses, staring with red flowered plants and white flowered plants in which both plants are pure breeding



a) What were parental genotype ? Use letter R to represent the gene for red colour and r for white colour (l mark)

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.....

.....

b) i) What was the colour of the flowers in the first filial generation? (l mark)

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ii) Give a reason for your answer in b (i) above (l mark)

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c) lf 480 red flowered plants were obtained in the second filial generation, how many F2 plants had white flowers? Show your working (5 marks)

3. A form 1 student placed a red blood cell in a solution and made an observation as follows. Start of experiment/ end of experiment

a) i) In what solution was the red blood cell paced? (l mark)

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ii) Explain the observation above (2 marks).

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b) If the red blood cell was replaced by a plant cell what would be the observation (2 marks)

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c) Why don't the red blood cell undergo the same changes as above while in the body(3 marks)

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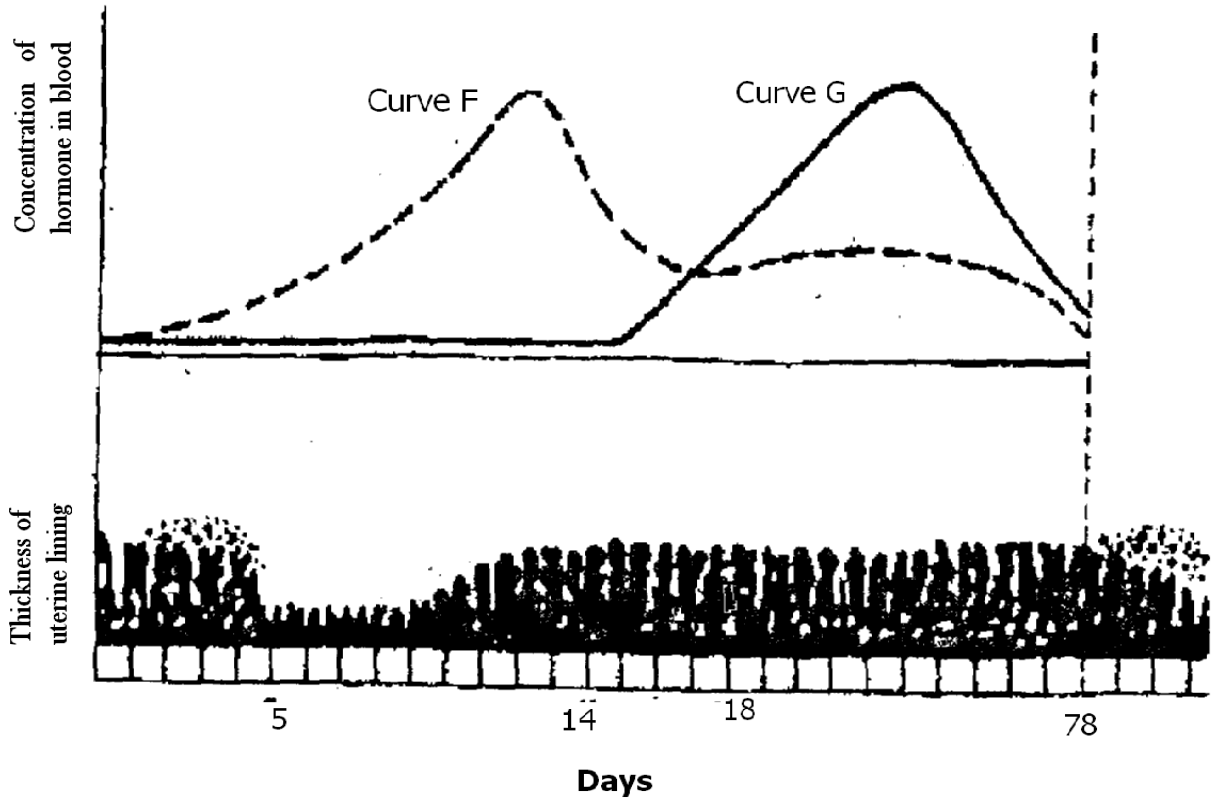
4. The figure shows changes that take place during menstrual cycle in human



a) Name the hormone whose concentrations are represented by curves F and G (2 marks)

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b) State the effects of the hormones named in (a) above on the lining of the uterus (2 marks)

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c) i) Name the hormone which is released by the pituitary gland in high concentration

on the 14th day of the menstrual cycle (l mark)

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ii) State two functions of the hormone named in (c) (i) above (2 marks)

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d) State the fertile period during the menstrual cycle (1 mark)

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5. The diagram below represents a bone obtained from a mammal

a) Name the bone (1 mark)

.....

b) Name the:

i) Bone which articulate with the bone named in (a) above at the cavity labeled K;

(1 mark)

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.....

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ii) Joint formed by the two bones (1 mark)

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c) State the function of the part labeled J

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d) Explain how the pelvic girdle is adopted to its function (4 marks)

Section B

Answer question six in the spaces provided and either question 7 or 8 in the spaces provided after question8

6. An experiment was carried out to investigate the nutritional value of two dry powder animals feeds X and Y over a period of six months. Twenty 5 month's old castrated goats were use. The goats were divided into two equal groups A and B.

The animal's in group A were fed on feed X throughout the experiment while those of group B were fed on feed Y.

The feeds were supplemented with dry hay and water. The average body weight of each group of goats and the weight of the dry powder feeds were determined and recorded each month. The faeces produced by each group was dried and weighed and the average dry faecal output per month was also recorded. The results are as shown below.

	GROUP	A		GROUP	B	
Months since commencement of the experiment	Average total weight of goats(Kg)	Average weight of total feed(Kg)	Average monthly dry faecal output(Kg)	Average total weight of goats(Kg)	Average weight of total feed(Kg)	Average monthly dry faecal output(Kg)
0	20.4	26.7	10.5	20.5	35.4	16.5
1	22.5	27.5	10.7	19.5	34.3	17.7
2	24.5	25.8	10.3	19.0	35.2	17.2
3	26.3	18.5	8.8	18.5	36.1	17.5
4	28.0	16.6	7.2	17.1	36.0	16.9
5	29.4	16.3	6.0	16.3	35.8	16.8
6	29.5	16.1	5.6	15.6	35.5	16.6

a) i) What is the relationship between the amount of feed and the faecal output(2 marks)

.....

ii) Work out the average increase in weight for the animal's in group A during:

The first four months

The last two months

.

(4 marks)

iii) Account for the average increase weight in goats in group A during:

The first four months

The last two months

(4 marks)

iv) Which of the two feeds is more nutritious? Give reason for your answer

(2 marks)

b) Explain the digestion of lipids in humans (8 marks)

7 a) Describe how semicircular canals perform their functions (8 marks)

b) Describe how the cervical, lumbar and sacral vertebrae are suited to their functions

(l2 marks)

8 a) State four characteristics of gaseous exchange surfaces. (4 marks)

b) Explain the theories for opening and closing of the stomata (16 marks)

FOR MARKING SCHEMES

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