KCSE FINAL PREDICTION

BIOLOGY

(KCSE PREDICTIONS 1-10)

An Exclusive Top-Notch KCSE Model Prediction Questions.

A special preview of Possible Expected sample KCSE Questions Most likely to be Tested in the Forthcoming KNEC examinations.

SERIES 1

Proudly prepared by an Exceptional team of Experienced Veteran KNEC examiners within the National Group of Mwalimu Agency.

For Marking Schemes/Answers

0746 222 000

MWALIMU AGENCY

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 1 PAPER 1

TIME: 2 HOURS

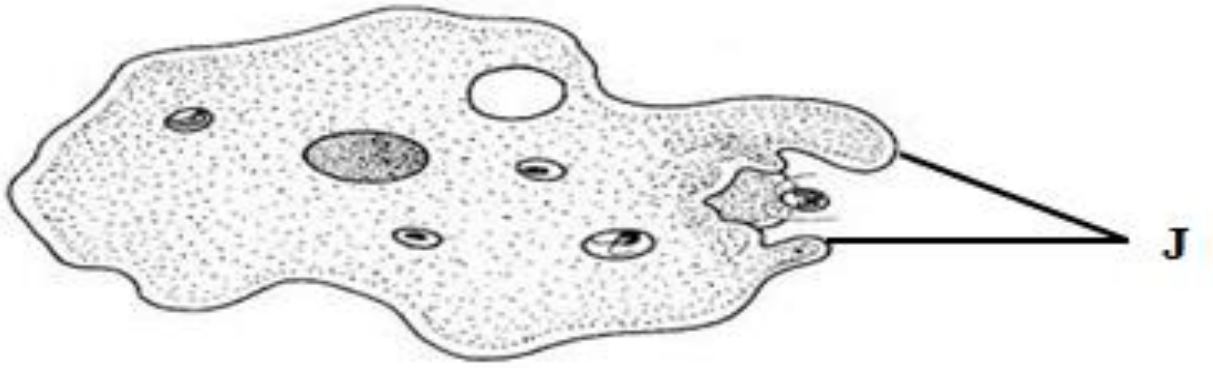
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

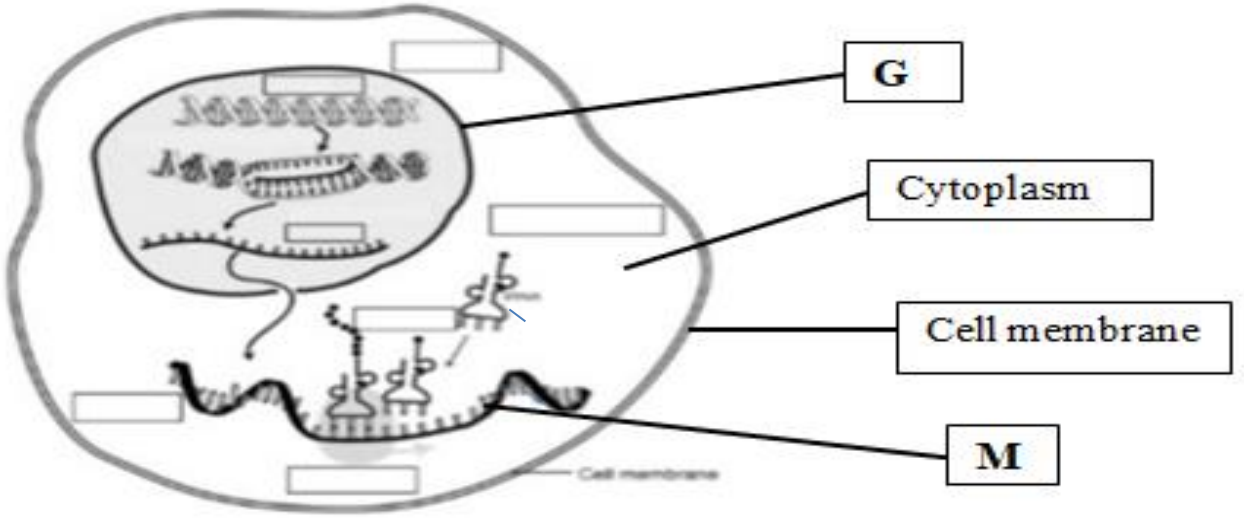
Answer All the Questions

1. Identify the characteristics of living organisms shown by the following; **(2marks)**
   - **a)** Bursting of the sporangium in *Rhizopous*.
   - **b)** A cheetah chasing after a gazelle.
2. Define the following terms as used in biology;
   - **i.** Entomology. **(1mark)**
   - **ii.** Histology. **(1mark)**
3. State **three** significance of Osmosis to plant nutrition. **(3marks)**
4. The diagram below represents amoeba. Study it and answer the questions that follow;



   - **a)** Name the respiratory surface found in the above organism. **(1mark)**
   - **b)** i. Identify the structures labeled **J**. **(1mark)**
   - **ii.** State **two** functions of the structure named in (b) (i) above. **(2marks)**

5. Below is a diagram of a mammalian cell. Study it and answer the questions that follow.



a) Identify the structures labeled; **(2marks)**

G. ……..
M. ……..

b) State the function of the structure labeled **M**. **(1mark)**

6. Give **two** roles of the colon in human digestive system. **(2marks)**

7. Distinguish between dentition and dental formula. **(2marks)**

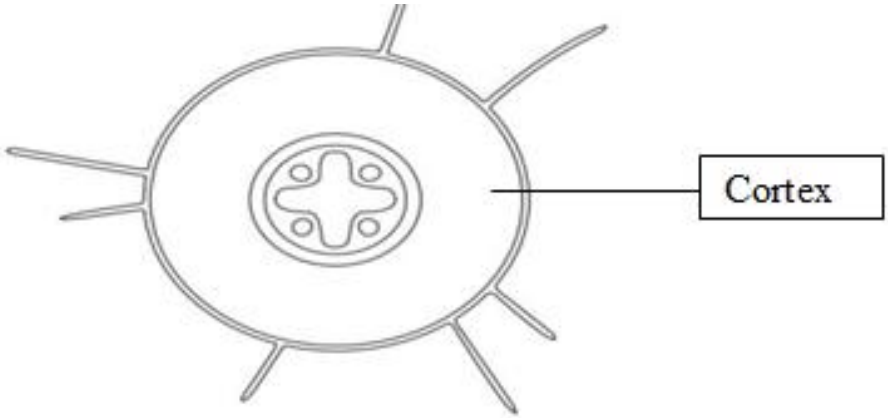
8. Name a carbohydrate that is abundance in the following;

a. Ripe fruits. **(1mark)**

b. Blood of vertebrates. **(1mark)**

9. Apart from photosynthesis identify one other function of chloroplast in plants. **(1mark)**

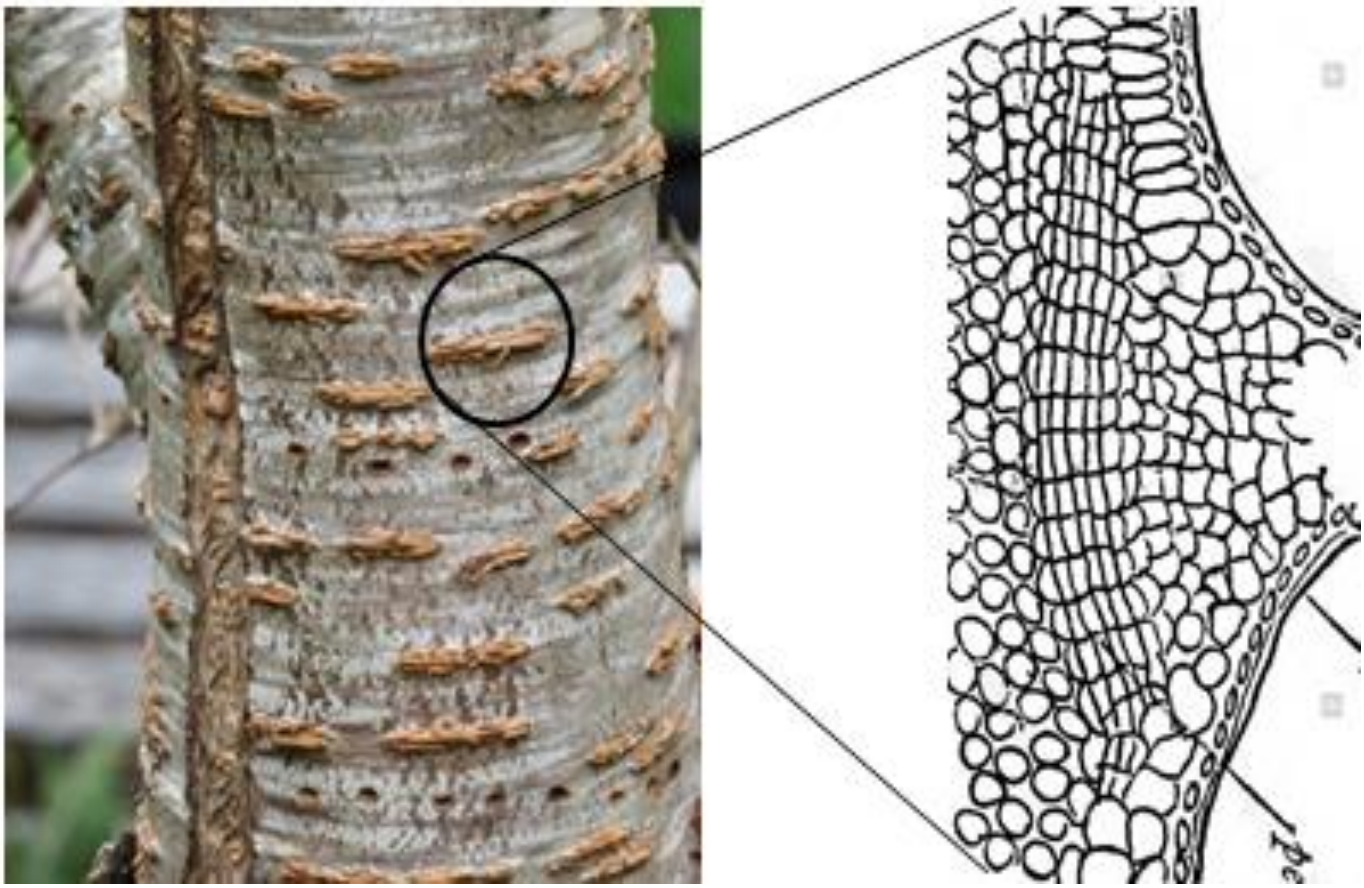
10. Below is a transverse section of a root. Study the diagram and answer the question that follows.



a) Identify the class from which the section was obtained. **(1mark)**
b) Give a reason for your answer in (a) above. **(1mark)**
c) State **one** adaptation of endodermis to its function. **(1mark)**
d) Name **two** tissues found in the cortex. **(2marks)**

11. Distinguish between Guttation and transpiration. **(2marks)**

12. During a field study, students from Kenya high school found a woody plant as illustrated below.

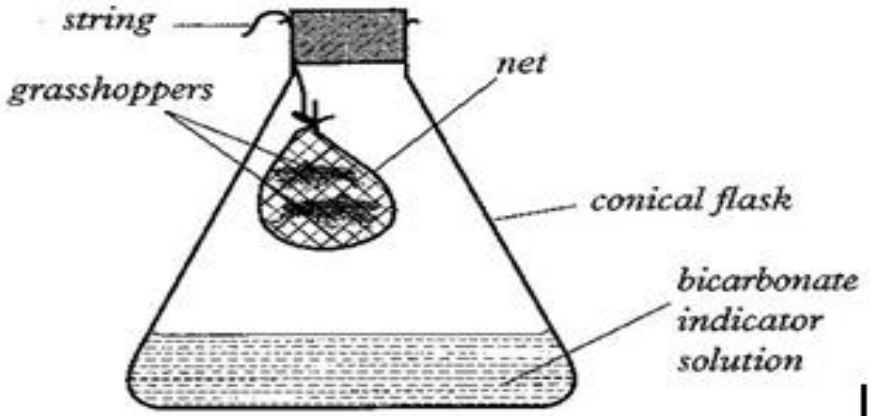


a) Identify the above structure. **(1mark)**
b) Give **two** adaptations of the structure named in (a) above**.** **(2marks)**
c) Where is the above structure located in halophytes? **(1mark)**

13. State **two** structural differences between a cell wall and a cell membrane. **(2marks)**

14. a) Identify the cells that secrete the following along the alimentary canal.
i) Hydrochloric acid. **(1mark)**
ii) Rennin. **(1mark)**
b. State **two** significance of smooth muscles in the digestive system. **(2marks)**

15. During an investigation of a certain metabolic reaction, students set up the apparatus as shown below.



a. Identify the physiological process being investigated. **(1mark)**

b. Account for the observation made in the conical flask after 30 minutes. **(2marks)**

16.a) State **three** ways in which human skin protects the body against bacterial infection. **(3marks)**

b, Name the protein found in the Malpighian layer of the skin and state its function.

Name. **…… (1mark)**

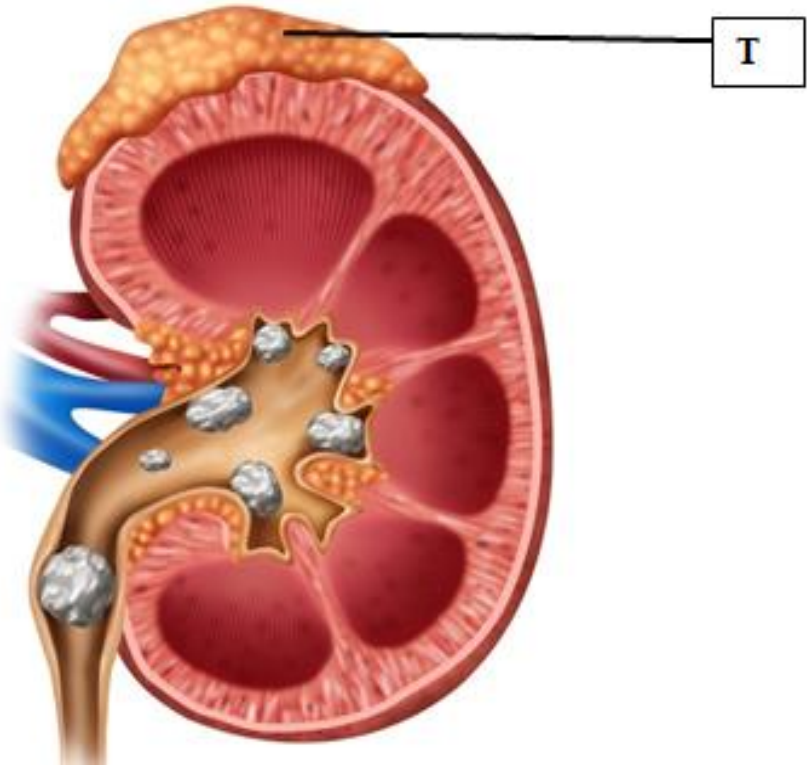
Function. **……..... (1mark)**

17. A student mixed a sample of urine from a person with Benedict's solution and heated, the colour changed to orange.

a) What did the student conclude on the health status of the person? **(1mark)**

b) Which organ in the person may not be functioning properly? **(1mark)**

18. An investigation was carried out on a mammalian kidney.



i. Name the structure labeled **T.** **(1mark)**

ii. What is the function of the structure named in (i) above in the kidney. **(1mk)**

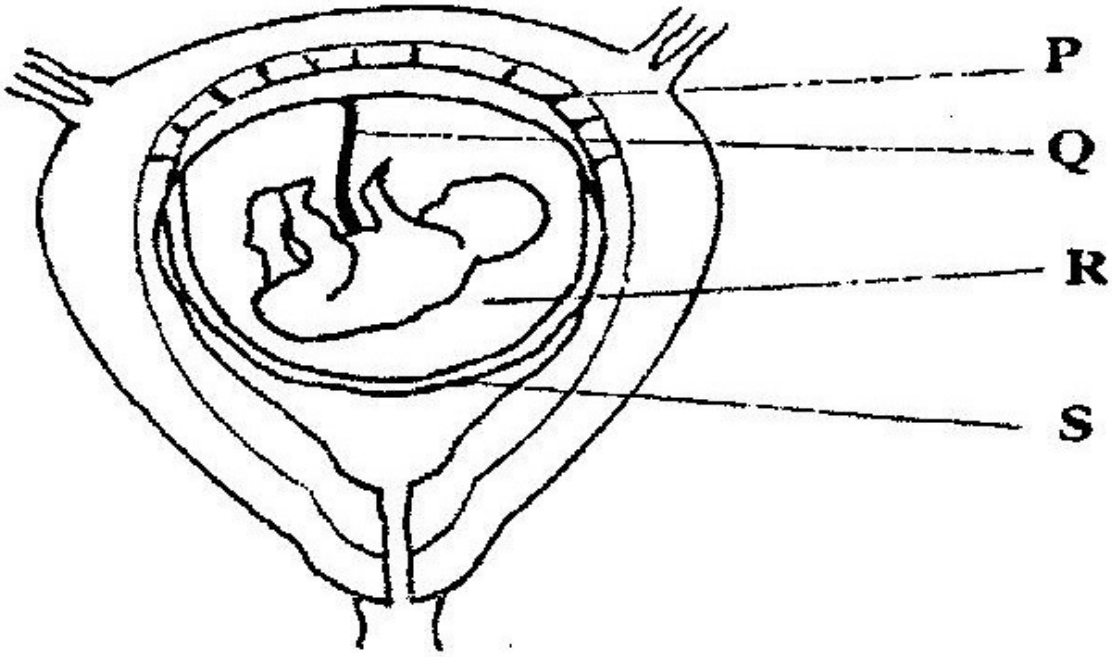
iii. Identify the disease shown in the kidney above. **(1mark)**

19. State the importance of Saprophytic fungi in an ecosystem. **(1mark)**

20. List **two** assumptions made when using Capture-recapture as a method of estimating population. **(2marks)**

21. Give **two** reasons why Pteridophytes are considered more advanced than Bryophytes. **(2marks)**

22. Study the diagram below and answer the following questions.



a) State the function of the part labeled **Q**. **(2marks)**

b) State the role of the part labeled **R**. **(1mark)**

c) Identify a hormone produced by part labeled **P**. **(1mark)**

23. Give the function of Prolactin in female reproductive cycle. **(1mark)**

24. Below is a photograph illustrating a germinating seedling.

a) Identify the type of germination. **(1mark)**

b) Give **two** functions of the structure labeled **Z**? **(2marks)**

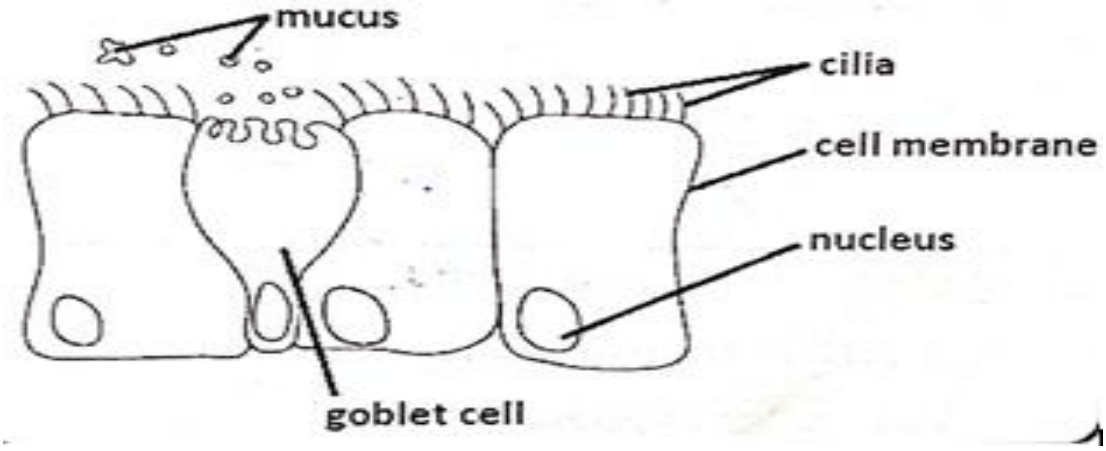
c) What the name given to the part labeled **W**? **(1mark)**

d) Explain how seedling H responds to light causing it to straighten. **(2marks)**

25. a) Define vestigial structures? **(1mark)**

b) State **two** examples of vestigial structures in man. **(2marks)**

26. The figure below shows some cells from parts of mammalian respiratory tract.



a. Identify the part of the respiratory tract where the cells were obtained from. **(1mark)**

b. Explain the role of: **(2marks)**

i. The mucus

ii. The cilia.

27. Mycorrhiza is a symbiotic association between two organisms. Name the two organisms that make this association. **(2marks)**

28. State the significance of diffusion in the following;

a. Pollination. **(1mark)**

b. Skeletal muscle cell. **(1mark)**

29. Explain the significance of the following;

a) The cardiac muscle is myogenic. **(1mark)**

b) The left ventricle of a mammalian heart is more muscular than right ventricle. **(1mark)**

c) Most of carbon (IV) oxide is not dissolved in the blood plasma. **(1mark)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 1 PAPER 2

TIME: 2 HOURS

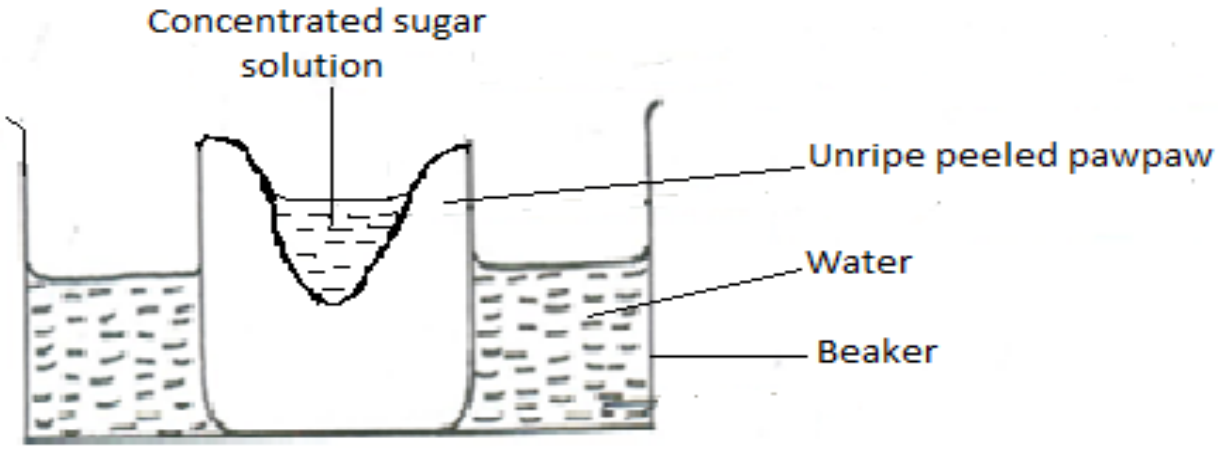
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) A group of students set up an experiment to investigate a certain physiological process. The set up was as shown in the diagram below.



After some time, the students observed that the level of sugar solution had risen.

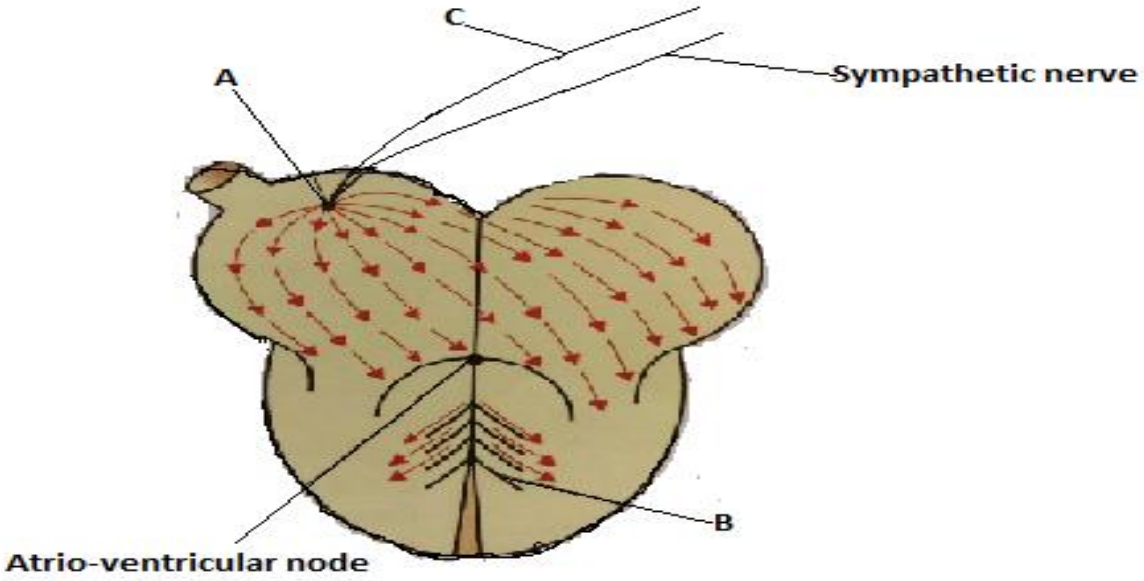
(a) What physiological process was being investigated? **(1mk)**

(b) Account for the rise in the level of sugar solution in this experiment. **(4mks)**

(c) (i) State the results the students would obtain if they repeated the experiment using a piece of boiled pawpaw. **(1mk)**

(ii) Give a reason for your answer in (c) (i) above. **(2mks)**

2) Use the diagram below to answer the questions that follow.



(d) (i) Name the parts labelled **A**, **B** and **C**. **(3mks)**

(e) State the function of the part labelled **C**. **(1mk)**

(f) Explain the difference between pulmonary circulation and systemic circulation. **(2mk)**

(g) What is the advantage of having a double circulatory system over a single circulatory system? **(2mks)**

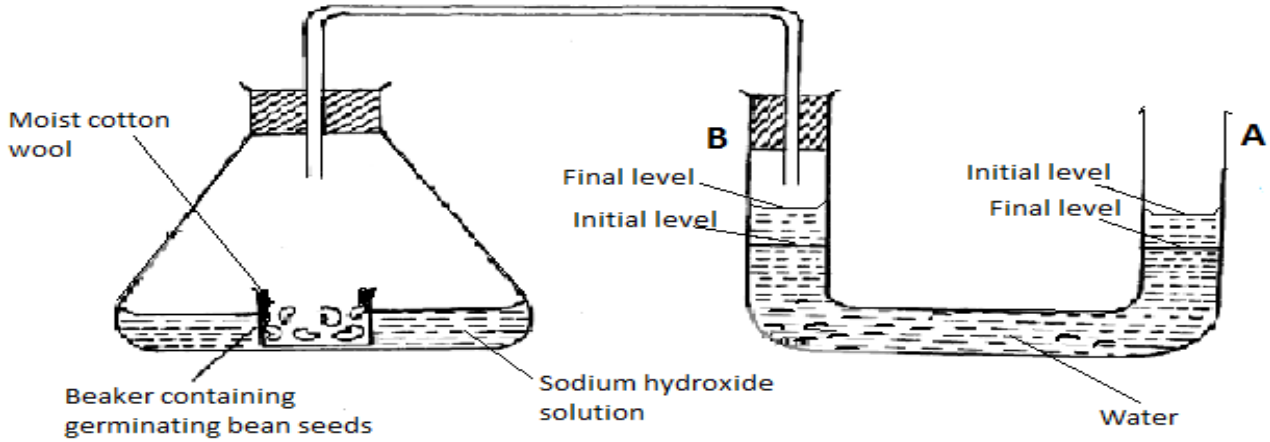
3) In an investigation, a variety of pea plants grown from seeds with smooth coats were crossed with plants grown from seeds with wrinkled coats. All the seeds obtained in the first filial (F1) generation had smooth seed coats.

(h) Using letter **R** to represent the gene for smooth seed coat, work out the genotypes of the F1generation. Show your working. **(3mks)**

(i) If F1 generation was selfed, determine the phenotypic ratio of the second filial (F2) generation. Show your working. **(4mks)**

(j) If the total number of seeds in the F2 generation was 14640, calculate the number of seeds with wrinkled coats. Show your working. **(1mk)**

4) The apparatus below was set up by a student to find out the changes in gases during germination of bean seeds. Study it and answer the questions that follow.



(k) After 48 hours the level of water in U-tube **A** had dropped and rose in **B** as indicated above. Explain this observation. **(3mks)**

(l) The equation below shows the process that takes place in mammalian muscles.

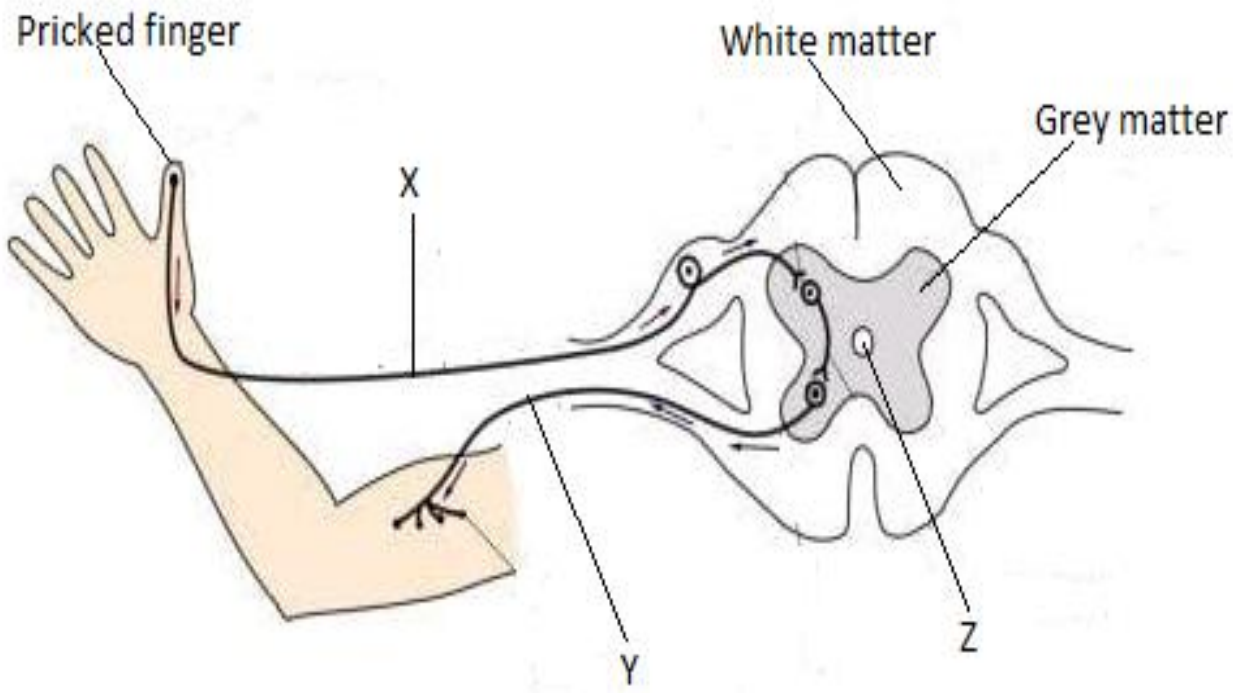
$2C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102CO_2 + 98H_2O + Energy$

Calculate the respiratory quotient from the equation above. **(2mks)**

Identify the substrate being respired from the equation above. **(1mk)**

Explain why it is difficult to calculate the respiratory quotient in plants. **(2mks)**

2) The diagram below illustrates the components of a simple reflex that takes place when a person's finger is accidentally pricked by a sharp pin.



(a) Name the neurones labelled **X** and **Y**. **(2mks)**

(b) State **one** function of the fluid found in the part labelled **Z**. **(1mk)**

(c) Explain how the above simple reflex action takes place. **(5mks)**

SECTON B (40 MKS)

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

6) In a population growth, two species of flour beetles, *Tribulum confusum* and *Tribulum casteanum* were grown in a box with unlimited supply of flour (food). The box was kept at 24^0C and 30% relative humidity. The beetles were counted at certain intervals and the results tabulated as shown below.

No. of days after introduction		0	10	50	60	80	100	120	140	180	200
No. of beetles present in the box	*T. confusum*	20	20	300	800	1330	1440	1620	1600	1620	1600
	T. casteanum	20	20	300	430	500	400	150	60	20	10

(a) Using the same axis, draw graphs of number of beetles in the box against time. **(8mks)**

(b) How many beetles were present on the 76th day? **(2mks)**

T.confusum.....

T.casteanum.....

(c) Account for the shape of *T. confusum* curve between day 1 and 180. **(5mks)**

(d) (i) What happens to *T. casteanum* between day 80 and 160? **(1mk)**

What biological phenomenon is represented by observation in (d) (i) above? **(1mk)**

(e) State any **three** factors that determine the distribution of animals in their habitat. **(3mks)**

7) (a) Explain how the human ileum is adapted to its function. **(10mks)**

(b) Explain the role of the liver in regulation of blood sugar. (**10mks)**

8) (a) Explain the economic importance of fungi. **(9mks)**

(b) Describe the adaptations of flowers to insect pollination. **(11mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 2 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) a) Define the term specimen. **(1mk)**
Give two significances of collecting specimens in biology. **(2mks)**

2) . Give three reasons why *Drosophila melanogaster* is considered suitable for use in genetic experiments. **(3mks)**

3) List two factors you would consider before selecting a microscope for use in a biological study. **(2mks)**

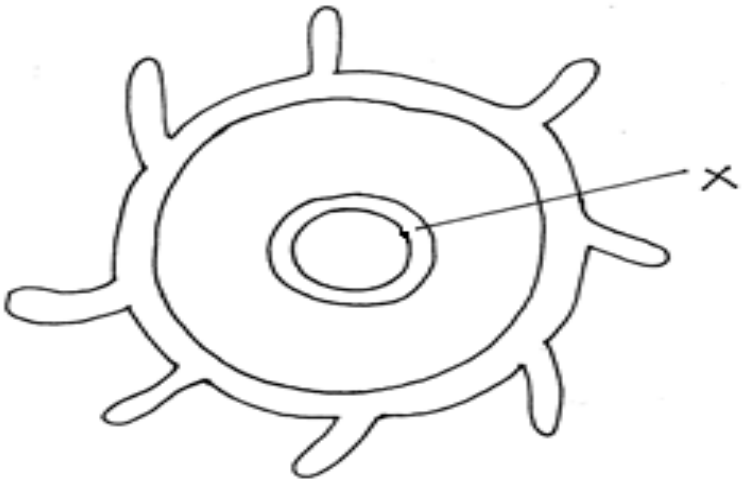
4) A group of form two students placed a fresh leaf in warm water. They observed that air bubbles formed on the surface of the leaf.

a) What biological process were they investigating? **(1mk)**
Name the structures from which the air bubbles were coming from. **(1mk)**
Explain the distribution of the structures named in (b) above on the leaf surfaces of an aquatic plant. **(2mks)**

5) Differentiate between hydrolysis and condensation. **(2mks)**

6) (a) Which sets of teeth would be used in chewing sugarcane for maximum extraction of sap? **(2mks)**
(b) What is the advantage of heterodont dentition over homodont dentition? **(1mk)**
(b) During digestion name the enzyme that acts on the sugarcane sap and give the final products. **(2mks)**
Enzyme
Final products

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



a) The part labelled X turned blue black after iodine solution was applied on the cut cross section of the above specimen

a. Name part X **(1mks)**

b. Give a reason for your answer. **(1mks)**

b) State two phenomenons of stomata which reduce the rate of transpiration. **(2mks)**

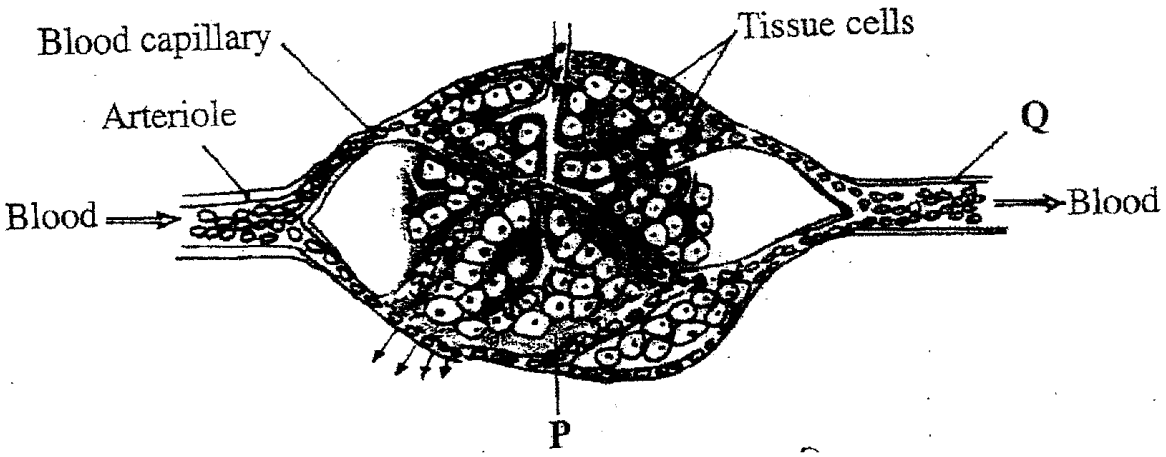
8) a) What is respiratory quotient? **(1mks)**

b) Explain why it is difficult to measure respiratory quotient in plants. **(2mks)**

9) Study and complete the table below. **(3mks)**

Character	Monocot	Dicot
a) Number of stamens		
b) Arrangement of vascular bundle in stem		
c) Type of root		

10) The diagram below shows blood circulation in a mammalian tissue.



a) Give the name of the above section of the blood circulation system. **(1mks)**

b) Explain two the adaptation of the above section to its function. **(2mks)**

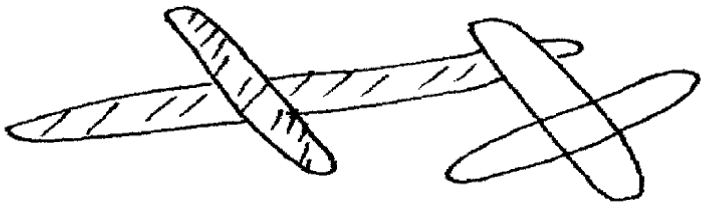
What is the name of blood vessel Q. **(1mk)**

11) Differentiate between dioecious and monoecious plants. **(2mks)**

12) a) Why does endosperm weight of a germinating seed decrease as the weight of the shoot increases. **(l mks)**

b) State three importance of the pupa stage of metamorphosis to insects. **(lmks)**

13) The diagrams below show a pair of homologous chromosomes. Study them and answer the questions that follow.



State the phenomenon shown above. **(lmk)**

What is the genetic significance of the phenomenon above? **(lmk)**

Name the type of mutation caused by the above phenomenon. **(2mks)**

14) In an experiment to determine the population of Tilapia fish in a school fish pond, students of Canada school decided to use capture-recapture method.

a) Name three vital tools the students would need for the exercise. **(3mks)**

b) State two factors that might affect the accuracy of their results. **(2mks)**

15) The table below show description of sizes of glomeruli and renal tubules of two animals, which are in different environments.

	Animal Q	Animal W
Glomeruli	Few	Many
Renal tubules	Long	Short

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

Q –

W-

b) Suggest the main nitrogenous waste produced by animal W. **(lmk)**

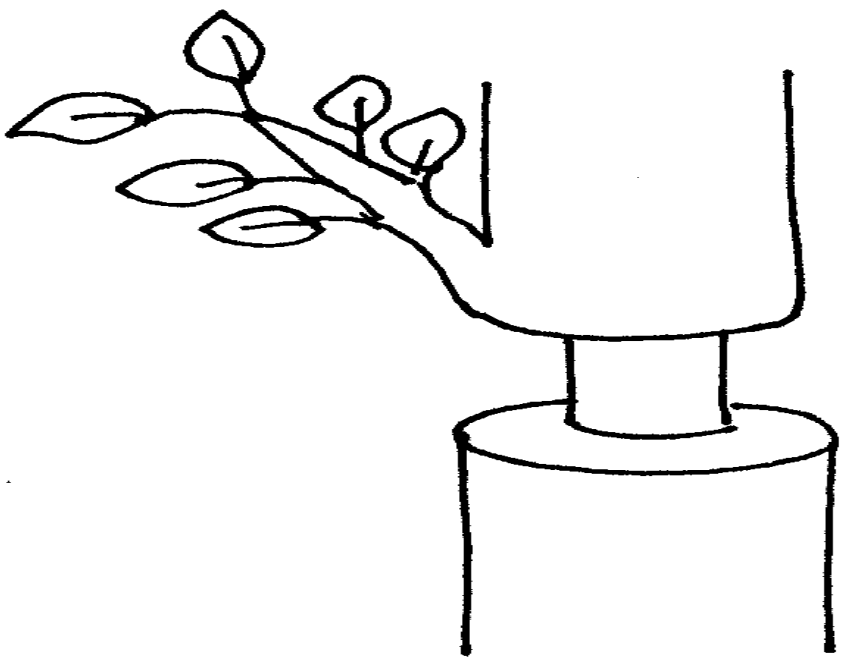
What is the importance of the renal tubules being long? **(lmk)**

16) What is the role of the following hormones in human reproduction?

Follicle stimulating hormone in male **(lmk)**

Luteinizing hormone during menstrual cycle. **(lmk)**

17) Below is representation of an experiment that was carried out on a tree in Kayombe forest.



a) Which two tissues are removed in a ring bark experiment? **(2mks)**

b) Removal of the tissues above leads to some effects to the plant. Name these 2 effects. **(2mks)**

c) State and explain the observation that would be made in the plant above after some time. **(3mks)**

18) A section of nucleic strand contains the following sequence.

A — C — G — A — G — A — T — A— C

i) Write the complimentary DNA stand. **(lmk)**

Write the mRNA strand of the strand in (a) above. **(lmk)**

b) Name the site for protein synthesis in a cell. **(lmk)**

State one disorder caused by non-disjunction mutation. **(lmk)**

19) i) State the importance of rings of chitin in the tracheal system of insects. **(lmk)**

a) Explain the significance of maintaining a steep concentration gradient in the respiratory surfaces of animals. **(lmk)**

b) Explain why a bony fish dies shortly after being removed from water. **(3mks)**

20) Explain why Lamark's theory of evolution is not accepted by modern scientist. **(2mks)**

21) Name the branch of biology that deals with;

a) Relationship between antelopes and gazelles in their environment. **(lmk)**

b) Study of Ebola virus. **(lmk)**

Explain what would happen if a given of living things lose their ability to reproduce. **(lmk)**

22) Explain the following when testing a leaf for starch.

i. Boiling the leaf in hot water. **(lmk)**

ii. Destarching **(lmk)**

iii. Boiling the leaf in methylated spirit. **(lmk)**

23) Explain why osmosis is a special type of diffusion. **(lmk)**

24) Explain three protective functions of the blood. **(3mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 2 PAPER 2

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) a) Digestive enzymes are made by different organs in the digestive system. Complete the table below by putting a tick (✓) or a cross (X) in the boxes. The first has been done. **(2mks)**

Enzyme	Salivary glands	Stomach	Pancrease	Ileum
Amylase	a. ✓	b. X	✓	✓
lipase				
Protease				

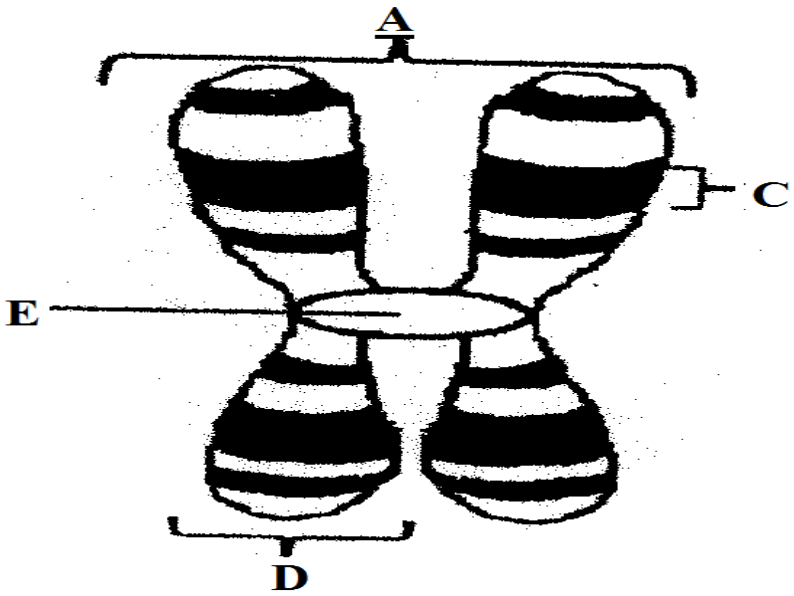
Name the features that increase the surface area of small intestines. **(2mks)**

Name the vitamin which is associated with citrus fruits and green vegetables. **(1mk)**

What food nutrient would be found in the villi of ileum few hours after a meal of boiled rice? **(1mk)**

Caecum is poorly developed in humans. Name the group of mammals in which its well developed and outline its role. **(2mk)**

2) The diagram below shows the structure of a chromosome.



a) Identify the parts labelled D and E. **(2mks)**

Name:

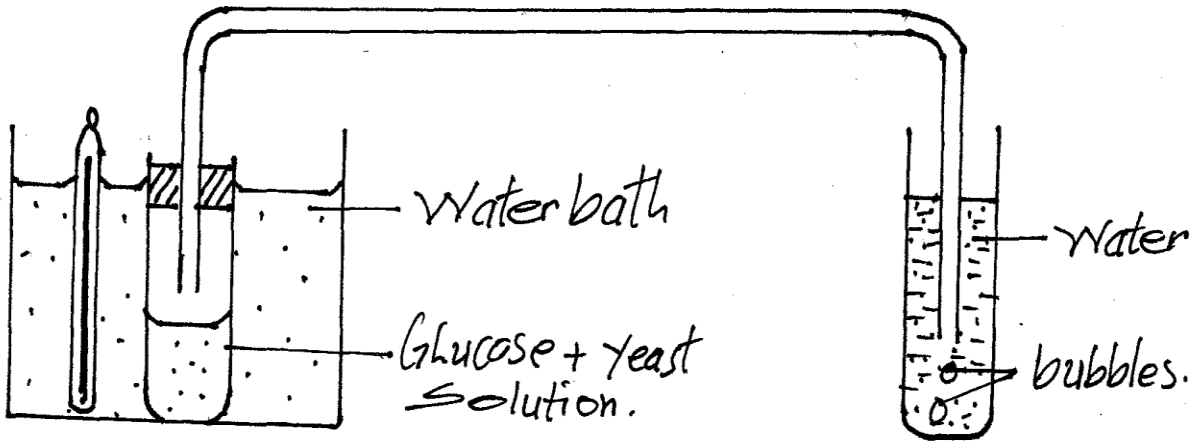
a. Two organelles in an animal cell where DNA is found. **(1mk)**

b. The process whereby DNA makes an identical copy of itself. **(1mk)**

b) Coat colour in cats is determined by a sex linked gene with two alleles, black and orange. When black cats are mated with orange cats, the female offspring are always tortoise shell, their coats show black and orange patches of various sizes, while the male offspring have the same coat colour as their mothers. Using symbols (B) for black and (O) for orange, draw a punnet square to account for a cross of tortoise shell female with an orange male.

(4mks)

3) A form 2 student wanted to investigate the effect of temperatures on the rate of carbon (IV) oxide production by yeast. He set up the apparatus as shown below.



a) The student varied the temperatures of the water bath between 15^0c – 65^0c. He measured the rate of carbon (IV) oxide production by counting the number of bubbles per minute.

Sketch the shape of the graph that the student would obtain on the axes below. **(3mks)**

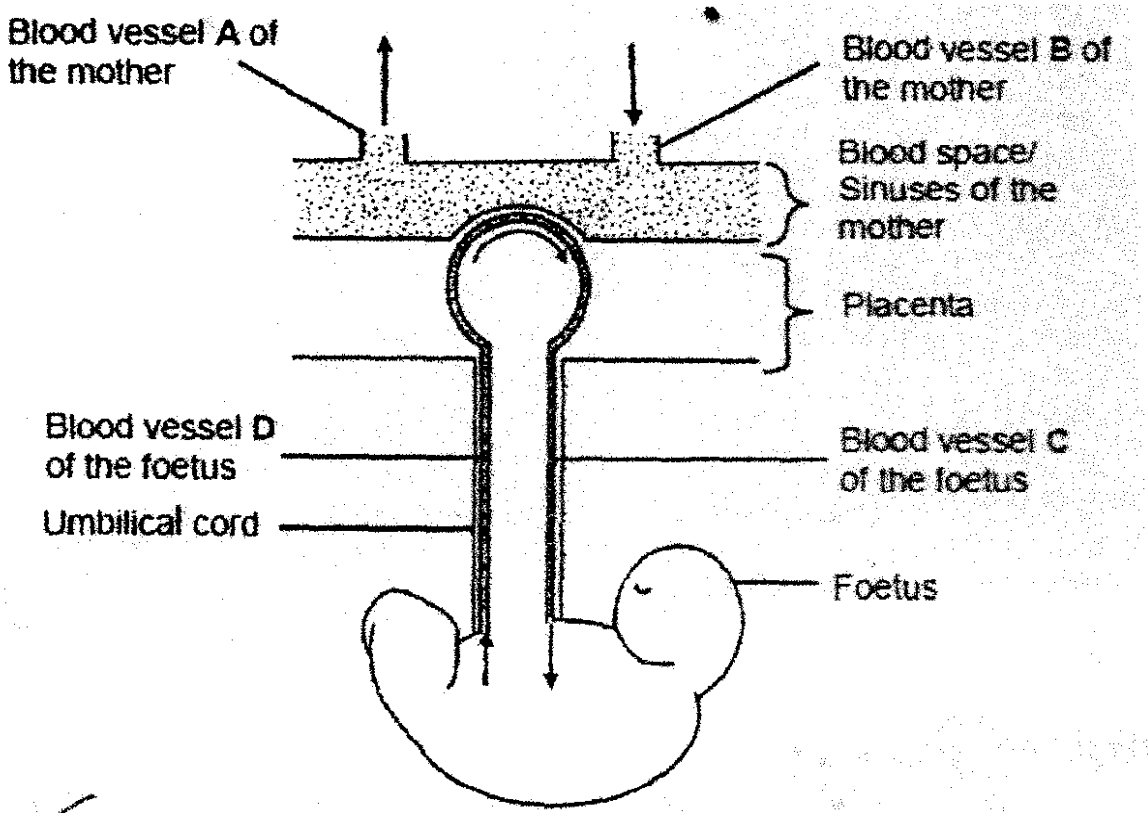
a. Account for the shape of the graph. **(1mk)**

b) Give two variables that the student would need to keep at constant in his experiment. **(2mks)**

i) Yeast is used in production of beer. Write the equation for the respiration of yeast that occurs during production of beer. **(1mk)**

Suggest why lactic acid produced in the body is not highly excreted out of the body. **(1mk)**

4) The diagram below represents the relationship between the blood system of the foetus and that of the mother. The arrows indicate the direction of blood flow in the blood vessels.



a) Apart from diffusion of substances from the mother's blood to the foetus blood and vice versa, state two other functions of the placenta. **(2mks)**

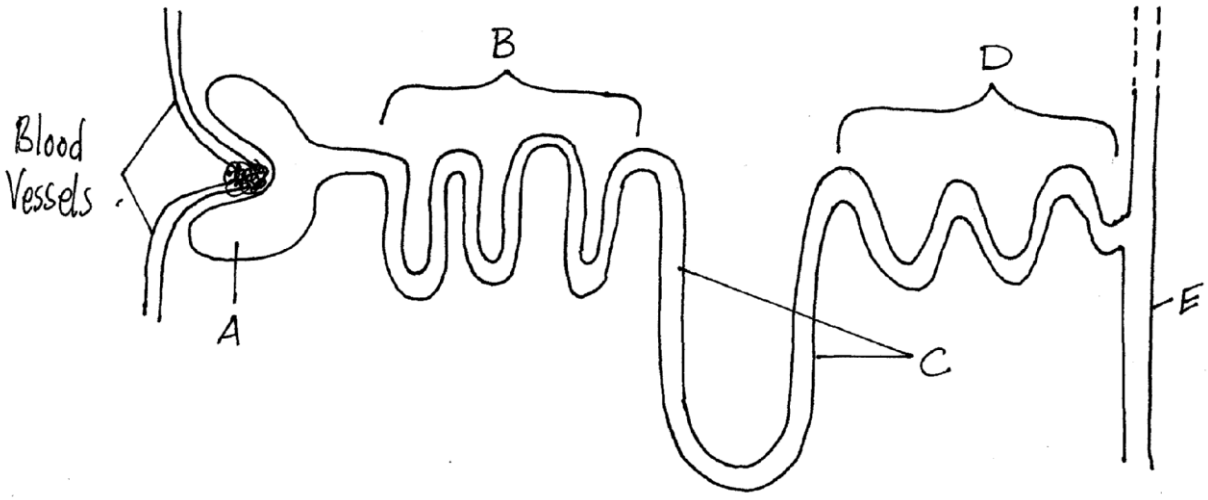
b) i) Name the blood vessels C and D. **(2mks)**

b) ii) State two differences between the composition of blood found in blood vessel C and blood found in blood vessel D. **(2mks)**

C	D

Explain one consequence for the foetus if blood vessel D becomes blocked preventing blood flow. **(2mks)**

5) The diagram below is of a mammalian nephron and associated structures.



a) i) Identify the parts labelled D and E. **(2mks)**

Reabsorbtion of substances takes place along the regions labelled B-E. Which two letters correspond to the regions in which most water is reabsorbed? **(1mk)**

b) The table below summarizes differences in the concentration of some substances in the blood plasma and the renal filtrate at the end of the proximal convoluted tubule.

Substances	Concentration in blood plasma	Concentration in filtrate at the end of PCT
Proteins	12	0
Glucose	0.15	0
Urea	0.04	0.09

Explain the results. **(3mks)**

In mammals there is a strong positive correlation between the length of the loop of henle and the degree of aridity (dryness) of the environment that a mammal such as the desert rat inhabits. Explain this relationship. **(2mks)**

SECTION B (40marks)

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

6) The table below contains information on changes that occur in a river, downstream from sewage outflow.

Distance downstream from point of sewage entry (m)	Concentration dissolved oxygen (%)	Number of organisms (arbitrary units)		
		Bacteria	Algae	Fish
0	95	88	20	20
100	30	78	8	6
200	20	74	6	2
300	28	60	20	0
400	42	50	40	0
500	58	48	70	0
600	70	44	84	0
700	80	42	90	0
800	89	38	84	0
900	95	36	68	4
1000	100	34	54	20

a) Plot a graph of number of organisms against distance downstream. **(7mks)**

6. b) Describe the changes in the concentration of oxygen dissolved in the water downstream from the point of sewage entry. **(2mks)**

b) Account for the changes in the numbers or each of the following organisms downstream.

a) Bacteria **(3mks)**

b) Algae **(3mks)**

c) Fish **(3mks)**

c) State two ways in which the degree of water pollution covered by sewage can be reduced. **(2mks)**

7. Describe the evidences of organic evolution. **(20mks)**

8. a) Describe the process of fertilisation in a flowering plant. **(15mks)**

b) State the changes that take place in a flower after fertilization. **(5mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 3 PAPER 1

TIME: 2 HOURS

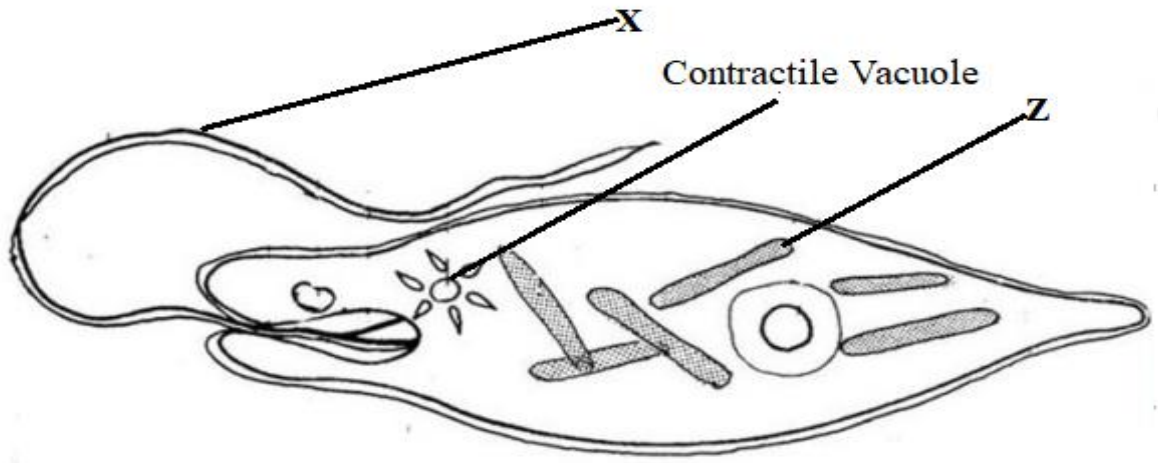
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. The study of biology enhances international cooperation, as countries work together to solve environmental problems. Name 2 biology related international conventions that help solve environmental problems. **(2 marks)**
2. A zebra is observed to be grazing at a grassland. Apart from **nutrition**, name **one** other characteristic of living things observed on the zebra as it grazes. **(1 mark)**
3. The diagram below represents an organism. Study it and answer the questions that follow.



a) Identify the kingdom to which the organism belongs **(1 mark)**

b) Name the structures labelled X **(1 mark)**

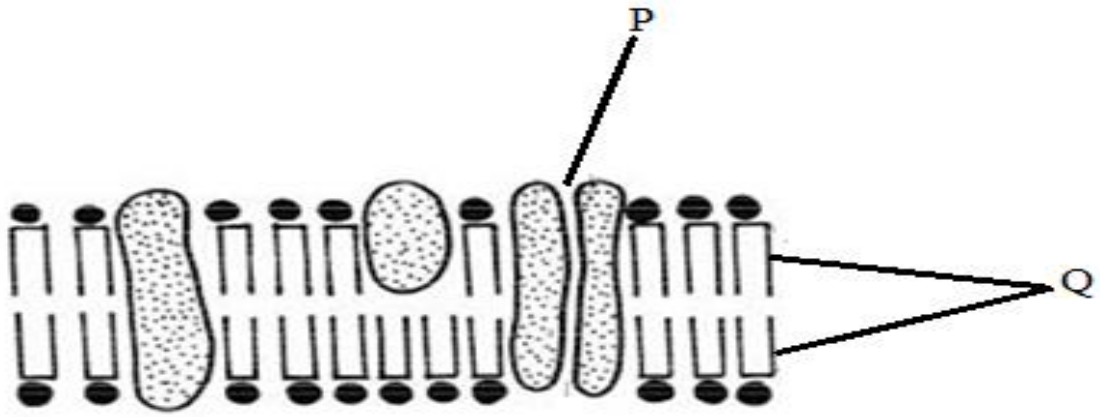
c) Identify the type of nutrition carried out by the organism and give a reason **(2 mks)**

Type of:

Nutrition

Reason

4. The diagram shown represents part of a cell.



a) Identify the structure **(1 mark)**

b) Label the following parts: **(2 marks)**

P……

Q……

5. Name the following organelles. **(3 marks)**

a) Contains chromatin material

b) Forms spindle fibres

c) Digests pathogens that enter the cell

6. The bacterium that causes typhoid is known as salmonella typhi.

a) Write the scientific name correctly **(1 mark)**

b) State the main mode of transmission of the above organism. **(1 mark)**

7. Three stems of *tradescantia* of equal length were placed in three solutions of different concentrations. The set ups were left to stand for 30 minutes. The results were recorded in the table below.

Solution	Initial length of stem (mm)	Final length of stem (mm)
A	37	37
B	37	35.2
C	37	39.7

a) Describe the nature of solution **A** in relation to the final length of the tradescantia stem. **(1mark)**

b) Explain the observation that was made on the tradescantia stem which was put in solution **B.** **(2marks)**

c) State what would happen to red blood cells if they were placed in solution **C.** **(1 mark)**

d) A KASSUME researcher found out that oxygen concentration and sugar consumption is directly related to potassium ion uptake in wheat roots. Name the process by which potassium ions is taken by the roots. Give a reason for your answer **(2 marks)**

8. The diagram below is an experiment that was carried out to investigate a certain biological process. Study it an answer the questions below.

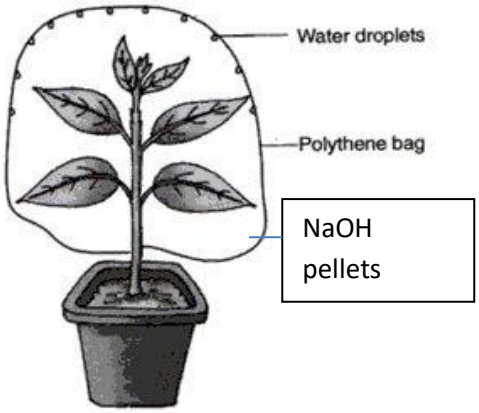
a) What is the aim of the experiment? **(1mark)**

b) Which specialised tissue was removed in the above experiment? **(1mark)**

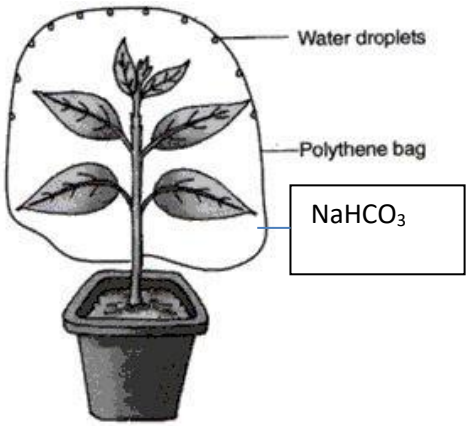
c) How is the tissue named above adapted to perform its function? **(1mark)**

d) Predict in diagrammatic form the fate of the trunk after 3 weeks? **(1 mark)**

9. Two potted plants A and B that had been kept in dark for 48 hours were placed in polythene bags.



set up A



Set up B

Into set up A, a dish of sodium hydroxide was placed inside the polythene bag. In the set up of plant B, a dish of sodium hydrogen carbonate was similarly placed. The plants were then placed in sunlight for six hours. After six hours a leaf from each plant was tested for starch.

(a) What is the expected results for **set up A** **(1 mark)**

(b) What was the purpose of:

(i) Sodium hydroxide **(1 mark)**

(ii) Sodium hydrogen carbonate. **(1 mark)**

(c) What would have been the case if neither sodium hydroxide nor sodium hydrogen carbonate were placed in the set up? **(1 mark)**

(d) State the purpose of this experiment. **(1 mark)**

(e) Explain how the teeth of a lion are adapted to carnivorous mode of feed. **(2 marks)**

10. Explain how emotional state of the body affect heart beat rate. **(1 mark)**

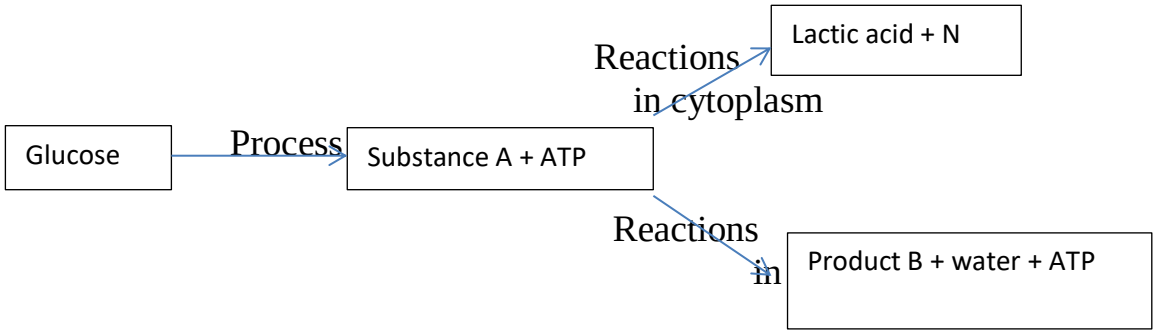
11. (i) What is meant by immune response? **(1 mark)**

(ii) Name one cell responsible for immune response in a human being. **(1 mark)**

12. Describe the mechanism of closing the stomata on the basis of photosynthetic theory **(3 marks)**

13. Explain how the floating aquatic plants are adopted of gaseous exchange. **(1 mark)**

14. The chart below shows a summarized process that occurs in animals.



(a) Name the: **(3 marks)**

(i) Process X .....

(ii) Substance A

(iii) Product B .....

(b) State the condition necessary for the reactions in matrix to occur. **(1 mark)**

15. Explain the roles of the following plant hormones

(i) Gibberellins **(3 marks)**

(ii) Ethylene **(2 marks)**

16. (a) Define the first law of heredity as postulated by Gregor Mendel **(1 mark)**

(b) A common species of rats has individuals with white, black or grey coats. During a study, a rat with white coat was crossed with a rat with black coat. Both parents were pure lines. All the offspring in F1 generation had grey coats. The F1 offspring were selfed to get F2. Using letter B to represent the gene for black coat and W for white coat, work out the phenotypic ratio of F2 offspring. Show your working. **(4 marks)**

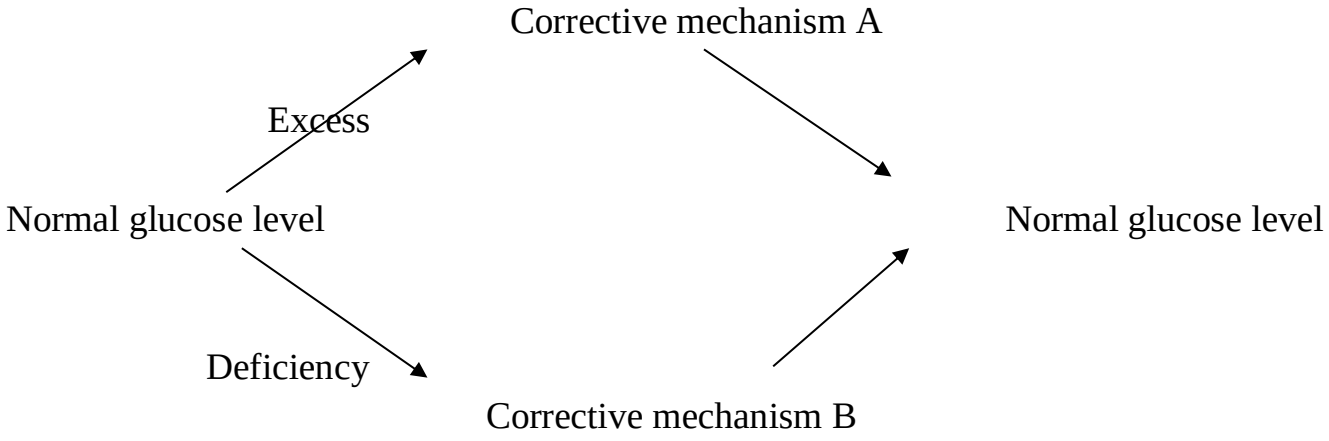
17. What is meant by the following terms

(a) Natural selection **(2 marks)**

(b) Struggle for existence

18. Despite the best efforts to make and use the most effective pesticides, bedbugs have not been eradicated from most homes. Give an explanation for this observation. **(2 marks)**

19. The diagram below illustrates the mechanism of blood glucose concentration

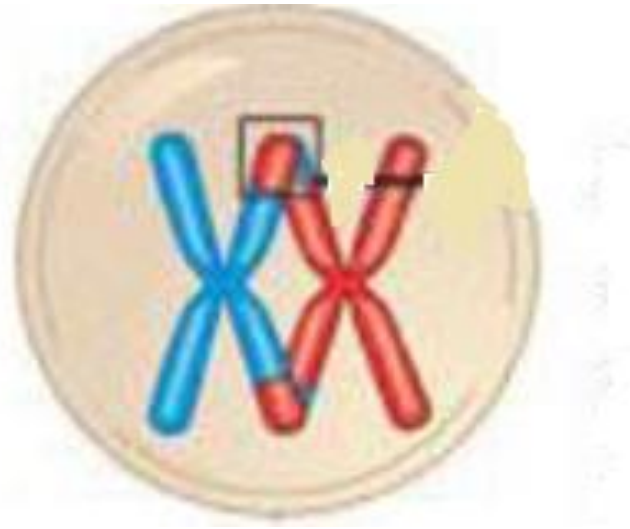


What principle of homeostasis is illustrated in the diagram? **(1 mark)**

Name the condition that may result from further excess **(1 mark)**

State how the corrective mechanism B restores blood glucose to normal level **(2 marks)**

20. The diagram below shows a stage in cell division

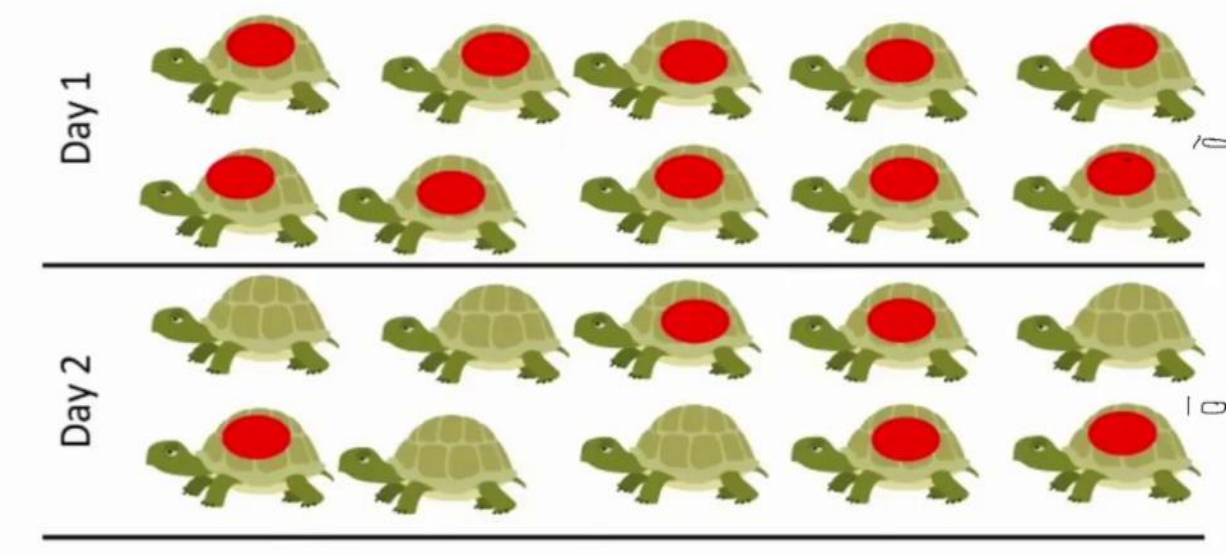


(a) Name the type of cell division? **(1 mark)**

(b) Give **two** reasons for your answer in (a) **above** **(2 marks)**

(c) State **two** differences between the end products of mitosis and meiosis **(2 marks)**

21. Study the diagram below and use to answer the questions that follow;



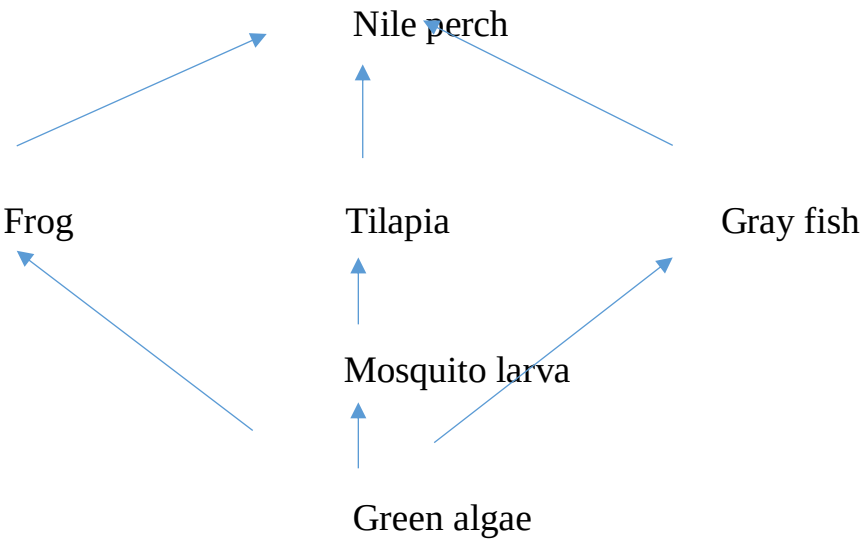
a) Identify the sampling method illustrated. **(1 mark)**

b) Describe how the sampling method above was used to estimate the population of organisms **(4 mark)**

c) Give any **two** assumptions that would be made when estimating the population the named organism in (a) above **(2 marks)**

d) Differentiate between the terms; habitat and ecological niche **(1 mark)**

22. Study the food relationship below and answer the questions



a) State the ecosystem from which the above food web was obtained **(1 mark)**

b) What will be the effect of increased fishing of nile perch on the number of malaria cases. **(2 marks)**

c) How is malaria transmitted from infected person to a healthy person **(1 mark)**

d) What will be the benefit of controlling malaria in the above ecosystem using biological control **(2 marks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 3 PAPER 2

TIME: 2 HOURS

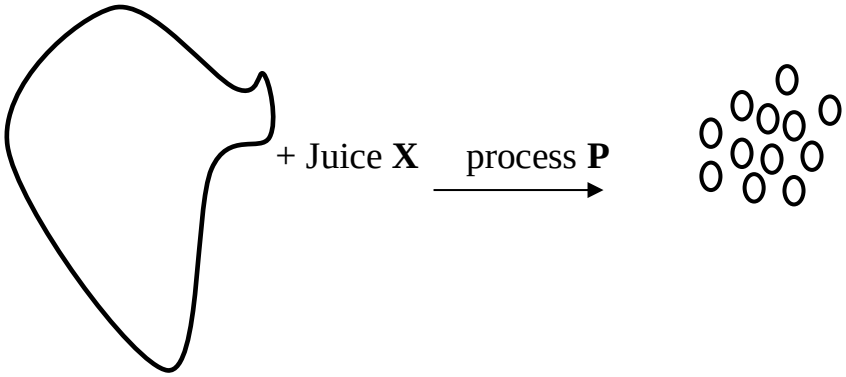
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……...

Answer All the Questions

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



A fat molecule

(a) Name process **P**…… **(1mark)**

(b) Name the juice involved in the process **P** **(1 mark)**

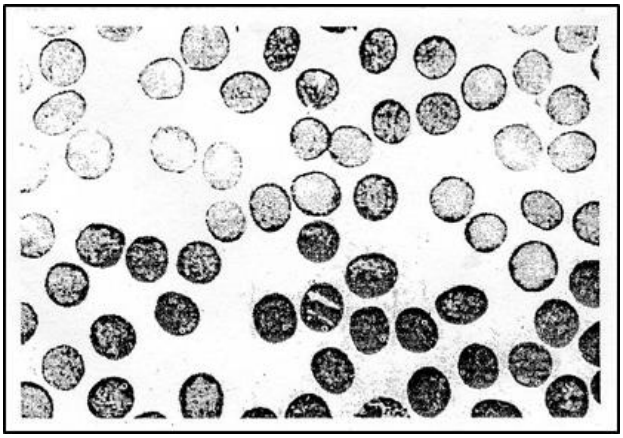
(c) List two Salts found in the juice name in (b) above that aids in process **P** **(2 marks)**

(d) Give a reason why liver damage leads to impaired digestion of fats **(1 mark)**

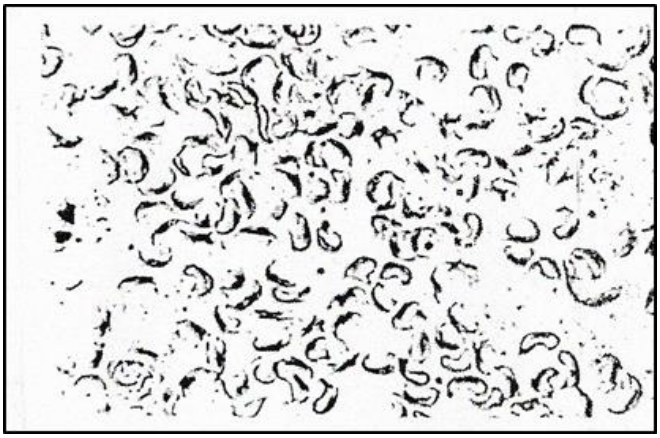
(e) What would be the likely effect on digestion if the small intestine of a human is reduced in an operation? **(2 marks)**

(f) State the fate of excess glucose in the human body. **(1 mark)**

2. The diagrams below shows samples of blood obtained from two different persons **A** and **B.**



Blood sample from person **A**



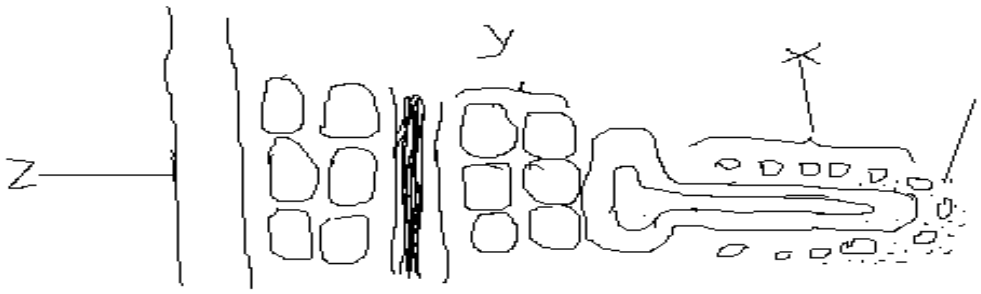
Blood sample from person **B**

a) What genetic disorder is person **B** suffering from? **(1 mark)**

(b) State one advantage and one disadvantage of the disorder in (a) above when its in heterozygous state. **(2 marks)**

(c) Work out the genotypes and phenotypes of the resulting offsprings of marriage between person **A** and person **B** **(5 marks)**

3. The diagram below represents the pathways of water from the soil into the plant.



(a)Name the parts X, Y and Z. **(3marks)**

(b) Explain how water moves from point X to Z. **(5mks)**

4. During an ecological study of a grassland ecosystem, a group of students recorded the following observations.

i. Grasshoppers feed on grass
ii. Guinea fowls feed on grasshoppers, termites
iii. Vultures feed on guinea fowls and leopards
iv. Leopards feed on gazelles
v. Termites feed on grass
vi. Gazelles feed on grass

(a) From this record of observations construct a food web. **(4 marks)**

(b) Write down, the food chains in which the guinea fowls are secondary consumers. **(2 marks)**

(c) Name the organisms through which energy from the sun enters the food web. **1 mark)**

(d) Name the organism that has the least biomass in the food web. **(1mark)**

5. Below is a chemical equation, study it and answer the questions that follow:-

Carbon (IV) oxide + water $\xrightleftharpoons[B]{A}$ Oxygen + glucose

(a) Name process A and B **(2 marks)**

(b) What is the biological significance of process **A** **(1 mark)**

(c) In which organelle does process **A** and **B** take place? **(2 marks)**

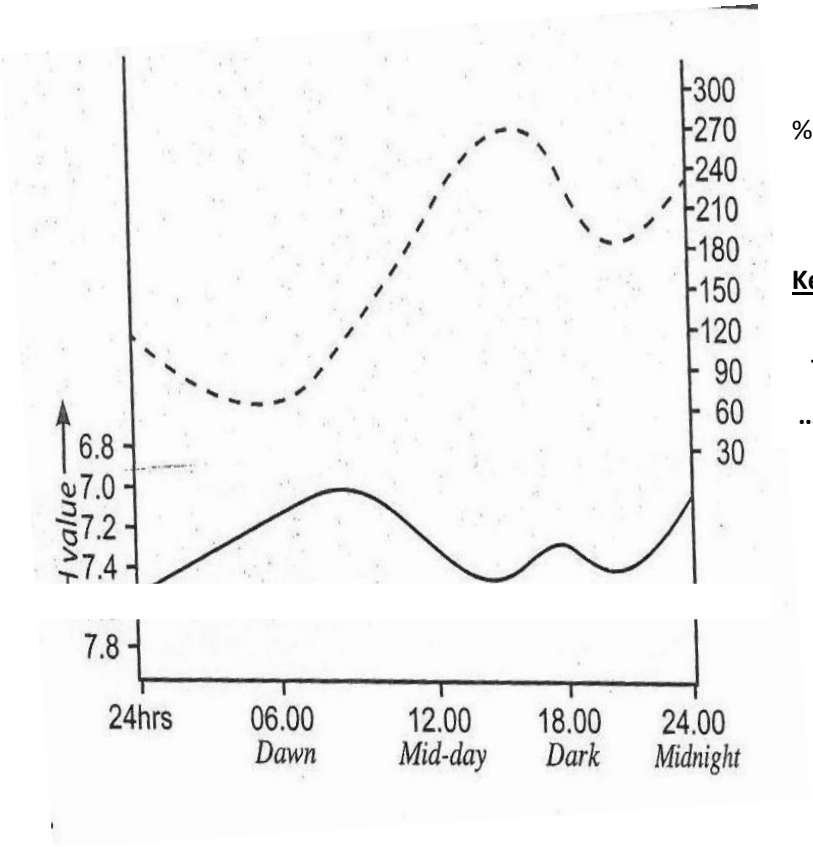
(d) Name two stages of process **B** **(2 marks)**

(e) Define compensation point **(1mark)**

SECTION B (40 MARKS)

Answer Question 6 (Compulsory) And Either Question 7 Or 8

6. The graph below shows changes in pH and oxygen saturation in river water over a 24 hour period



a) when is the pH value and dissolved oxygen saturation % highest? **(2 marks)**

(b) Account for the pH value recorded

(i) Between 08.00 and 1.00 p.m **(2 marks)**

(ii) Between 2100 and 2400 midnight **(2 marks)**

(c) Explain the influence of light intensity on % saturation of oxygen dissolved in this study **(4 marks)**

(d) State two structural adaptations that the submerged plants in this river have, which enable them to carry out photosynthesis **(2 marks)**

(e) Explain the variations that will be recorded if a similar study was carried out in a river near a nitrate fertilizer industry. **(4 marks)**

7. Explain the various ways in which a typical cell is adapted to its functions **(20 marks)**

8. Discuss the causes, effects and control measures for water pollution **(20 marks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 4 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

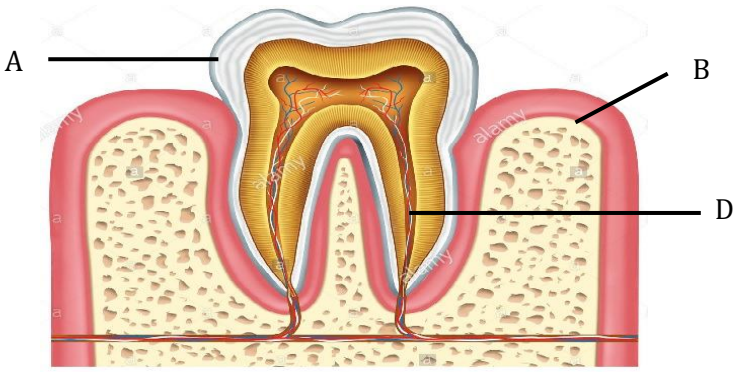
Answer All the Questions

1. How does growth as a characteristic of living organisms differ in plants and animals ? **(2marks)**

2. a)State the role of active transport in animal nutrition **(1mark)**

b) Cyanide lowers the rate of active transport. Explain? **(2marks)**

3. The figure below is a diagram of a vertical section of a mammalian tooth.

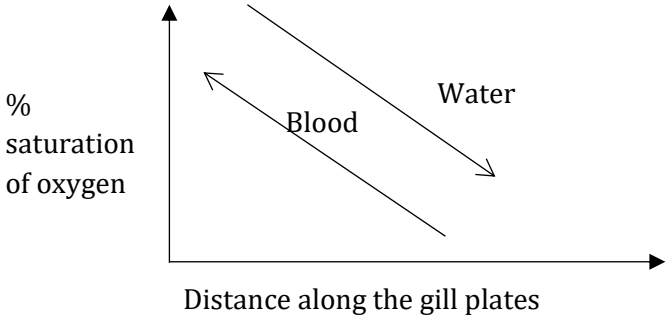


(i) Name the part labelled **A** and **B**. **(2 marks)**

(ii) State ***two*** ways in which structure **D** is adapted to its functions. **(2 marks)**

(iii) List ***two*** ways of preventing gingivitis. **(2 marks)**

4. The figure below shows % saturation of oxygen in blood in fish as water passes along the gill plate.



(a) (i) Name the type of blood flow shown in the gill plate. **(1mark)**

(ii) Explain the advantage of the type of flow named in a (i) above **(2marks)**

(b) State **two** organs in humans which display the type of flow named in a (i) above **(2marks)**

(c) State **two** ways in which floating leaves of aquatic plants are adapted to gaseous exchange **(2marks)**

5. The equation below shows an oxidation reaction of food substances.

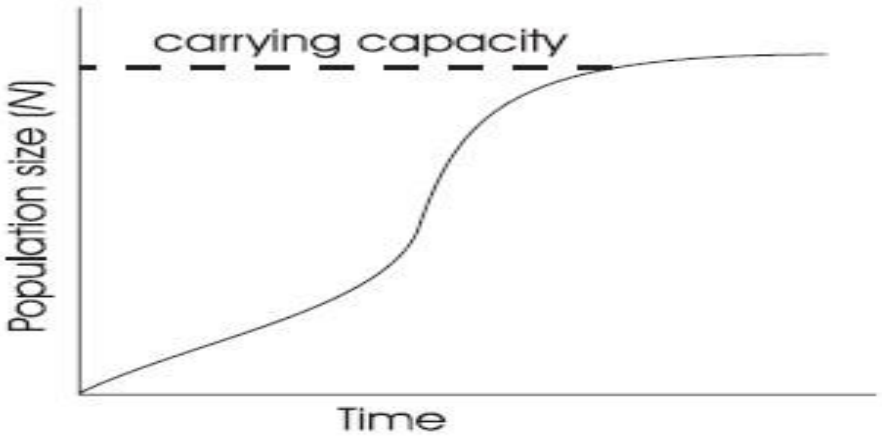
$C_{51}H_{98}O_6 + 145O2$ ------- X CO2 + 98 H2O + energy

a) What do you understand by the term respiratory quotient? **(1mark)**

b) Determine respiratory quotient of the oxidation of food substance. **(2marks)**

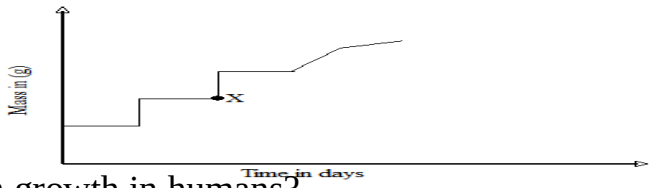
c) Identify the food substances. **(1mark)**

6. When any one of the growth parameters such as growth in size or weight, increase in number of cells are plotted in a graph against time like below, a clear curve is obtained



State its name…….... **(1mark)**

7. The graph below represents the growth in a certain phylum.



How does this differ from growth in humans? **(1mark)**

8. The embryo of a dry, fully developed seed usually passes through a period of rest after ripening period and it cannot germinate even when provided with all favorable conditions. State the significance of this. **(2marks)**

9. a) Cowpeas seeds were place in a vacuum flask and left for five days. What is the expected change in composition of gases in the flask on the sixth day? **(1mark)**

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

10. Biotechnologist works day a night to curb food insecurity using the knowledge of polyploidy in genetics. Explain the economic importance of such practice? **(2marks)**

b) Define a backcross? **(1 mark)**

11. The structure below was obtained from an animal cell

a) What is the name of the hair like processes and state its function? **(2marks)**

Name

Function

b) From which parts of the mammalian body are these structures found? **(1mark)**

c) State the effect of cigarette smoking to the structure? **(1mark)**

12. A student was found to have blood group B+

a) What type of antibody is present in his plasma? **(1mark)**

b) Which antigens are present in this blood group? **(1mark)**

13. Plants relatively have less waste to excrete than animals. Give two reasons to explain this observation **(2marks)**

14. State **two** methods by which plants get rid of their waste products **(2marks)**

15. To estimate the population size of mosquitoes in Banji village that covers an area of 25km^2, visiting researchers caught 400 mosquitoes which they marked and released. After 24 hours, 200 mosquitoes were caught out of which 120 had not been marked.

(a) Suggest the sampling method described above. **(1 mark)**

(b) What are the disadvantages of this method? **(2 marks)**

16. The table below shows stomatal distribution on leaves A and B and their surface area. Use the information to answer the questions.

	Leaf surface	A	B
Number of stomata	Upper leaf surface	20	5
	Lower leaf surface	0	15
Surface area		25 cm^2	18cm^2

Identify with reasons the habitats of the plant from which the leaves were obtained.

Leaf A: **(2 marks)**

Habitat ……..……..……..

Reason ……..……..……..…….

Leaf B: **(2 marks)**

Habitat ……..……

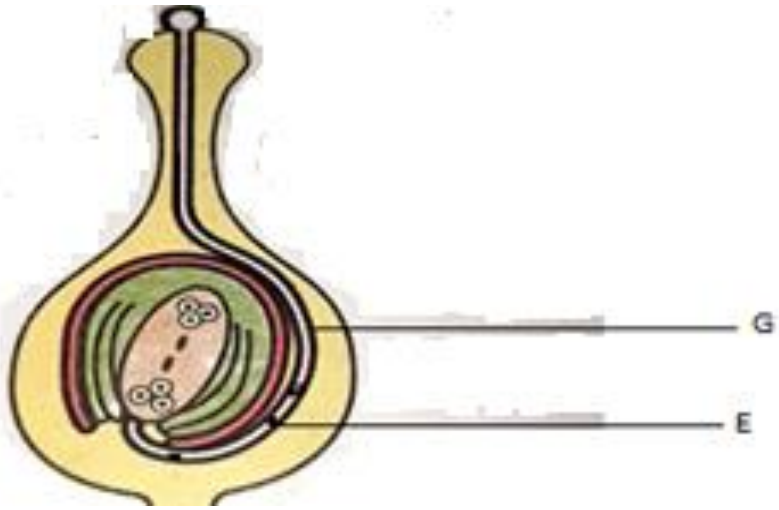
Reason

17. Name the causative agent of the following diseases **(2 marks)**

(i) Trichomoniasis.

(ii) Gonorrhea

18. The diagram below shows a pollen tube as it develops down the style. Use it to answer the questions that follows;



(i) Name the part labelled **G**. **(1 mark)**

(ii) State ***two*** functions of structure labelled **E**. **(2 marks)**

19. (a) Define parthenogenesis? **(1 mark)**

(b) Name the plant hormone that induces fruit ripening. **(1 mark)**

20. A group of Form Three students collected a certain specimen for study as shown below. Study it carefully and use it to answer the questions that follow.

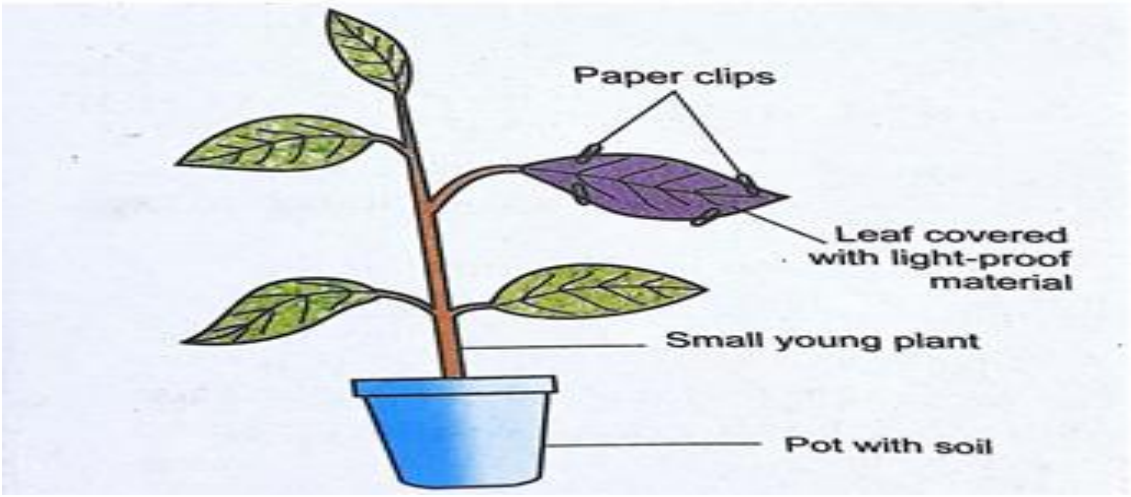
(i) Name the type of metamorphosis in the above specimen. **(1 mark)**

(ii) Give any ***two*** advantages of the above metamorphosis. **(2 marks)**

21. **(i)** Give ***two*** structural features in a leaf that adapts it to absorb Carbon (IV) Oxide. **(2 marks)**

(ii) Name the cell organelle in which Carbon (IV) oxide combines with water to form a complex organic compound takes place **(1 mark)**

22. In an experiment to investigate a factor affecting photosynthesis; leaf of a potted plant, which had been kept in the dark overnight was covered with an aluminum foil as shown in the diagram below. The set up was kept in the sunlight for three hours after which a food test was carried out on the leaf.



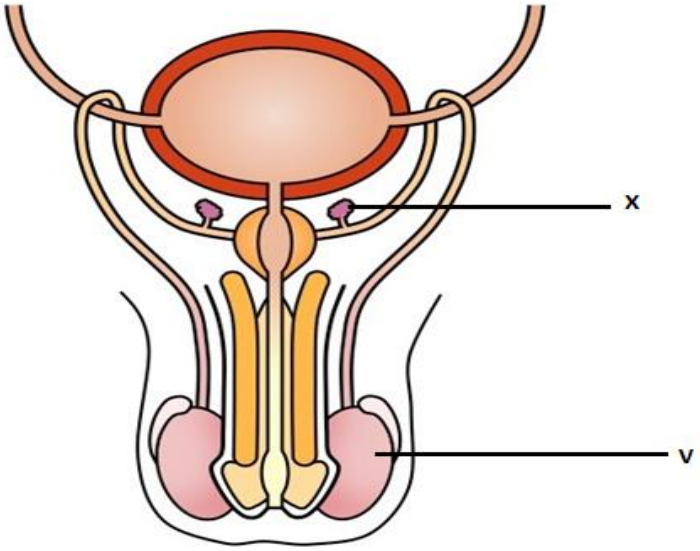
(a) Which factor was being investigated in the experiment? **(1 mark)**

(b) Which food test was carried out? **(1 mark)**

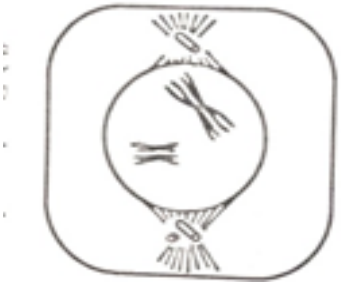
(c) State the results of the food test. **(1 mark)**

23. Explain how the following plant adaptations minimizes rate of transpiration **(2marks)**
a) Sunken stomata
b) Thick cuticle

24. Explain how drooping of leaves on a hot sunny day is advantageous to a plant**(2mks)**
25. Name **two** tissues in plants which are thickened with lignin **(2marks)**
26. The diagram below shows the front view of a male reproductive system.



a) Give the functions of the structures labelled **X** and **V** **(2marks)**
b) What is the role of Follicle Stimulating Hormone in male reproduction?
(1mark)
27. Explain why the concentration of insecticides in fish eating birds may be hundreds of times greater than its concentration in the water where the fish live **(3marks)**
28. The diagram below shows a stage in meiosis



State the biological significance of the stage represented on the diagram above **(1mark)**

29. How do the following factors hinder self-pollination in flowering plants? **(3marks)**

a) Self-sterility
b) Heterostyly
c)Protogyny

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 4 PAPER 2

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) In human beings, a **downward pointed frontal hairline** ("windows peak") is a heritable trait. A person with windows peak always has at least one parent who has this trait; where as persons with **frontal hairline** may occur in families in which one or even both parents have windows peak. Using **W** and **w** to symbolize genes for this trait

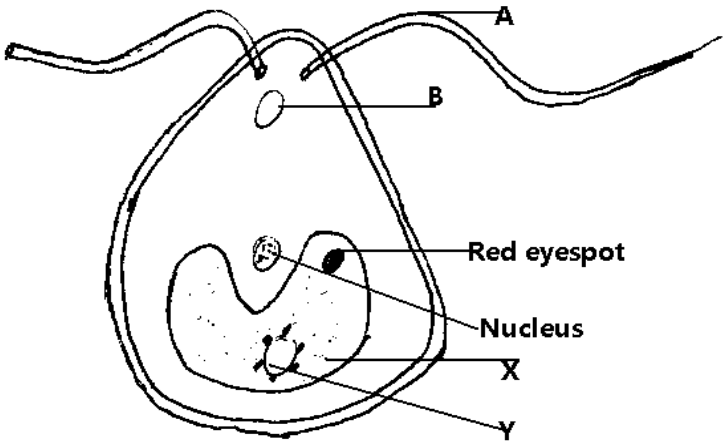
a) Determine the F1 generation if a homozygous windows peak male parent is married to a homozygous frontal hairlined female parent **(4mks)**

(b) State two causes of variations **(1mk)**

c) Name two sex linked genetic disorders affecting human females and males **(2mks)**

What is genome

2) The diagram below shows an organism obtained from an aquatic ecosystem



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

(b) **Name** the parts labeled **(1mk)**

a. **B**

b. **Y** **(1mk)**

State the functions of the following parts

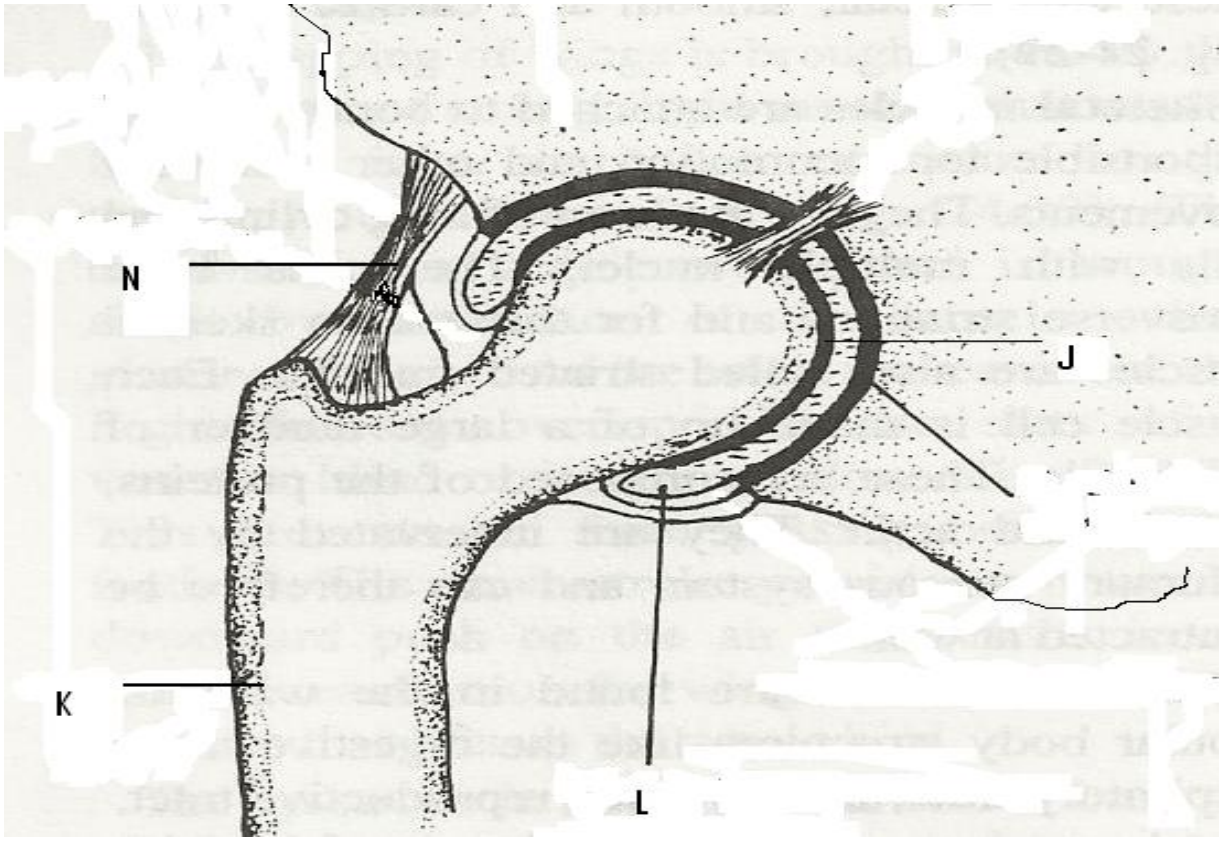
A **(1mk)**

X **(1mk)**

Z **(1mk)**

(d)Explain briefly why the organism is described as eukaryotic **(2mk)**

3) a) The diagram below shows some of the features of a synovial joint. Study the diagram carefully and answer the questions that follow.



Name the type of synovial joint. **(1 mark)**

Name the parts labeled J, and L **(2 marks)**

State **two** roles of the part labeled L. **(2 marks)**

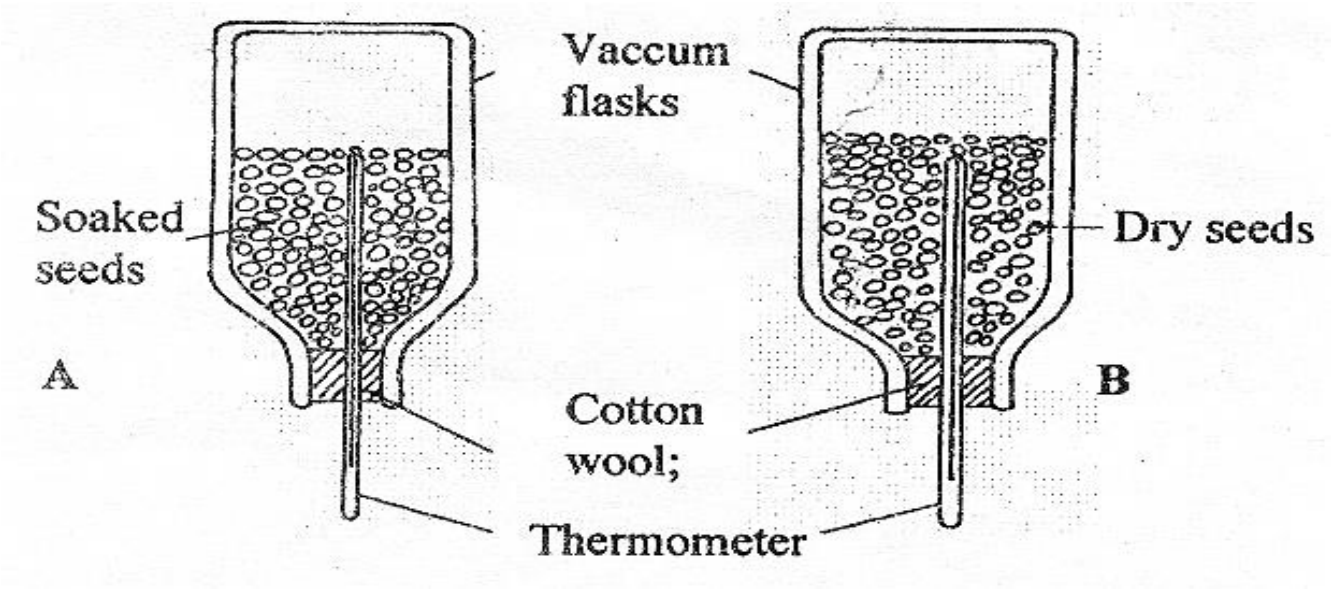
Suggest **one** advantage of this type of joint. **(1 mark)**

State how the following tissues are adapted to provide mechanical support in plants **(2mks)**

a. Parenchyma

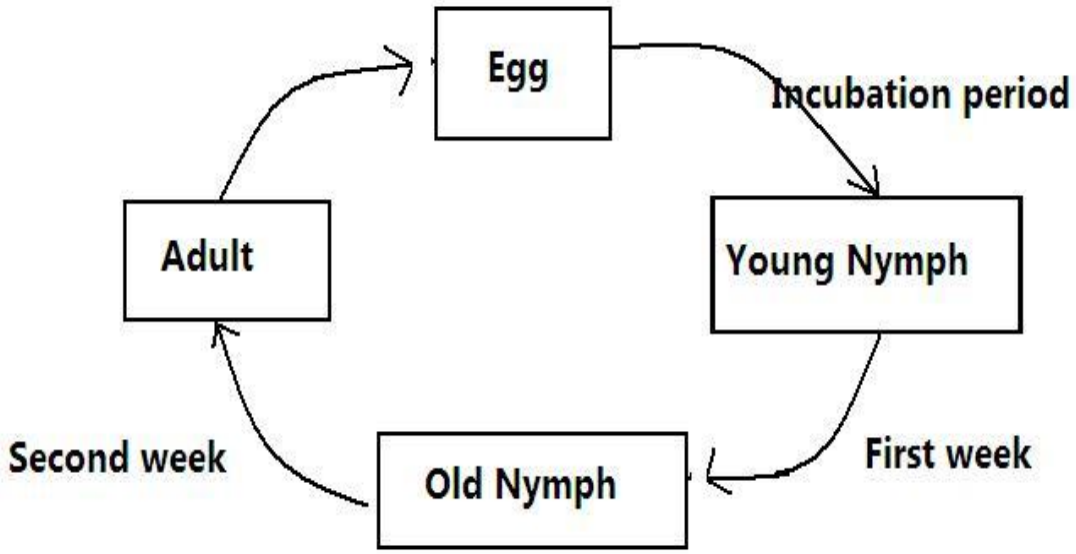
b. Collenchyma

4) A student set up an experiment using soaked and dry seeds as shown below



State the objective of this experiment **(1mk)**
State the observations made in each of the flask after 24 hours **(2mks)**
Account for the observation made in (b) above **(2mks)**
Suggest why vacuum flasks were used in this experiment **(1mk)**
What alteration would you make in the set-up to make the results more reliable **(1mk)**
Why should the seeds be washed with antiseptic/10% formalin? **(1mk)**

5) a) Explain how the following meristematic tissues contribute to growth of higher plants
i) Vascular cambium **(2mks)**
ii) Cork Cambium **(2mks)**
The diagram below shows a life cycle of a cockroach



a) Name the hormone that would be at high concentration during.

First week **(1mk)**

Second week **(1mk)**

Name the structure that produces hormone in a (ii) above **(1mk)**

Name the series of stages through which the nymph undergoes to reach adult stage **(1mks)**

SECTION B (40 Marks)

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

6) The menstrual cycle is a sequence of events repeated monthly in the female production system. The table below shows the concentration of oestrogen and progesterone hormones and body temperatures of female against time.

Time in days	Oestrogen mg/100cm of blood	Progesterone mg/100cm^3 of blood	Temperature in 0^oc
1	20	0	36.4
2	20.5	0	36.6
3	25	0	36.7
4	27.5	0	36.8
5	30	0	36.7
6	32.5	0	36.6
7	35	0	36.8
8	40	0	36.7
9	48	0	36.6
10	56	0	36.8
11	64	0	36.7
12	72	0	36.6
13	80	0	36.4
14	170	20	36.3
15	140	50	36.6
16	80	80	37.0

17	70	130	37.2
18	65	170	37.0
19	60	160	37.1
20	65	150	37.15
21	130	130	37.2
22	140	110	37.1
23	130	90	37.0
24	100	70	37.1
25	80	50	37.2
26	60	20	37.0
27	20	0	36.4

a). Using the same axis draw graphs of oestrogen and progesterone against time/days **(8mks)**

b) State the possible event taking place in the uterus during the first week? **(1 mark)**

c) State the events taking place in the ovary between day 1 and day 13**.** **(2 marks)**

d) Account for the sudden increase in the progesterone concentration between day 14 and day18**. (2 marks)**

e) Account for the change in temperature between day 14 and 17**.** **(1 mark)**

f) Account for the change of the curve of progesterone between day 19 and 27. **(2marks)**

a) State the function of the following.

(i) Ovary **(1mark)**

(ii) Progesterone **(1 mark)**

(iii) Oestrogen **(1 mark)**

7 a) Describe how the following evidences support the theory of organic evolution: geographical distribution, fossil records and comparative anatomy **(10mks)**

b) Explain tropic responses in plants and their survival values **(10mks)**

8 a) Describe the structural adaptations of mammalian heart to its Functions **(10mks)**

b) Explain the role of osmosis in organisms **(10mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 5 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. Identify the following. **(2mrks)**

i. Type of movement in cells.

ii. Arrangement of leaves on a plant.

2. Explain how adequate water supply increases the rate of glucose formation in plants. **(1mrks)**

Name the element obtained from insects by insectivorous plants. **(1mrk)**

3. A mushroom research station would like to employ a researcher. Which scientist is most appropriate. **(1mkr)**

Name the branch of biology that deals with phylogenetic relationship between organisms. **(1mrk)**

4. State the role of the diaphragm.

i. In the light microscope. **(1mrk)**

ii. During ventilation in man. **(1mrk)**

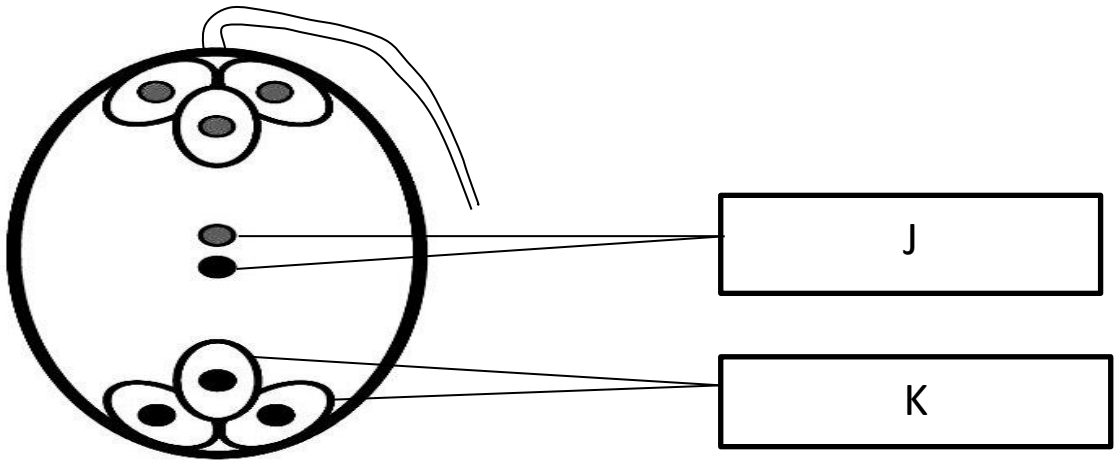
5. Explain why plants absorb water in waterlogged soil but not mineral salts. **(2mrks)**

6. A biological washing detergent removes stains like oils from cloths.

i. Name the enzyme that it contains. **(1mrk)**

ii. Explain why the stains would be removed faster with the detergent in water at 35^{o}c rather than at 15^{O}c. **(1mrk)**

7. Below is a diagram of an embryo sac.



Identify the structures labelled. (2mrks)

J-

K-

8. Explain why low temperature will cause seed dormancy by not very high temperatures. **(1mrk)**

9. Explain why the average length of the chicken egg is 6cm while that of a human is 0.1mm. **(1mrk)**

Identify two features that enable mammalian fallopian tubes perform their function. **(2mrks)**

10. State a limiting factor of using a potometer to measure the rate of transpiration. **(1mrk)**

Name the tissue that transports hormones in plants. **(1mrk)**

11. To control the spread of malaria, fish are introduced into water bodies near residential area.

a. Name this method of population control. **(1mrk)**

b. State an advantage of the above method. **(1mrk)**

12. Apart from vaccination, state two ways of controlling highly infectious disease among animals. **(2mrks)**

13. Name the enzyme that breaks down hydrogen carbonate ions in mammalian blood to release carbon (IV) oxide. **(1mrk)**

Explain why obligate anaerobes die in presence of oxygen. **(1mrk)**

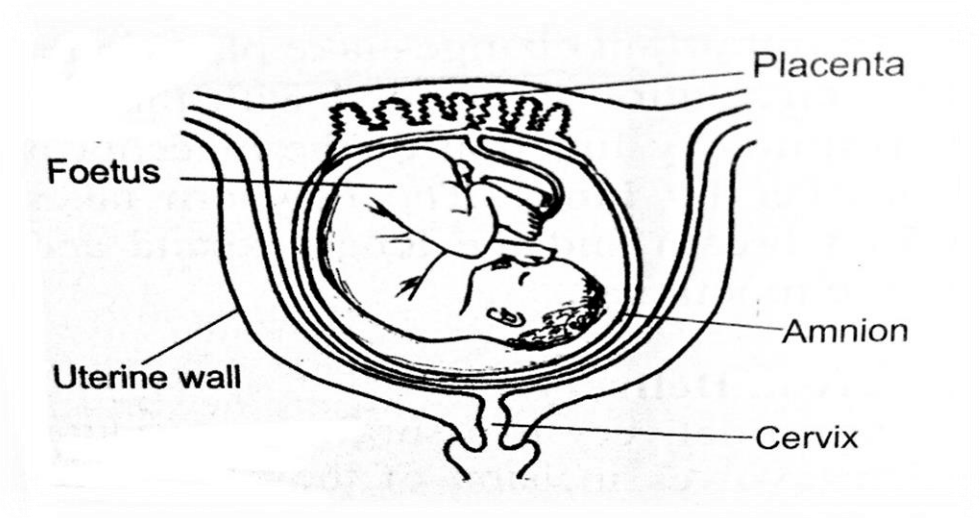
14. Name the group of sporangia born on fern leaves. **(1mrk)**

Why are fruits not produced in gymnosperms? **(1mrk)**

15. Explain why lactating mothers need extra energy. **(1mrk)**

State the function of interstitial cells found in the testes. **(1mrk)**

16. Below is a diagram showing a foetus in the uterus.



state two observations showing that parturition is about to take place. **(2mrks)**

17. The symptoms of typhoid disease include high fever, vomiting and diarrhoea. Explain why they may lead to death if not treated. **(2mrks)**

18. The table below represents a chromatid which undergoes a mutation, the letters genes.

Before mutation

L	M	N	O	P	Q

After mutation

L	O	N	M	P	Q

a. Name the type of mutation**. (1mrk)**

b.

i. Identify the nucleic acid whose base sequence is shown below. **(1mrk)**
G-A-C-U-A-G-A-C-G

ii. If the above strand was involved in protein synthesis, how many amino acids would the protein have? **(1mrk)**

19. Explain why resistance to antibiotics is considered an example of evolution. **(2mrks)**

20. People are encouraged to take the corona virus disease vaccine. How does it work? **(1mrk)**

What is the significance of;

i. Red blood cells lacking mitochondria. **(1mrk)**

ii. Xylem vessels being dead. **(1mrk)**

21. Use of fossil fuel as source of energy causes global warming. Governments are being encouraged to use 'clean energy'. State two sources of this energy. (2mrks)

22. An athlete training to take part in an international competition moved to a high attitude area to train for 12 days. He took his pulse rate per minute and recorded as shown below.

Day	1	2	3	4	5	6	7	8	9	10	11	12
Pulse rate	72	78	89	92	92	90	86	80	77	74	72	72

Account for the change in the pulse rate from.

i. Day 1-5. **(2mrks)**

ii. Day 6-12. **(2mrk)**

23. A patient complained of frequent thirst. A sample of the patient's urine was found not to have any sugar.

i. Name the hormone the person was deficient of. (1mrk)

ii. Name the gland that secretes the above hormone. (1mrk)

24. The paddles of a whale and fins of a fish adapt them to aquatic habitat.

i. Name the evolutionary process that may have given rise do these structures. **(1mrk)**

ii. What name is given to such structures? **(1mrk)**

State two advantages of natural selection. **(2mrks)**

25. Explain why ingestion of salty food may reduce the amount of water passed out in urine. **(2mrks)**

Explain why small birds puff their features when cold. **(2mrks)**

26. Explain why halophytes have pneumatophores. **(1mrk)**

Explain how the following features adapt root hairs cells to absorption

i. Large sap vacuole. **(1mrk)**

ii. Numerous mitochondria. **(1mrk)**

27. A certain metabolic pathway takes place following sequence.

J-K-L-M-N

An inhibitor was added to the reactants during an experiment. At the end of the experiment, there was more K and little L, M and N.

a. At what stage of the sequence was the inhibitor added. **(1mrk)**

b. Briefly explain how the inhibitor affected the reaction. **(2mrks)**

28. Suggest a change in the diet of a person whose liver is damaged. **(1mrk)**

a. State the importance of caecum in herbivores. **(1mrk)**

b. Name the polysaccharide that offers mechanical support in;

i. Arthropods **(1mrk)**

ii. Plants. (1mrk)

29.

a. Explain why an effective respiratory system is associated with the circulatory system. (2mrks)

b. Distinguish between haemoglobin and myoglobin. **(2mrks)**

30.

a. New born babies have a higher heart beat than adults. Explain why**?** **(2mrks)**

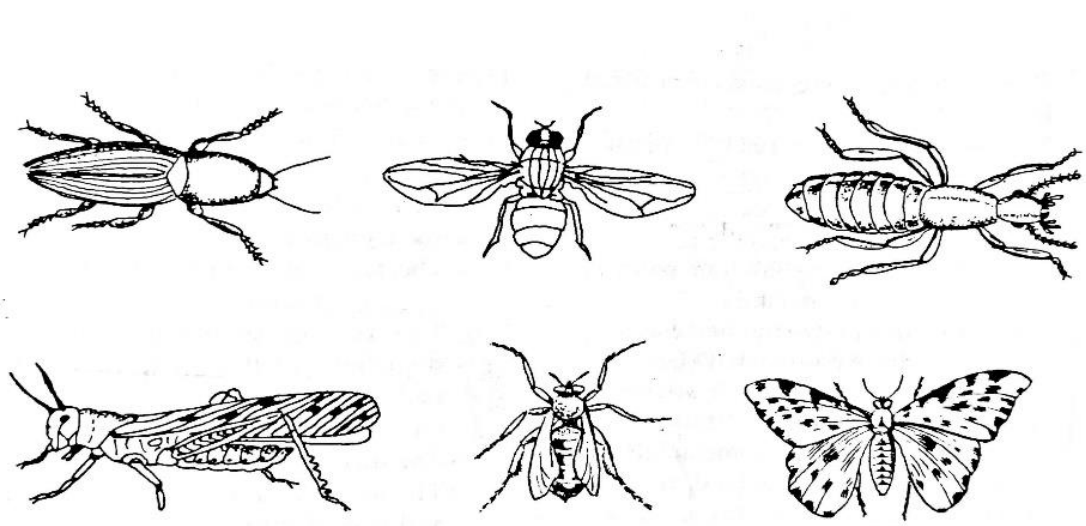
b. What Is the advantage of oxyhaemoglobin over carboxyhaemoglobin? **(1mrk)**

31. Explain why;

i. Fish pass a lot of water over the gills frequently. **(1mrk)**

ii. Lack of magnesium leads to yellowing of leaves**.** **(1mrk)**

32. The organisms below belong to kingdom Animalia.



a. Name the phylum and class where they belong**.** **(2marks)**

i. Phylum……

ii. Class

b. Give a reason for placing the organisms in the class in (**a(ii)** above**.** **(1mrk)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 5 PAPER 2

TIME: 2 HOURS

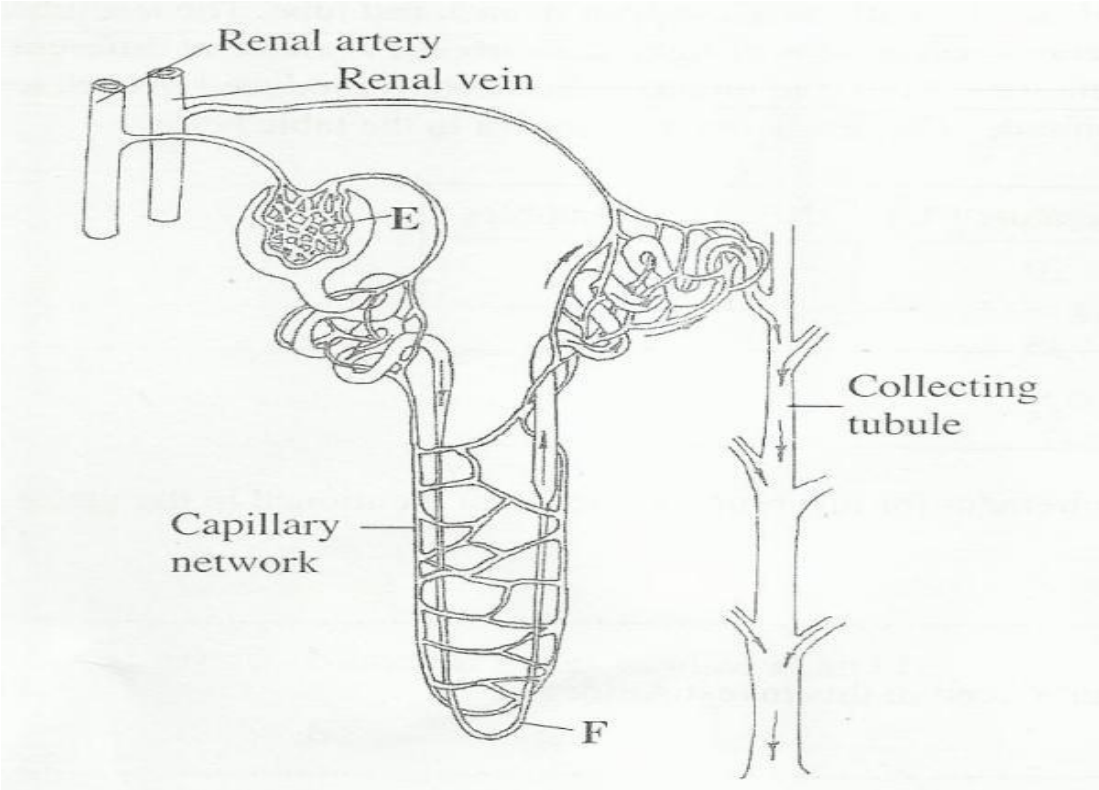
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……...

Answer All the Questions

1) The diagram below illustrates the structure of the kidney nephron.



(a) Name the part labeled E. **(1 mark)**

(b) How is the part labeled F adapted to its function? **(4 marks)**

(c) State three physiological mechanisms of controlling the human body temperature during a cold day. **(3 marks)**

2) The genetic disorder hemophilia is due to a recessive sex linked gene .A man who is hemophilic marries a woman who is carrier for the condition.Using letter H to represent the gene normal condition and letter h for the gene for hemophiliac condition.

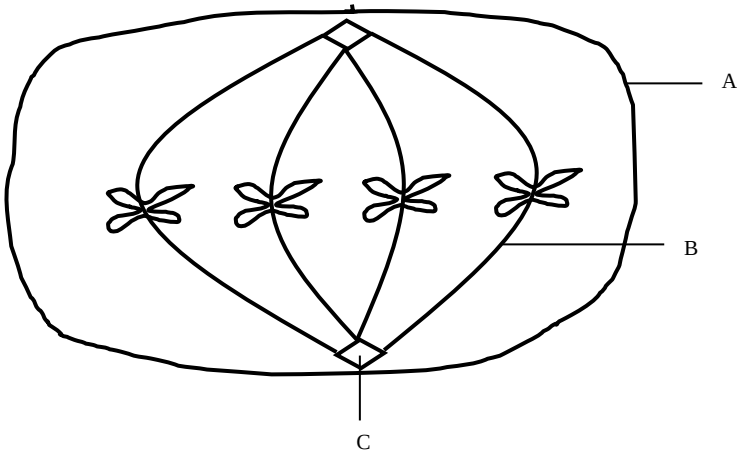
i) What is the genotype for the man and the woman? **(2marks)**

ii) Work out a cross between the man and woman **(3marks)**

What is the chance that both the first and second sons will be hemophiliac? **(2marks)**

Hemophilia is more common in males than in female humans. Explain **(1mark)**

3) The diagram below represents a state in cell division. Study it and answer the questions below.



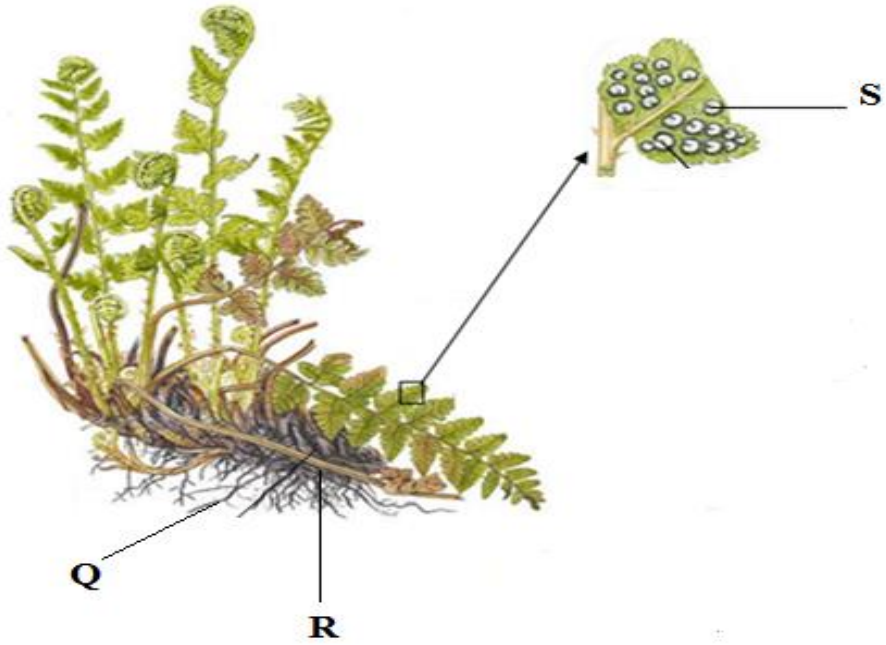
Name the stage of cell division illustrated in the diagram above. **(1 mark)**

Name the parts labelled A, B and C **(3 marks)**

State **THREE** differences between mitosis and meiosis. **(3 marks)**

Name the process during which the exchange of genetic materials occur at prophase 1 of meiosis. **(1 mark)**

4) The diagram below indicates an organism that grows under shaded places with damp conditions. Study it and answer the questions that follow.



(a) Name the division to which the specimen belongs. **(1 mark)**

(b) Name and state the functions of the parts labeled Q, R and S. **(6 marks)**

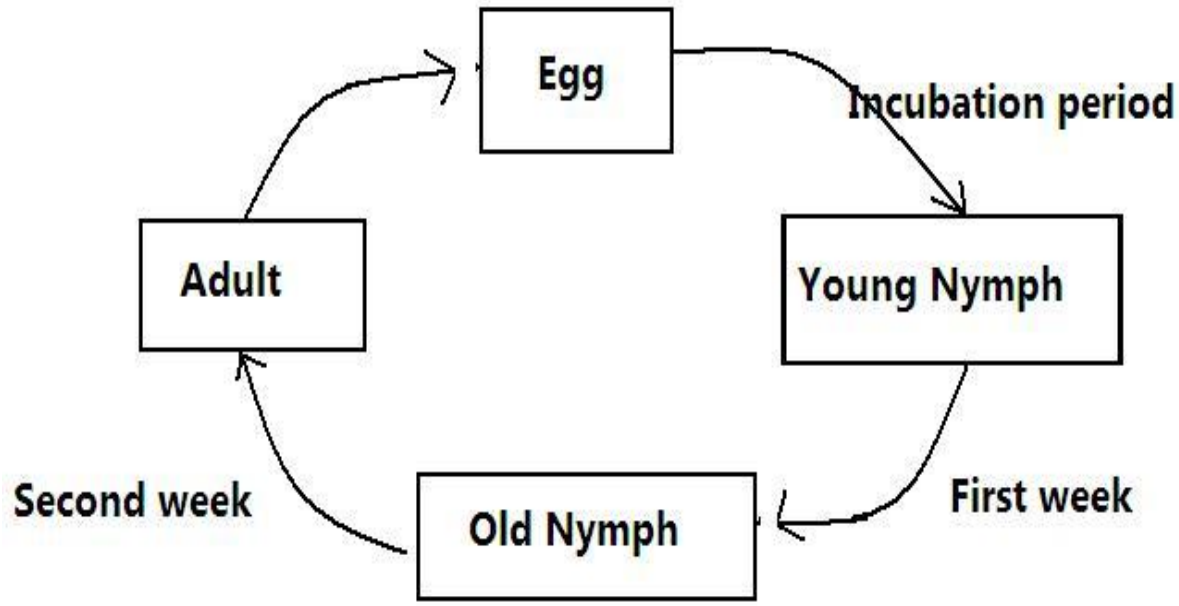
Name the two body forms of the organism in its alternation of generation. **(2 marks)**

5) a) Explain how the following meristematic tissues contribute to growth of higher plants

i) Vascular cambium **(2marks)**

ii) Cork Cambium **(2marks)**

The diagram below shows a life cycle of a cockroach



Name the hormone that would be at high concentration during.

First week **(1mark)**

Second week **(1mark)**

Name the structure that produces hormone in a (ii) above **(1 marks)**

Name the series of stages through which the nymph undergoes to reach adult stage **(1 marks)**

SECTION B:(40 MARKS)

*Answer question **6 (Compulsory)** and **EITHER** question **7** or **8***

6) An experiment was carried out in which red blood cells were put in salt solutions of different concentrations. The table below shows the percentage of cells which were destroyed by haemolysis in different salt concentration.

Salt concentration (g/dm^3)	% of RBC destroyed By haemolysis
0	100
1	100
2	100
2.5	100
3.0	100
3.5	96
3.7	80
4.0	60
4.5	16
4.7	0
5.0	0
6.0	0

(a) Draw a graph of percentage of red blood cells haemolysed against salt concentration. **(6 marks)**

(b) Explain haemolysis of red blood cells. **(3 marks)**

(c) From the graph, state:

(i) the salt concentration at which 50% red blood cells were haemolysed**. (1 mark)**

(ii) the highest salt concentration when the largest number of red blood cells were haemolysed. (1 mark)

(d) (i) Suggest the normal salt concentration in the blood of the mammal from which the red blood cells were obtained. **(2 marks)**

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

What term is used to describe the solution with equal solute concentration as that of the cells **(1 mark)**

(e) Name the process in the human body that ensures that haemolysis of red blood cells is prevented. **(1 mark)**

(f) State four roles of osmosis in organisms. **(4 marks)**

7. Describe the role of hormones in the mammalian female reproductive cycle. **(20 mks)**

8. Describe the

(i) Process of inhalation in mammals **(10 marks)**

(ii) Mechanism of opening and closing of stomata **(10 marks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 6 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

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

Housefly **(1 mk)**
Scorpion **(1 mk)**
Ants **(1 mk)**

2) State **two** reasons why a snake is classified as a reptile. **(2 mks)**

3) (a) **Explain** the role of oxygen in Active transport **(1mk)**
Name **two** processes that depend on Active transport in animals **(2mks)**

4) **Explain** how sunken stomata lower the rate of transpiration **(2mks)**

5) **State** how xylem vessel is adapted to its function **(3mks)**

6) a) **Define** the term immunity. **(1mk)**
Distinguish between natural immunity and acquired immunity. **(1mk)**
Identify **one** immunizable disease in Kenya. **(1mk)**

7) (a) State **two** adaptations of the alveolus to its functions. **(2mks)**
Suggest a reason for asthmatic patient producing a wheezing sound during breathing? **(1mk)**
What is the significance of the cartilage found in the human trachea being incomplete (c- shaped rings) **(1mk)**

8) **Define** the following terms;

a. Inter specific competition. **(1mk)**

b. Carrying capacity **(1mk)**

9) Suggest **two** methods that can be used to determine the type of food eaten by animals. **(2mks)**

10) (a)State **one** significance of genetics counseling **(1mk)**

Part of a strand of DNA molecules was found to have the following sequence

A-T-C-G-G-G-A-T-C-T.

What is the sequence?

Of the complementary strand? **(1mk)**

On a m- RNA strand copied **(1mk)**

11) The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

Name the evolutionary process that may have given rise to these structures. (1mk)

What is the **name** given to such structures? (1mk)

Give **two** examples of vestigial organs in man. (2mks)

12) Name the organelles that carry out the following functions **(4mks)**

Destroy old and worn-out organelles

Formation of spindle fibres

Osmoregulation

Selective passage of substances into the cell

13) (a) Why would you give an athlete glucose and not sucrose after a race? **(1mk)**

What happens to lactic acid after oxygen debt recovery? (2mks)

14) **State** the difference between glycolysis and kreb"s cycle based on the following.

(a) where they occur . **(1 mk)**

(b) Amount of energy produced. **(1 mk)**

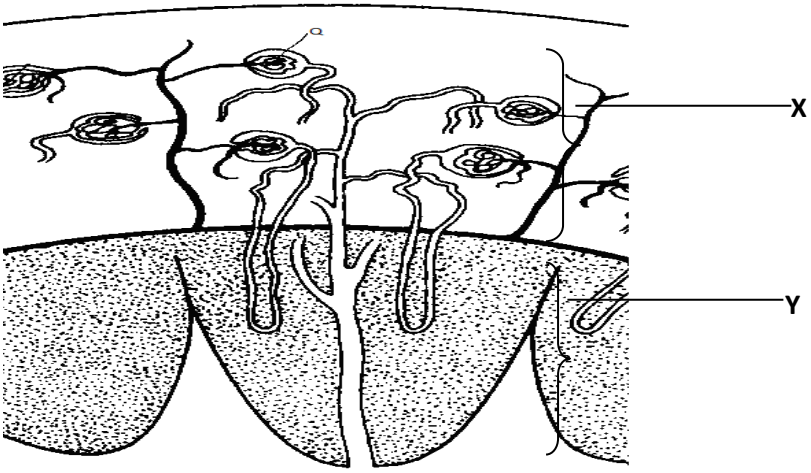
(c) End product(s) **(1 mk)**

15) a) Under which of the following magnifications would one see a larger part of the specimen X40 0r X500? Give a reason. **(2 mks)**

b) State how magnification is worked out in a light microscope. (1 mk)

16) The illustration below shows a transverse section through a mammalian kidney.

a.



(a) **Name** the structures labelled **X** and **Y**

(b) **State** the process in **Q** that leads to the formation of glomerular filtrate. **(1mk)**

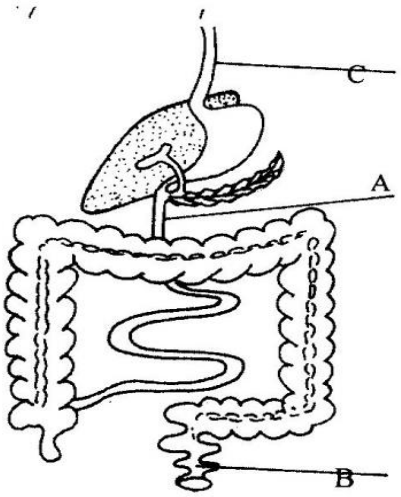
(c) State one function of sebum **(1 mk)**

17) State **three** differences in composition between umbilical artery and umbilical vein. **(3 marks)**

18) (a)**What** is meant by the term taxonomy? **(1mk)**

(b)**When** are two organisms considered to belong to the same species. **(2mks)**

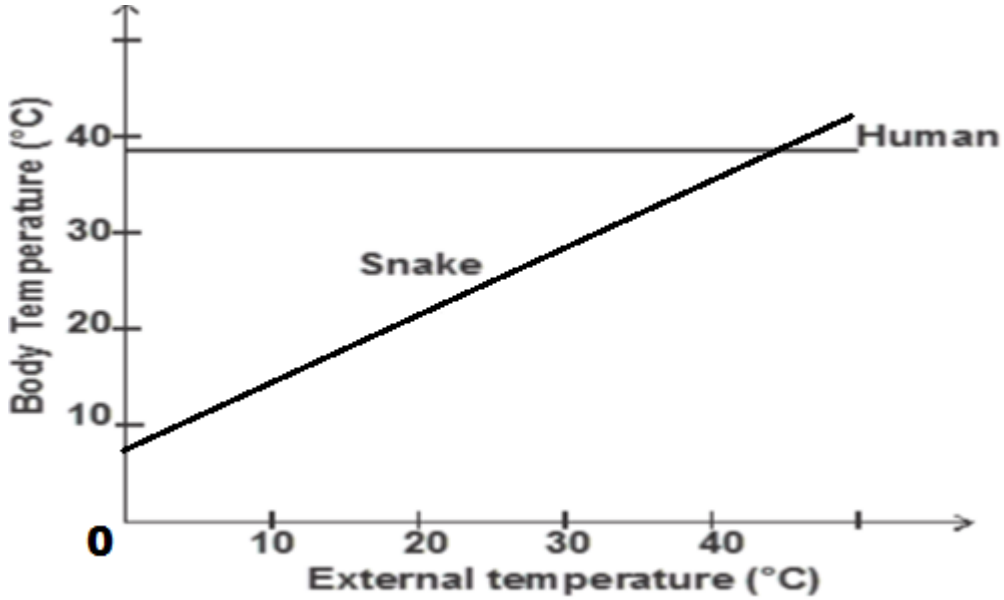
19) The diagram below shows part of alimentary canal of a mammal



a. (i)**Name** the parts labeled **A** and **C** **(2mks)**

b. (ii)**State** the function of the part labeled **B.** **(1mk)**

20)
The graph below shows the relationship between body temperatures and external temperatures in a human being and a snake. **Study** it and answer questions that follow.



What happens to the temperature of each organism as the external temperature increases. **(2 mks)**

Human –
Snake

b)Humans are described as homoithermic. **State** the advantage of this condition. **(2mks)**

21) .

a)State **three** differences between light stage and dark stage of photosynthesis. (3 mks)

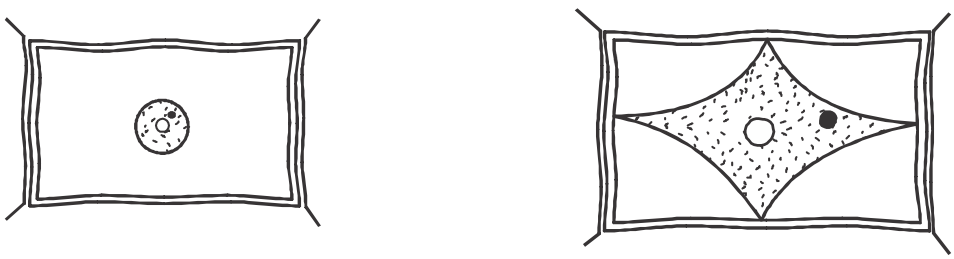
22) Define;

Pulmonary circulation **(1mk)**

Systemic **circulation** **(1mk)**

23) .

The diagram below represents a plant cell that was subjected to a certain treatment.



(a) At the start **At the end of the experiment**

Account for the shape of the cell at the end of the experiment. **(2 mks)**

Draw a diagram to illustrate how an animal cell would appear if subjected to the same

treatment. **(1mk)**

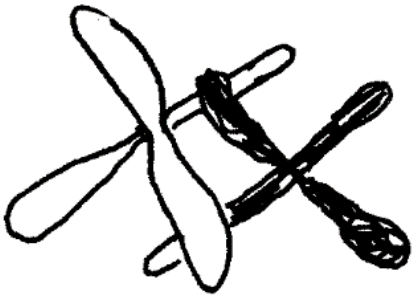
24) a) **Give** a reason why each of the following steps are followed when preparing cross sections of a leaf for examination under a microscope.

Cutting thin sections. **(2 mk)**

Placing the sections in water. **(1 mk)**

25) . Explain **why** the population of people with sickle cell anaemia is higher in malaria prone areas. **(3mks)**

26) . The diagram below is of a stage in cell division

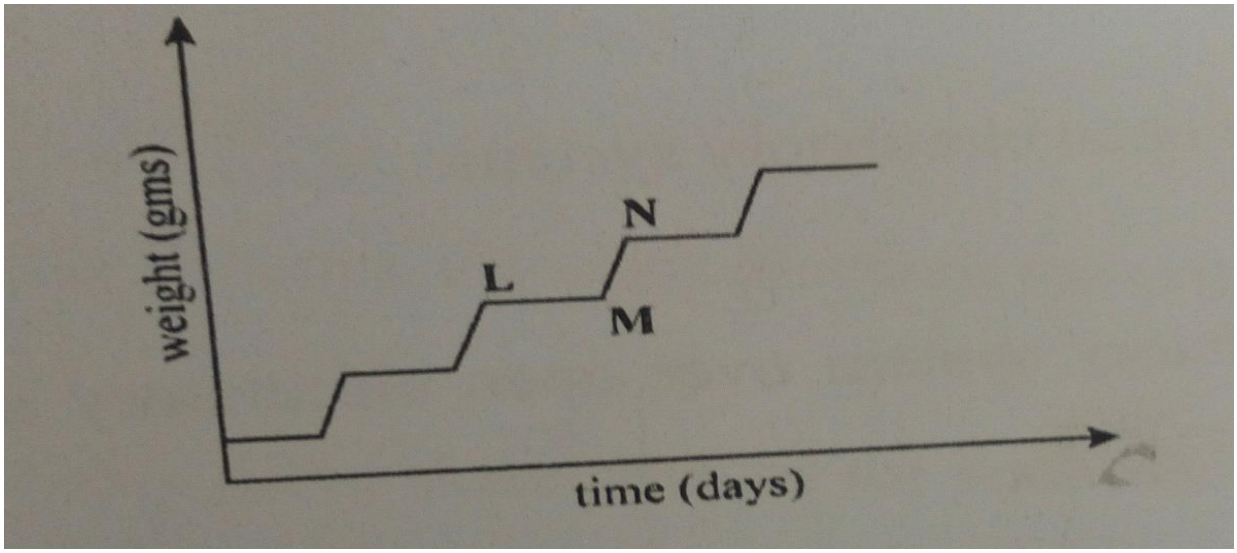


a. With a reason identify the stage.

i. Stage **(1 mk)**

ii. Reason **(1 mk)**

27) The graph below represents growth pattern in a group organism



(a) Name the type of growth curve **(1 mk)**

(b) Name the phylum that shows this type of pattern **(1 mk)**

(c) State one disadvantage of this type of pattern **(1 mk)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 6 PAPER 2

TIME: 2 HOURS

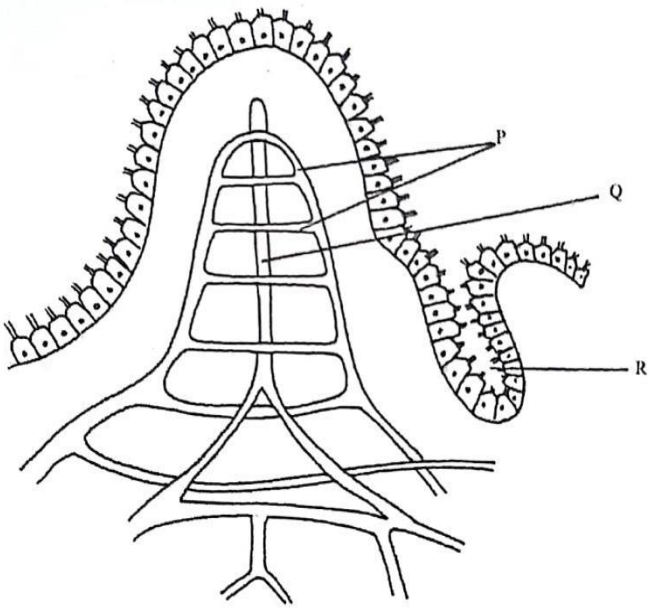
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

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



Identify the **structure** **(1mks)**

State the role of the part labeled **R** **(1mk)**

A student took a meal of lean meat. Briefly describe the digestion of the food substance where this structure is found **(3mks)**

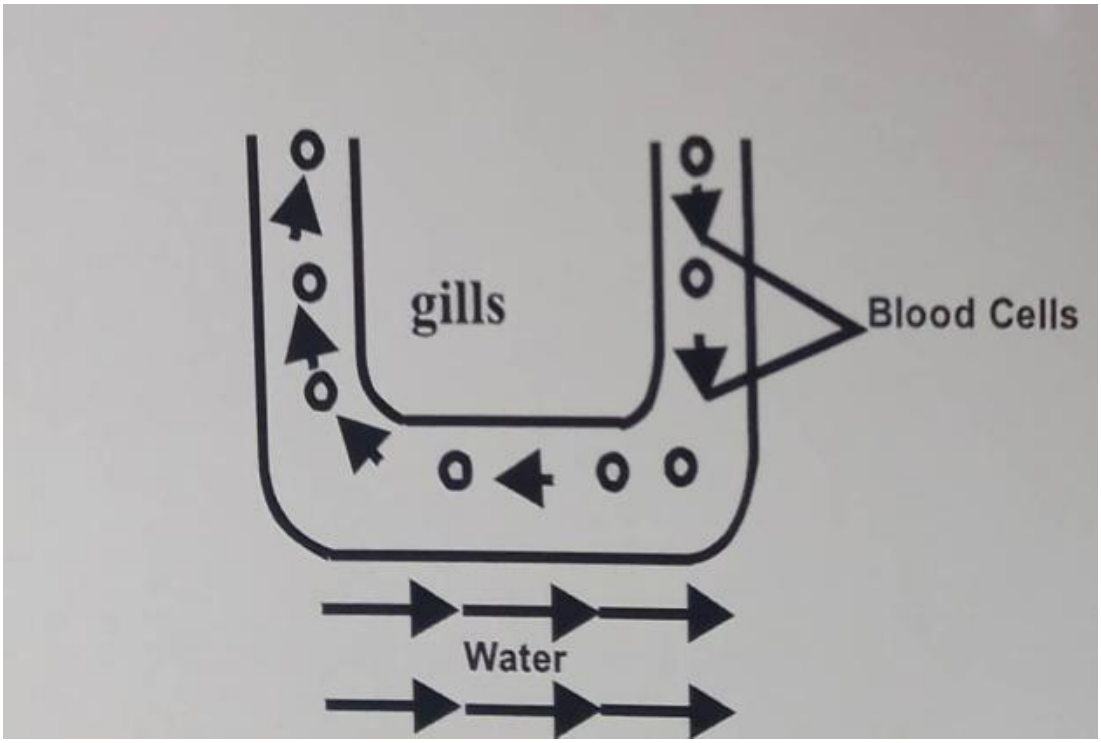
What is the role of the following: enterokinase and cholecystokinin in digestion? **(2mk)**

Enterokinase.

Cholecystokinin……

State the deficiency disease associated with lack of vitamin B_2 **(1mk)**

2) The diagram below shows how gaseous exchange occurs across the gills in fish.



i Name the type of flow shown above **(1mk)**

ii Explain the advantage of the above flow named in a(i) above. **(1mk)**

If the fish is removed from water it dies immediately. Explain why **(2mks)**

c) Explain mechanism of gaseous exchange in frog through the skin **(4mks)**

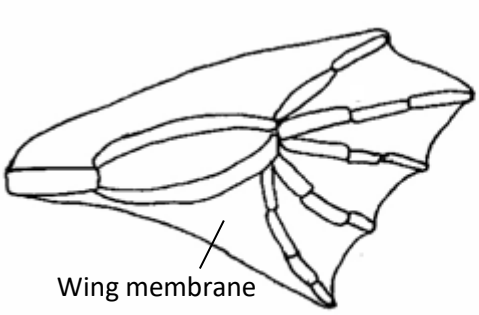
3) A freshly obtained stem from herbaceous measuring 4cm long was split lengthwise to obtain two similar pieces. The pieces were placed in two different solutions of different concentrations in petri dishes (l1 and L2) for 30 minutes. The appearance after 30 minutes is as shown.

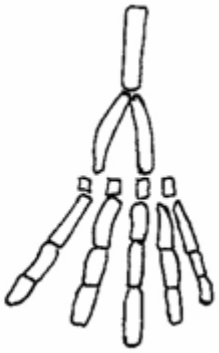
State the type of solutions in which **L_1** and **L_2** was placed **(2mks)**

Account for the appearance of the pieces in solutions L_1 and L_2 **(4mks)**

State two significance of the biological process involved in the experiment.**(2mks)**

4) .The diagram below shows structures of the bat wing and human arm.





These structures are thought to have same ancestral origin. State one structural similarity and one adaptation difference between the two.

i) Structural similarity. **(1mk)**

ii) Adaptation difference. **(2mks)**

(b)Give two other examples of structures in nature that show the type of evolution as in (a) above. **(2mks)**

(c)Distinguish between the erms 'chemical evolution' and 'organic evolution'. **(2mks)**

(d) What is the study of fossils called? **(1mk)**

5) Pure breed of red cows and pure breed of white bulls were crossed to give F_1 calves which had a mixture of red and white coat known as roan. The F_1 were selfed.Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F_2. **(4mks)**

Work out the genotypic ratio of a cross between F_1 offspring and white bull. **(3mks)**

(c) Comment on the gene(s) controlling the colour of coats in cattle mentioned above. **(1mk)**

SECTION B (40MKS)

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

6) An experiment was carried out to investigate the effects of hormones on growth of lateral buds of three pea plants. The shoots were treated as follows; Shoot A – Apical bud was removed Shoot B – Apical bud was removed and gibberellic acid placed on the cut shoot.

Shoot C - Apical bud was left intact.

The length of branches developed from lateral buds was determined at regular intervals. The results obtained are as shown in the table below:

TIME IN DAYS	SHOOT A	SHOOT B	SHOOT C
0	3	3	3
2	10	12	3
4	28	48	8
6	50	90	14
8	80	120	20
10	118	152	26

(a) Using the same axes, draw graphs to show length of branches against time. **(8mks)**

(b) (i) What was the length of the branch in Shoot B on the 7th day? **(1mk)**

(ii)What would be the expected length of the branch developing from Shoot A on the 9th day? **(1mk)**

(c) Account for the result obtained in the experiment. **(6mks)**

(d) Why was Shoot C included in the experiment? **(1mk)**

(e) What is the importance of gibberellic acid in Agriculture? **(1mk)**

(f) State two physiological processes that are brought about by the application of gibberellic acid on plants. **(2mks)**

7(a) Describe the process of fertilization in a flowering plant. **(14mks)**

(b) State the changes that take place in a flower after fertilization. **(6mks)**

8 Describe the structural adaptation of the mammalian heart to its functions **(20mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 7 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. a) Name the causative agents of the following diseases in humans.
i) Typhoid. **(1mk)**
ii) Amoebic dysentery. **(1mk)**

2. State the function of the following cell organelles.
i) Ribosome. **(1mk)**
ii) Lysosomes **(1mk)**
iii) Nucleolus. **(1mk)**

3. a) Name **one** defect of the circulatory system in humans. **(1mk)**
b) State **three** functions of blood other than transport. **(3mks)**

4. a) Distinguish between epigael and hypogeal germination in plants. **(2mks)**
b) Name the gland that secretes the following hormones. **(2mks)**
i) Ecdysone
ii) Juvenile

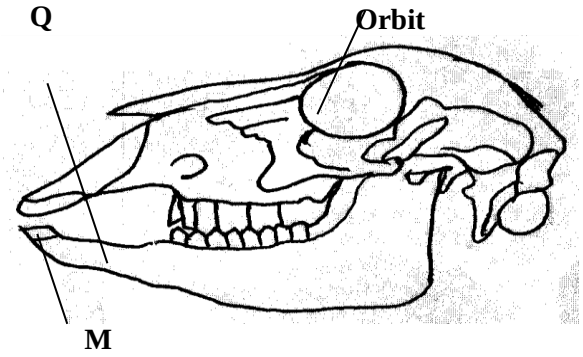
5. a) Give two sex linked genes found on the Y-chromosome. **(2mks)**
b) Below is a nucleotide strand

A	A	G	T	C

i) Identify the type of nucleic acid. **(1mk)**
ii) Give a reason for your answer in (a) above. **(1mk)**

6. a) Distinguish between homologous and analogous structures. **(2mks)**
b) Give **one** reason why organisms become resistant to drugs. **(1mk)**

7. The following specimen was extracted from a newly discovered organism.



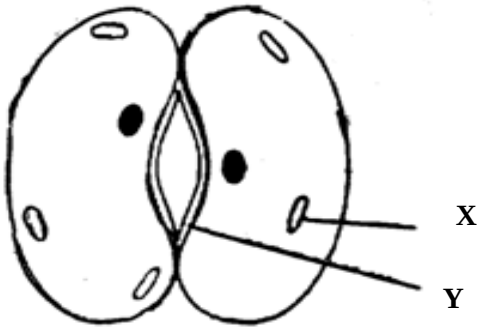
a) Name the tooth labeled **M**. **(1mk)**

b) Name the part labeled Q and state its role. **(2mks)**

Name……..…….

Role

8. The diagram below represents a cell organelle



a) Name the part labeled Y. **(1mk)**

b) State the function of the part labeled X. **(1mk)**

c) Explain how dark stage of photosynthesis is dependent on the light stage. **(2mks)**

9. a) Name **two** gaseous exchange surfaces in plants. **(2mks)**

b) What is the importance counter current flow system in fish? **(2mks)**

10. Form three students wanted to estimate the population in $5km^2$ grass field near a school compound. They captured 36 grass hoppers and marked them before returning them to the field. After a few days they made another catch of grasshoppers. They collected 45 grasshoppers out of which only 4 had marks.

a) Name the method of population estimation the students used. **(1mk)**

b) State **two** assumptions that were made by the students during the study. **(2mks)**

c) From the data, calculate the population size of grasshopper. **(2mks)**

11. State the functions of the following parts. **(2mks)**

i) a) Endometrium

b) Epididymis

ii) What mechanism facilities the movement of the ovum towards uterus. **(1mk)**

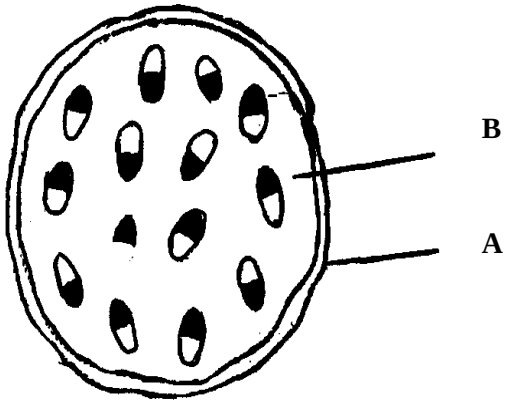
12. The diagram below represents the flow of energy in a food chain.

Sun → Grass → Antelope → Leopard → Bacteria → **P**

a) Suggest a reason why the energy labeled P does not enter food chain **(1mk)**

b) State **one** way in which energy is lost from the food chain. **(1mk)**

13. The diagram below represents the cross section of a part of a certain plant.



a) Name the class of the plant from which the section was taken. **(1mk)**

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

c) Name the parts labeled **A** and **B**. **(2mks)**

14. State **two** reasons why the study of biology is important. **(2mks)**

15. State the economic importance of the following plants excretory procedures. **(3mks)**

a) Caffeine

b) Quinine

c) Colchicine

16. Define the following terms

a) Irritability **(1mk)**

b) Stimulus **(1mk)**

17. A process that occurs in plants is replaced by the equation below

$$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + CO_2 + \text{Energy}$$

a) Name the process. **(1mk)**

b) State the importance of the process named in a) above. **(2mks)**

18. a) What is Binomial Nomenclature? **(1mk)**

b) State **two** rules that are followed when printing scientific names. **(2mks)**

19. Name **three** strengthening tissues in dicotyledonous plants. **(3mks)**

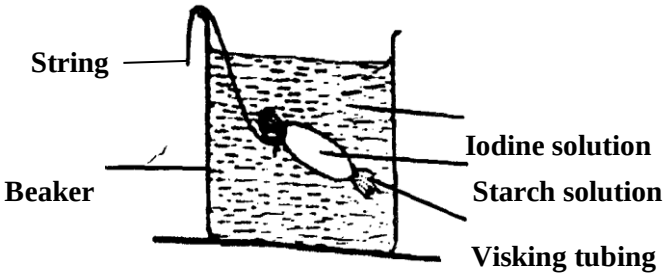
20. Name the site for gaseous exchange in insects. **(1mk)**

21. a) What is alternation of generations **(2mks)**

b) Explain why leaves of Peridophytes are referred to as Fronds. **(1mk)**

22. State **four** adaptations of red blood cells to its functions. **(4mks)**

23. The experiment illustrated below was set up to investigate a certain physiological process



a) Name the physiological process that was being investigated. **(1mk)**

b) State the observations that were made after at the end of the experiment

(i) Inside the Visking tubing **(1mk)**

(ii) Outside the Visking tubing **(1mk)**

c) Account for the observations in b) above. **(2mks)**

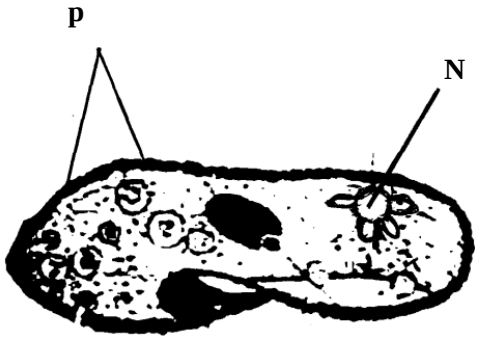
24. State the differences between the following structures in wind and insect pollinated flowers. **(3mks)**

(i) Anther

(ii) Pollen grains

(iii) Stigma

25. A student placed a drop of pond water in a cavity slide and observed it under the microscope. The student observed many fast moving organisms, one of which is represented in the diagram below.



a) Name the kingdom to which the organism belongs. **(1mk)**

b) Name the structures labeled **P** and **N** **(2mks)**

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

a) Disease the person was suffering from **(1mk)**

b) Hormone that was deficient **(1mk)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 7 PAPER 2

TIME: 2 HOURS

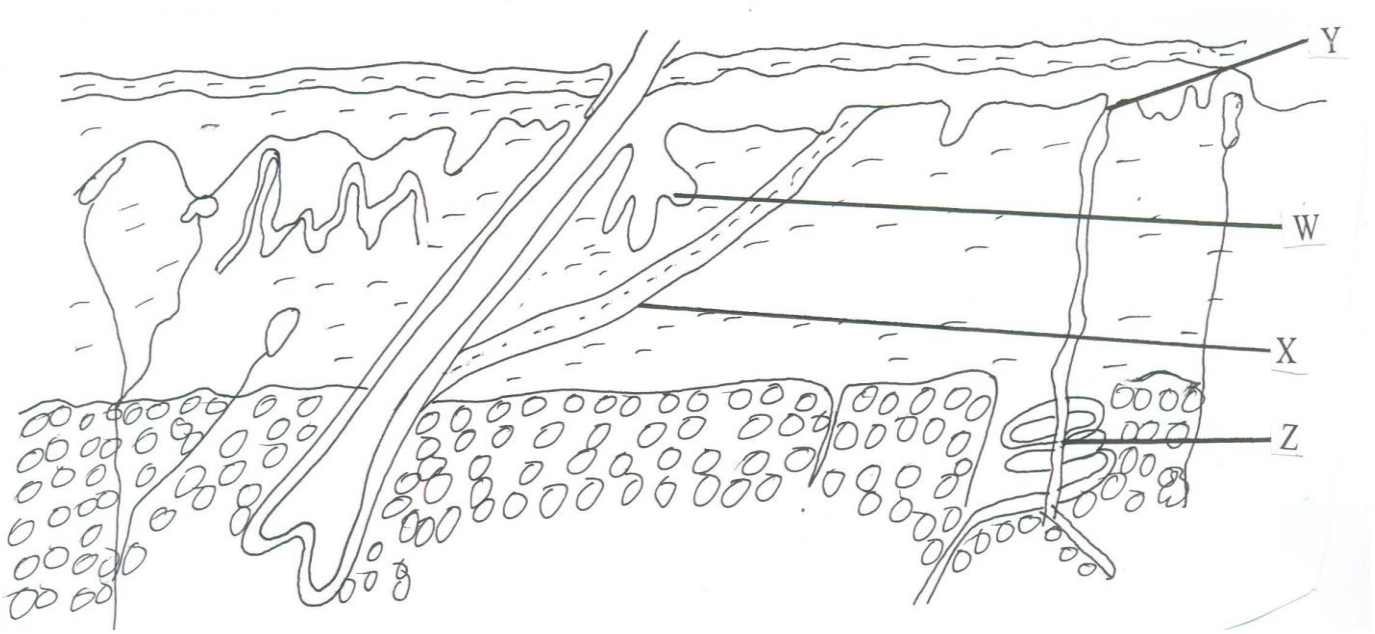
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……...

Answer All the Questions

1. The diagram below shows a section through the mammalian skin



(a) Name the parts labelled W and X **(2mks)**

(b) State the function of the parts labelled Y and Z **(2mks)**

(c) Explain the changes that occur in the skin when it is cold **(4mks)**

2. (a) Eye colour in fruits flies is sex-linked. Red eye colour **R** is dominant to white eye colour **r**

A heterozygous red –eyed female fly was crossed with a white eyed male

(i) Show the parental genotypes **(1mk)**

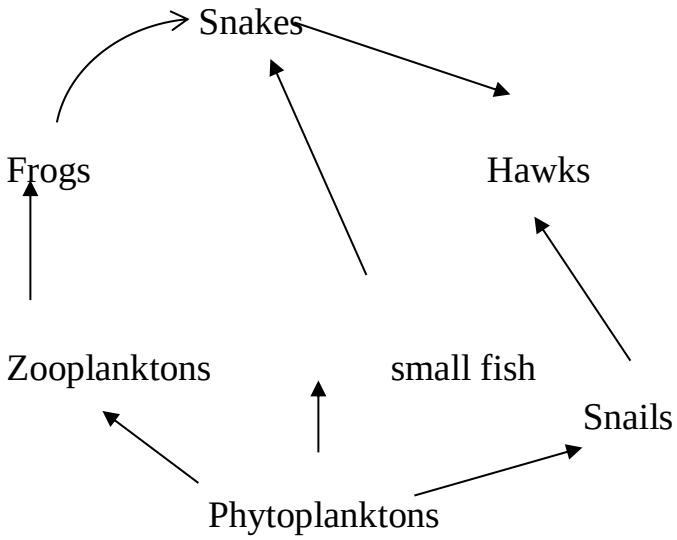
(ii) By means of a genetic cross, determine the genotypic ratio of the offsprings **(4mks)**

(iii) Explain why the actual phenotype ratio obtained from this cross could differ from the

Expected **(1mk)**

(b) Name two disorders due to non-disjuction **(2mks)**

3. The diagram below represents a feeding relationship in an ecosystem.



(a) Name the type of ecosystem represented by the above food web **(1mk)**

(b) Name the organism in the food web that

(i) Is a producer **(1mk)**

(ii) Occupies the highest tropic level. **(1mk)**

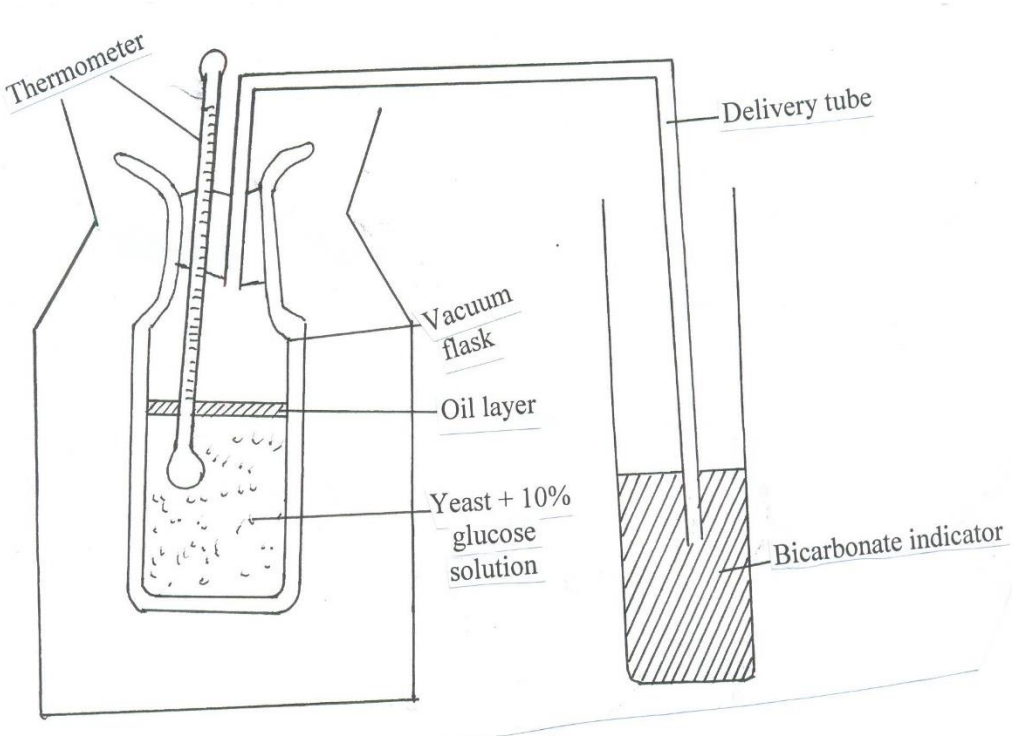
(c) (i) Write a food chain that ends with the hawk as a quarternary consumer. **(1mk)**

(ii) State two short terms effects on the above ecosystem if all the small fish were killed **(2mks)**

(d) (i) How does oil spills lead to death of fish? **(1mk)**

(ii) Name one other cause of water pollution apart from oil spills. **(1mk)**

4. The experiment below was set – up to investigate some physiological processes. The glucose solution was first boiled then cooled. The set up was left for 24 hours



(a) Suggest two aims of the experiment. **(2mks)**

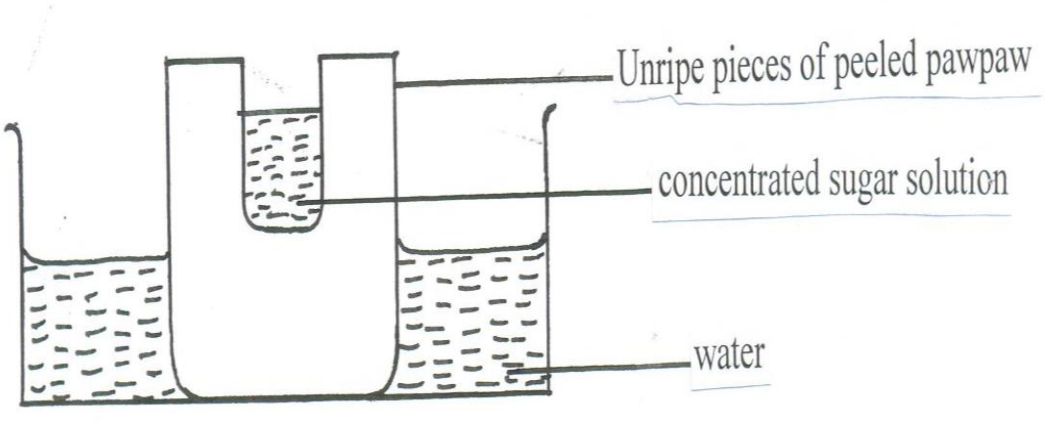
(b) (i) State the expected observations after 24 hours **(2mks)**

(ii) Explain your observations in a (i) above **(2mks)**

(iii) Why was glucose solution boiled then cooled? **(1mk)**

(c) Suggest a control for the above experiment. **(1mk)**

5. A group of students set up an experiment to investigate a certain physiological process. The set up was as shown in the diagram below.



After some time, the students observed that the level of sugar solution had risen

(a) What physiological process was being investigated. **(1mk)**

(b) Account for the rise in the level of sugar solution in this experiment. **(4mks)**

(c) (i) State the results that the students would obtain if they repeated the experiment using a piece of boiled pawpaw. **(1mk)**

(ii) Give a reason for your answer **(2mks)**

SECTION B (40 MARKS)

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

6. During germination and growth of a cereal, the dry weight of endosperm, the embryo and the total dry weight were determined at two day intervals. The results are shown in the table below:

Time after planting (days)	Dry weight of endosperm (mg)	Dry weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

a) Using the same axes, draw graphs of dry weight of endosperm, embryo and the total dry weight against time. **(7mks)**

b) What was the total dry weight on day 5 **(1mark)**

c) Account for

i. Decrease in dry weight of endosperm from 0 to 10 **(2mks)**

ii. Increase in dry weight of embryo from day 0 to day 10 **(2mks)**

iii. Decrease in total dry weight from day 0 to day 8 **(1mk)**

iv. Increase in total dry weight after day 8 **(1mk)**

d) State two factors within the seed and two outside the seed that cause dormancy

i. Within the seed. **(2mks)**

ii. Outside the seed **(2marks)**

e) Give two characteristics of meristematic cells **(2mks)**

7. (a) Describe the process of fertilization in flowering plants **(15mks)**

(b) State the changes that take place in a flower after fertilization **(5mks)**

8.(a) Describe the mechanism of inhalation in man. **(10mks)**

(b)Using photosynthesis theory explain the mechanics of opening of stomata.**(10ms)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 8 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

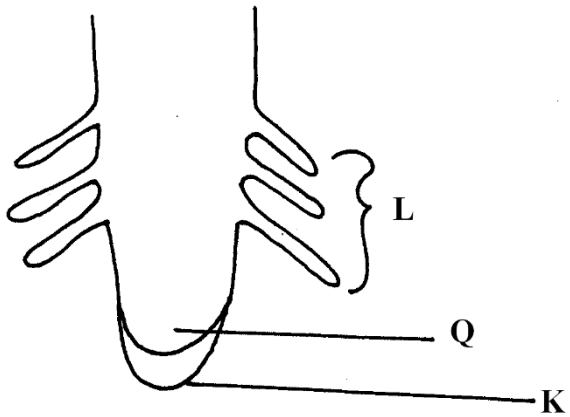
DATE……....

Answer All the Questions

1) Define the term Entomology. **(1mk)**

2) What is meant by the term Natural Selection. **(2mks)**

3) The diagram below shows regions of a root-tip

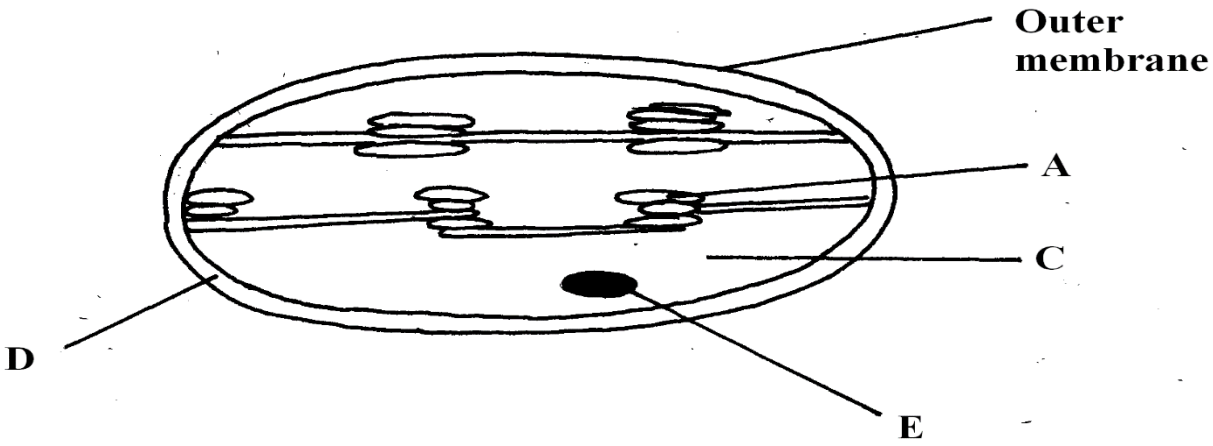


What is the function of the part labeled K. **(1mk)**

Name the region labeled L. **(1mk)**

Give ONE characteristics of the cells in the part labeled Q. **(1mks)**

4) The organelle below is important in the process of Nutrition.



Identify the organelle. **(1mk)**

Name the part labeled C. **(1mk)**

Identify the structure within the organelle that would make the leaf to be variegated. **(1mk)**

5) A Rhinocerous in a game park was found to be infested with ticks. State the trophic leveloccupied by Ticks **(2mks)**

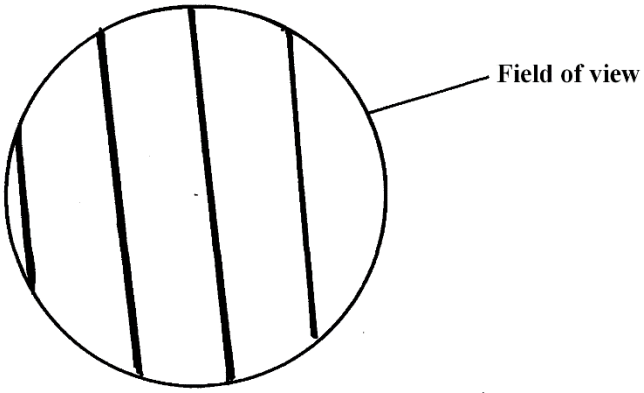
6) State the causative agent of the following diseases. (2mks)

a) Typhoid

b) Pneumonia

7) A student estimating a cell size of an onion epidermal cells observed the following on

a. The microscope field of view using a transparent ruler.



b. The student identified 20 cells across the field of view. Calculate the size of the cell in

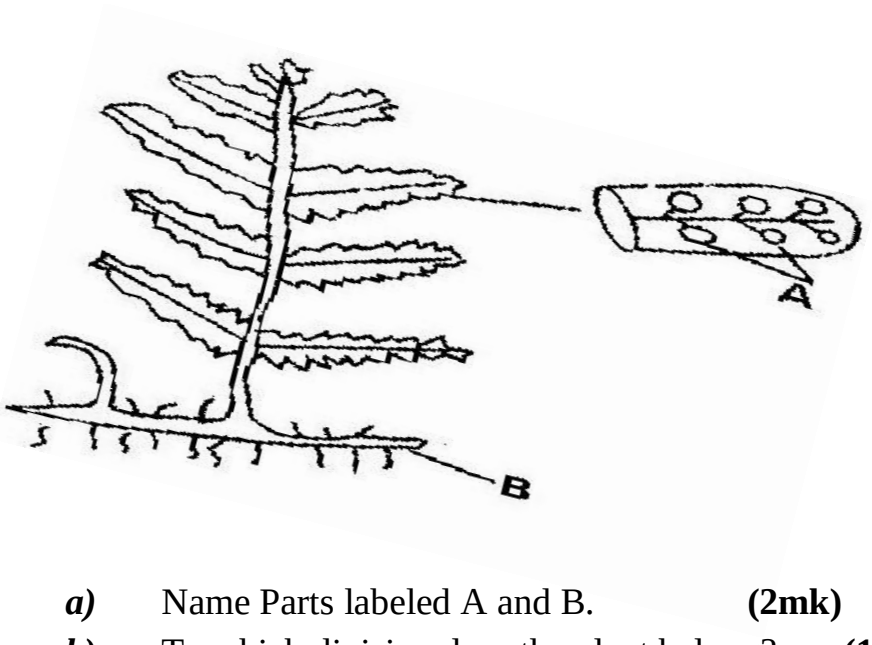
c. Micrometers (show your working) **(3mks)**

8) Name the tissues whose cells are thickened with:

Cellulose and pectin. …… (**1mk)**

Lignin. …… **(1mk)**

9) The diagram below represents a fern.



a) Name Parts labeled A and B. **(2mk)**

b) To which division does the plant belong? **(1mk)**

10) Explain how the following factors hinder self-pollination in plants:

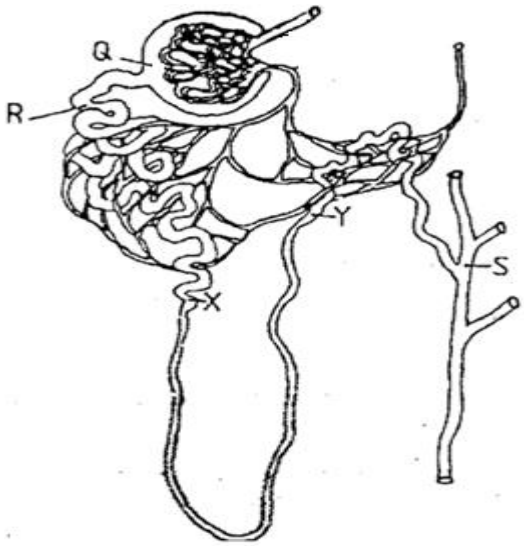
a) Protogyny **(1mk)**

b) Dioecism **(1mk)**

11) Explain the likely effect on humans and other organisms of untreated sewage discharged into water body that supplies water for domestic use. **(3mk)**

12) State TWO differences between osmosis and active transport. (2mk)

13) The diagram below illustrates part of a nephron from a mammalian kidney.



Name the fluid found in the part labeled Q. **(1mk)**

Identify the process responsible for the formation of the fluid named in (a) above. **(1mk)**

Which two hormones exert their effect in the nephron? **(2mk)**

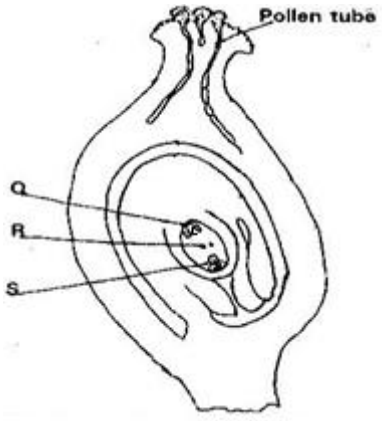
14) State TWO characteristics of members of kingdom Monera that are not found in other kingdoms **(2mk)**

15) What is meant by the following biological terms?

Crenation **(1mk)**

Haemolysis **(1mk)**

16) The diagram below shows a stage during fertilization in flowering plant.

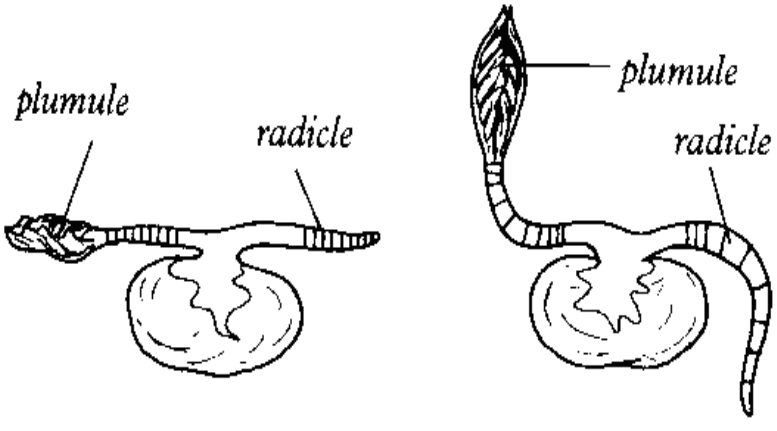


i.

Name the parts labeled Q, R, and S. **(3 mk)**

State the function of the pollen tube. **(1 mk)**

17) An experiment was set to investigate a certain aspect of response. A seedling was put on a horizontal position as shown in figure M below. After 24 hours, the set up was as shown in figure N.



M N

a) Name the response exhibited. **(1mk)**

b) Explain the curvature of the shoot upwards. **(3mk**

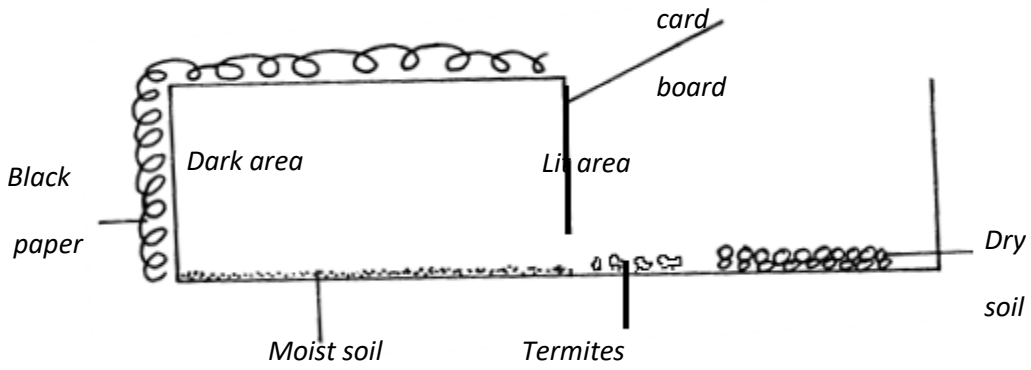
18) The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

Name the evolutionary process that may have given rise to these structures. **(1mk)**

What is the name given to such structures? **(1mk)**

Give ONE examples of vestigial organs in man. **(1mk)**

19) A group of Form four students set up an experiment to investigate a biological process using termites. They used a small box in which a portion was covered with black paper and had moist soil. The open part had dry soil. Termites were placed inside in open area of the box.

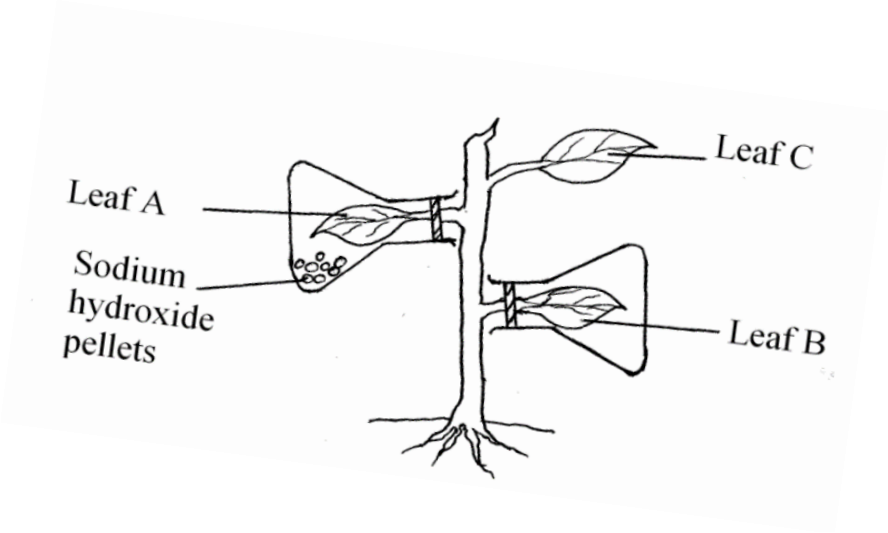


Predict what happened to the termites after 30 minutes**.** **(1mk)**

What form of response is exhibited by termites? **(1mk)**

State one biological significance of the above response to termites.**(1mk)**

20) The diagram below represents an experimental set up to investigate a certain scientific concept. The potted plant was first destarched by keeping it in dark for four days.



The set up was then placed in sunlight for five hours and leaves were tested for starch. What scientific concept was being investigated? **(1mk**

i) Give the results likely to be obtained after starch test for A and B.

a) **A and B.**

ii. A …… (1mk)

iii. B …… (1mk)

iv. ii) Account for the results in leaf A in b (i) above. **(1mk)**

Why was leaf C included in the set-up**?** **(1mk)**

21) Explain why a pregnant woman excretes less urea compared to a woman who is not- pregnant. **(2mk)**

22) a) Outline the main features of Lamarckian theory of evolution**.** **(2mk)**

In view of modern genetics, explain why Lamarck's theory is unacceptable. **(1mk)**

Name one factor in nature that increases the process of evolution. **(1mk)**

23) Explain why fresh water Protozoa like amoeba do not burst when placed in distilled water. **(2mks)**

24) The equation below shows an oxidation reaction of flow food substance

$5C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102CO_2 + 98H_2O$ + Energy

Determine respiratory quotient of the oxidation of the food substance above**.(2mks**

Identify the food substance **(1mk)**

25) Give the one aspect of dichogamy in flowers **(1mk)**

26) The table below shows the concentration of important plant nutrients

Ion	Concentration in pond water (ppm)	Concentration in cell sap (ppm)
Chloride	200	50
Potassium	1	15

a. Name the process by which the above ions could have been taken up by the plants

Potassium …… (1mk)

Chloride……..(1mk)

27) In an experiment **<u>Drosophila</u> <u>melanogaster</u>** (fruit flies) with broad abdomens were crossed with those having narrow abdomens. All the offspring (F1 generation) from the crosses had broad abdomens. Using A to denote the genes for abdomen size,

Give the genotypes of the parents **(2mks)**

If 150 fruit flies had narrow abdomens in the second filial generation (F2) how many fruit flies with broad abdomens were in the same generation (show your working) **(2mks)**

28) Give a reason why two species in an ecosystem cannot occupy the same niche. **(1mk)**

29) A person was found to pass out large volume of dilute urine frequently. Name the:

Disease the person was suffering from? **(1mk)**

Hormone that was deficient **(1mk)**

30) Identify the processes X and Y and the unknown product Z in the chemical equations below;

[i] Glucose + Galactose $\xrightarrow{X}$ Lactose + Z **(2mks)**

X _____

Z _____

[ii] G + water $\xrightarrow{Y}$ Glucose + Fructose **(2mks)**

Y

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 8 PAPER 2

TIME: 2 HOURS

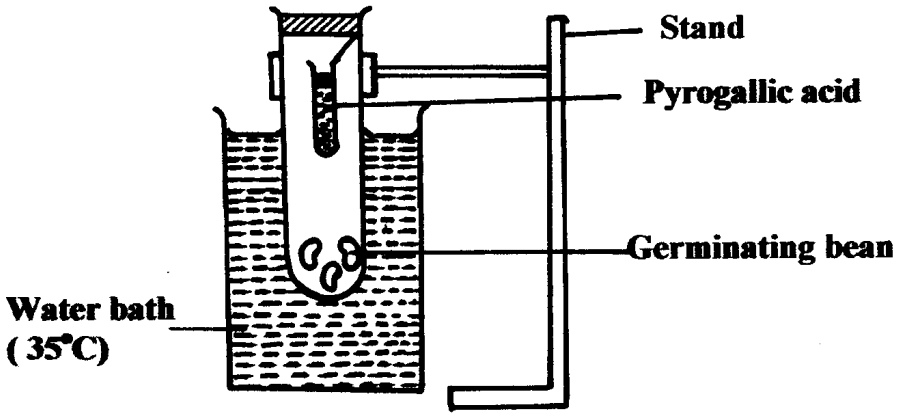
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) The diagram below shows a set up to investigate a factor necessary for germination.



Name the factor under investigation. **(1mk)**

State the role of pyrogallic acid in the set up. **(1mk)**

Which type of respiration is taking place in the beans? **(1mk)**

Write a word equation for the process named in (c) above. **(1mk)**

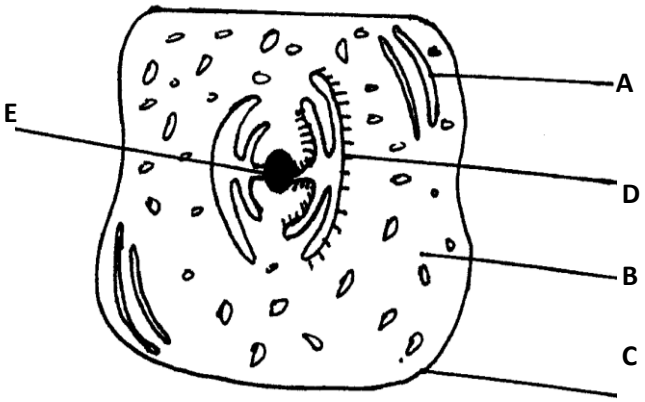
Explain why plants can only carry out the above respiration process for a short while. **(1mk)**

State other **three** factors necessary for germination. **(3mks)**

2) a) Birds have beaks which are structurally modified to different modes of feeding.
What is the name given to such structures in evolution? **(1 mark)**
What is the name given to the evolution of beaks of birds? **(1 mark)**
What is meant by "vestigial structures"**?** **(1 mark)**
Name two vestigial structures present in man. **(1 mark)**
Bacteria tend to develop resistance to antibiotics after they have been subjected to them for a long period of time. Explain. **(2 marks)**
Explain continental drift as an evidence of evolution. **(2 marks)**

3) What is internal fertilization ? **(1mk)**
Suggest two disadvantages of internal fertilization in most mammals. **(2mks)**
State two roles of placenta in mammals. **(2mks)**
Mention one role played by each of the following hormones in human menstrual cycle.
Oestrogen
Luteinizing hormone.
Follicle stimulating hormone **(3mks)**

4) Below is a cell obtained from a living organisms. Study it and answer the questions that follow



From which kingdom of organism was the cell obtained? **(1mk)**

Give **two** reasons for your answer in 4 (a) above **(2mks)**

On the diagram identify parts **A,B** and **C**. **(3mks)**

State the role of parts **D** and **E**. **(2mks)**

5) a) What is meant by the term linked genes**?** **(1mk)**

Haemophilia is a genetic condition transmitted through a recessive gene linked to **X** chromosome. The normal gene may be represented by $\mathbf{X^H}$**.**

What is the genotype of a haemophilic female**?** **(1mk)**

A woman who is a carrier for the haemophilia gene marries a normal man. Work out the phenotypic ratio for their offspring**.** **(4mk)**

Haemophilia is more common in males than in females. Explain this phenomenon. **(2mks)**

SECTION B (40 MARKS)

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

6) The table below shows how the quantities of sweat and urine vary with external temperature.

External temperature	Urine cm^3/hr	Sweat cm^3/hr
0	100	5
5	90	6
10	80	10
15	70	20
20	60	30
25	50	60
30	40	120
35	30	200

(a) On the same axis plot graphs of the quantities of urine and sweat produced against the external temperature. **(7mks)**

(b) At what temperature are the amounts of sweat and urine produced equal? **(1mk)**

(c) What happens to the amount of sweat produced as the temperature rises? Explain the observation. **(3mks)**

(d) Account for the observation made on the amount of urine produced as the temperature increases **(3Mks)**

(e) (i) How is the kidney adapted to its function **(4mks)**

(ii) Differentiate between excretion and egestion. **(2mks)**

7. Explain how the following organisms are adapted to their mode of feeding

(a) Herbivores **(10mks)**

. (b) Carnivores **(10mks)**

8. **(a) (**i) State **two** significances of transpiration**.** **(2mks)**

(ii Discuss the forces involved in movements of water from roots to the leaves **(8mks)**

(b) Describe the mechanism of opening and closing of stomata using photosynthetic theory **(10mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 9 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1) State two features of leaves which enable a plant to reduce the loss of water. **(2mk)**

2) a) State the Phylum where all members have open circulatory system. **(1mk)**
Explain two advantages of closed circulatory system over open circulatory system. **(2mk)**

3) 3. a) Under which of the following magnifications would one see a larger part of the specimen X 40 or X500? Give a reason. **(2 Marks)**
(b) State how magnification is worked out in a light microscope. **(1 Mark)**

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

5) The following is an equation representing a type of respiration

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

Identify the type of respiration. **(1mk)**
b) Suggest one industrial application of the process named in (a) above. **(1mk)**

6) 6a) What is meant by the term binomial nomenclature. **(1mk)**
A dog is called Canis familiairis. Name the taxonomic unit represented by canis.(**1mk)**

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

8) The colour of tips of hair in Shepherd dog is controlled by a gene with three alleles B for Black, R for red and C for copper. A cross between pure breeding red and copper hair tips produce offsprings with scarlet hair tips. Crossing pure breeding red and black hair tips yields all red offsprings. A cross between pure breeds of copper and black produce offsprings that are all copper.

a) Comment on the inheritance of the three alleles B, R and C. **(2 marks)**

b) A dog breeder wishes to know the genotype of a dog with red hair tips. State and explain the cross needed to determine the dog's genotype. **(2 marks)**

9) . What is the importance of seed dispersal? **(3mks)**

10) State two adaptations of guard cells to its function. **(2Marks)**

11) Describe the censor mechanism of seed dispersal. **(2mks)**

12) Explain "struggle for existence" and "survival of the fittest" as they apply to natural Selection. **(4mks)**

Struggle for existence

Survival of the fittest:-

13) (a) Define the following term

Incomplete metamorphosis. **(1mk)**

(b) State one function of each of the following hormones **(2mks)**

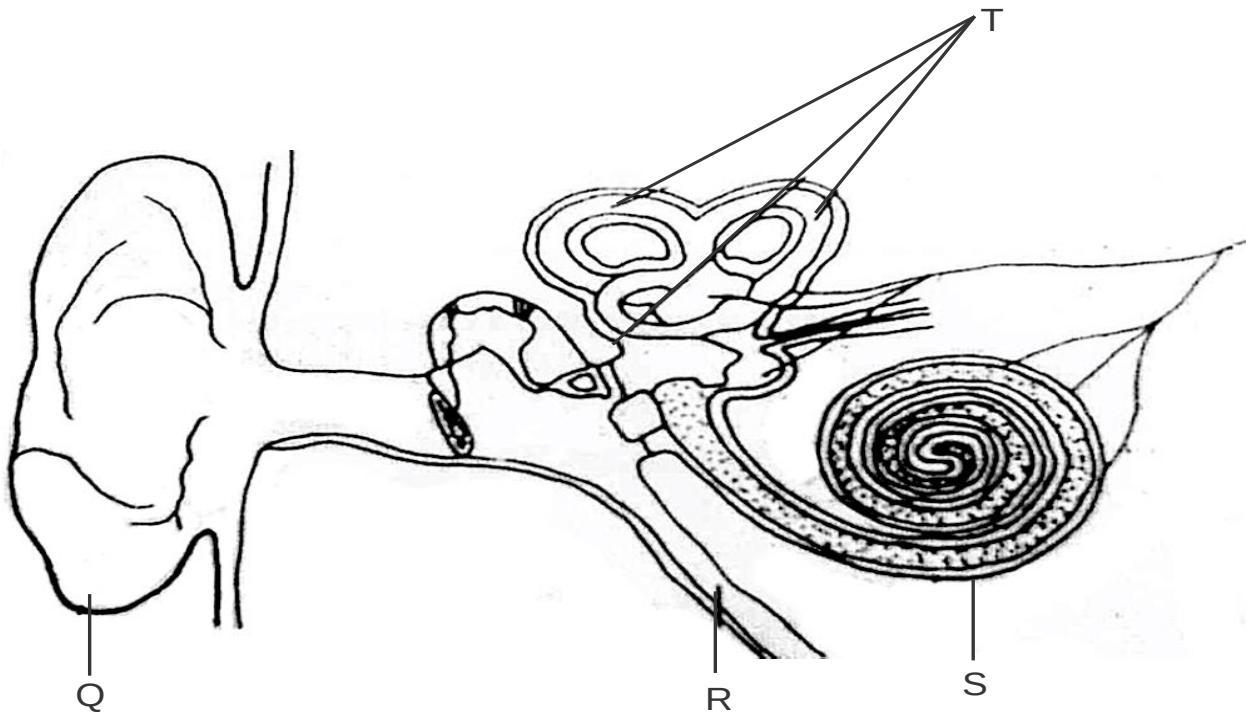
a. Juvenile hormone.

b. Ecdysone.

14) a) Name the organelle where the cell wall components are synthesized. **(1mk)**

b) State two roles of cell wall to a plant. **(2mks)**

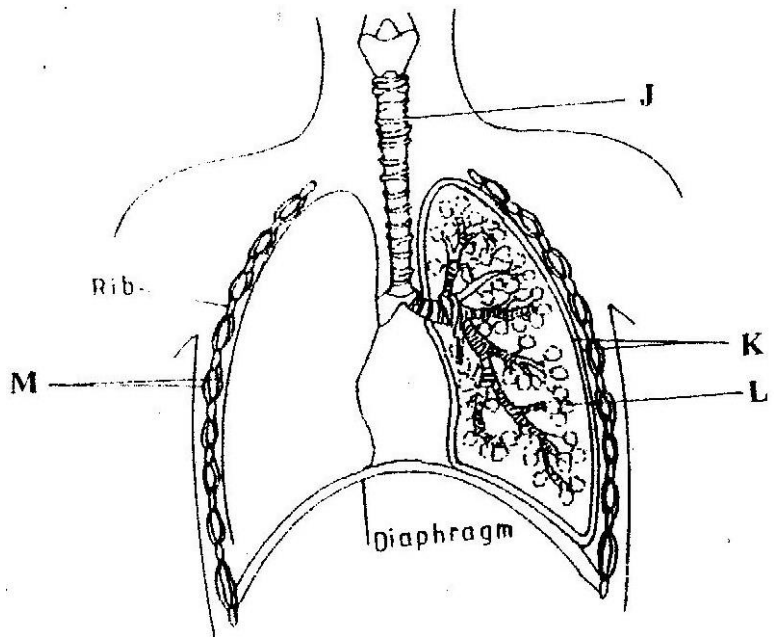
15) The diagram below represents a section through the mammalian ear.



a) Name the structures labelled R and T. **(2 mark)**

b) State how the structures Q and S are adapted to their functions. **(2 mark)**

16) The diagram below represents some gaseous exchange structures in humans



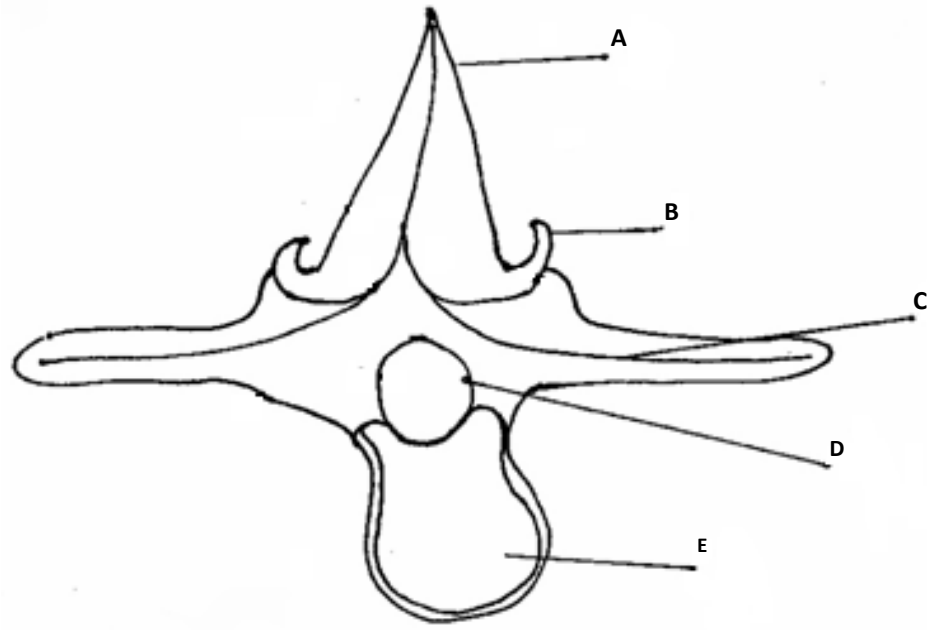
(a) Name the structures labeled K **(1 marks)**

(b) state two way in which the structure labeled J is suited to its function? **(2 marks)**

Name the process by which inhaled air moves from the structure labeled **L** into blood capillaries **(1 mark)**

Give the scientific name of the organism that causes tuberculosis in humans **(1 mark)**

17) The diagram below represents the anterior view of a certain vertebra.



(a) With a reason, identify the type of vertebra shown above. **(1mks)**

Name the parts labeled.

(i) A **(1mk)**

(ii) **D** **(1mk)**

c) State the function of part E. **(1mk)**

18) State THREE adaptations of a leaf to gaseous exchange. **(3 marks)**

19) What is the importance of the pollen tube in fertilization in plants? **(1 marks)**

20) .The following are events suggested by the theory of natural selection.

Reproduction of organism with favorable variation

The emergence of new species

Variation between individuals

A struggle for existence

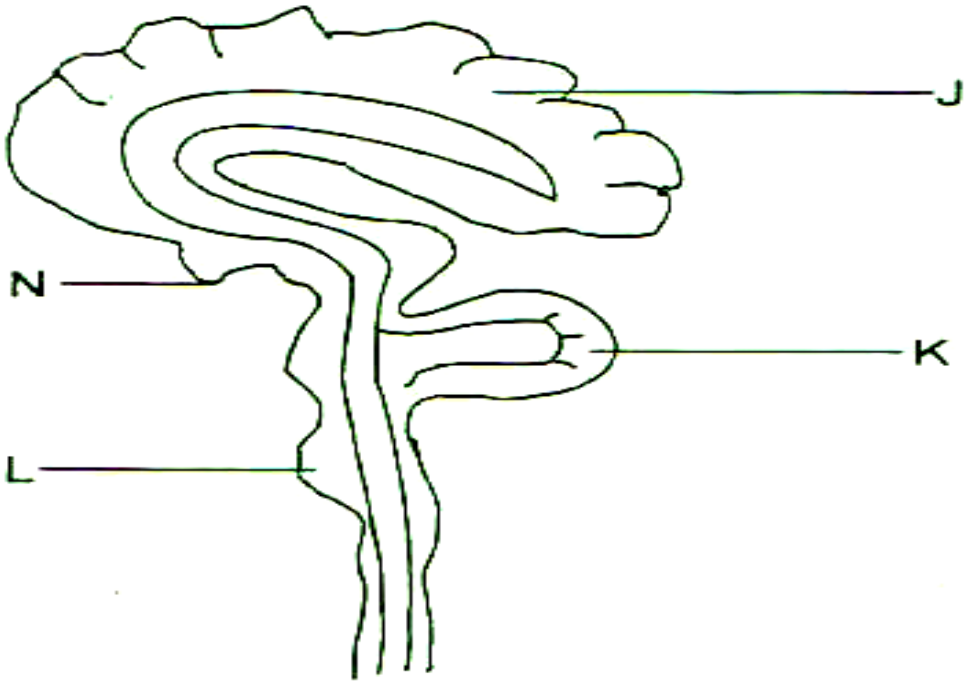
The survival to the fittest

Who postulated the theory of natural selection? **(1 mark)**

What is meant by natural selection? **(1 mark)**

Arrange in an order that best illustrate the sequence of events leading to evolution by natural selection **(1 mark)**

21) .The diagram below shows a vertical section through human brain.



Name the part labeled K **(1 mark)**

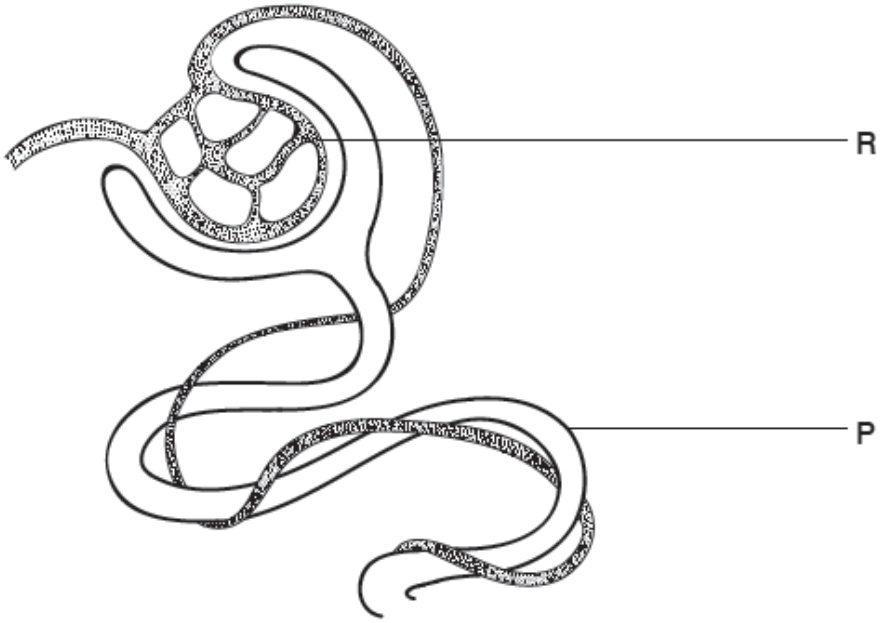
State why the part labeled J is large and highly folded. **(1 mark)**

Give a letter on the diagram which:

Serve as endocrine gland **(1 mark)**

Control breathing, swallowing and blood circulation **(1 mark)**

22) The diagram below shows part of a nephron from the human kidney.



(i) Name the structure labelled **R.** **(1 mark)**

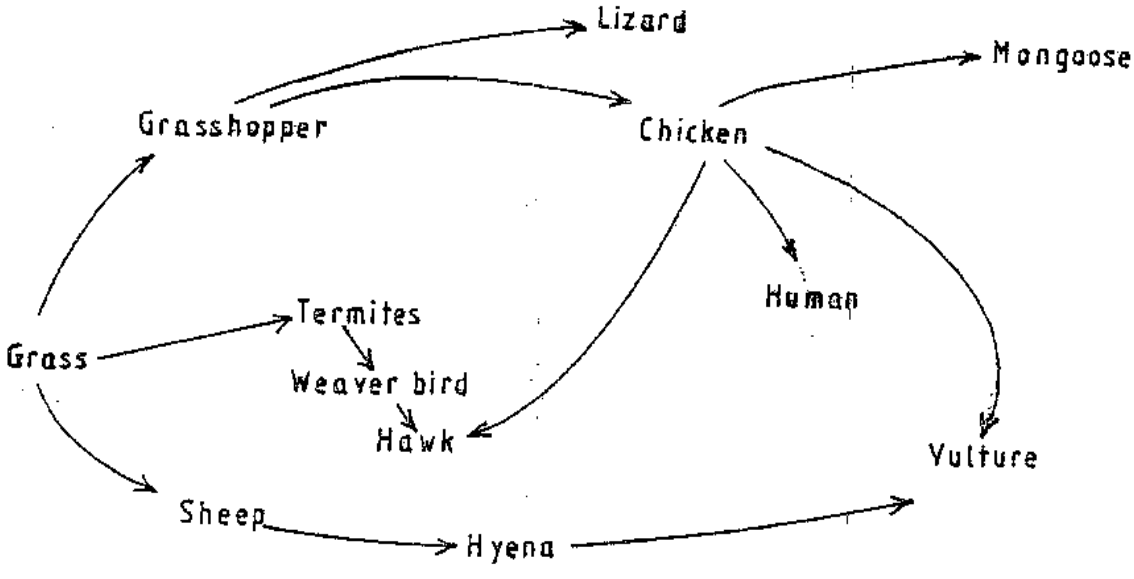
(ii) Name the process carried out at **P** **(1 mark)**

The hormone ADH affects water reabsorption from the nephron.

Which part of the brain releases ADH? **(1 mark)**

Name a part of the nephron where water is reabsorbed. **(1 mark)**

23) .The figure below illustrates a food web in a certain ecosystem.



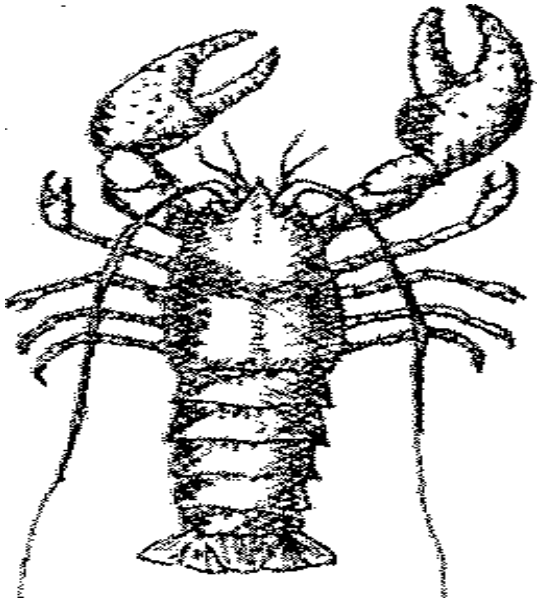
From the food web:

Draw the shortest food chain; **(1mk)**

identify the organisms with the highest
Number of predators **(1mk)**

Biomass **(1mk)**

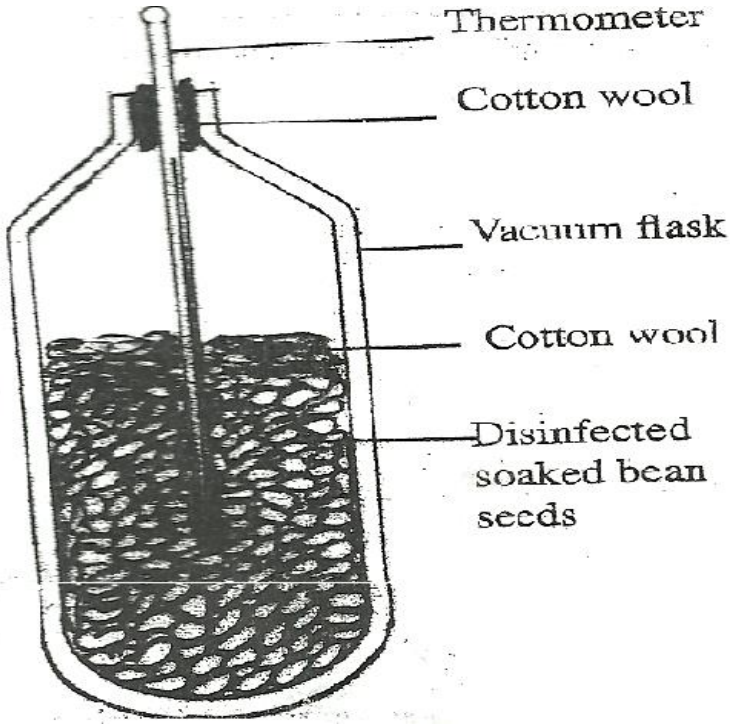
24) .The diagram below represents a certain organism collected by a student at the sea shore.



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

(b) Give three reasons for your answer in (a) above**.** **(3mks)** -

25) In an experiment, disinfection soaked bean seeds were put in a vacuum flask which was then fitted with a thermometer as shown in the diagram below.



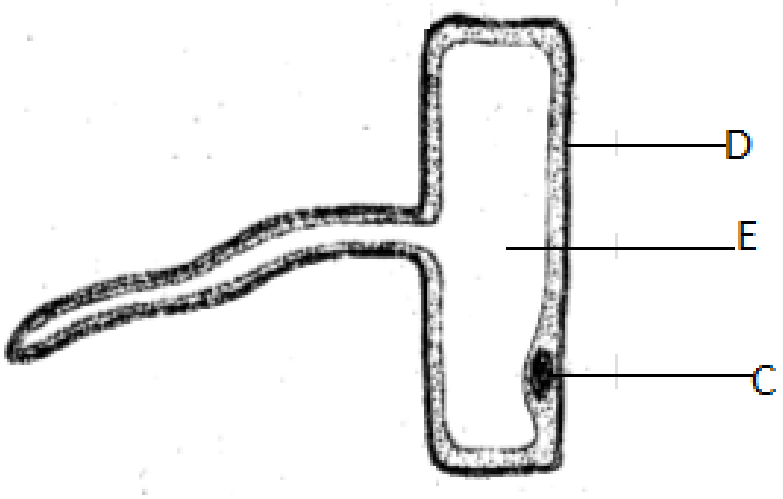
The temperature readings were taken every morning for three consecutive days.

Which process was being investigated? **(1 mark)**

i) what were the expected results? **(1 mark)**

ii) Account for the answer in (b) (i) above? **(2 marks)**

26) The diagram below shows a specialized plant cell



(a) i) name the cell **(1mk)**

ii) name the cell parts labeled D and E **(2mk)**

b) state the functions of the part labelled **C** **(1mk)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 9 PAPER 2

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. An investigation was carried out to study the effects of the concentration of sucrose solutions on pieces of tulip stem 44mm in length. The pieces were placed in different concentrations of sucrose solutions and measured after two hours of immersion. The results are shown in the table below.

Sucrose concentration (moles per litre)	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Length after 2 hours (mm)	50	48	46	44	42	42	42

a. Explain the effect of the 0.2 moles per litre sucrose solution on the length of the pieces of the tulip stem. **(3mks).**

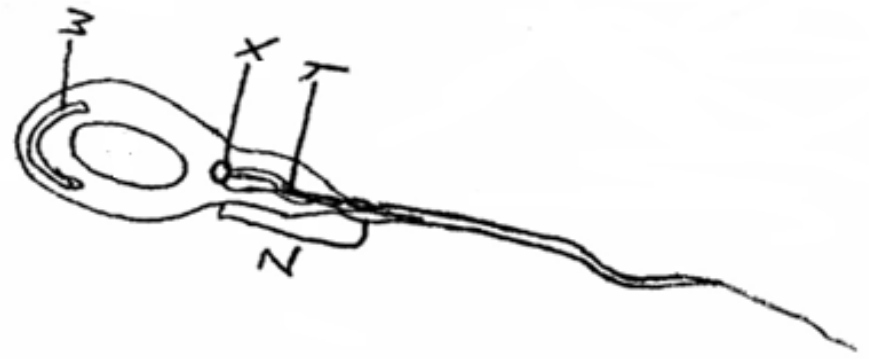
b. Use information from the table to predict the concentration of a sucrose solution isotonic to the cells in the tulip stem. **(1mk).**

c. (i) Give the term which would be used to describe the cells in the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre. **(1mk)**

ii. Draw the appearance of a cell from the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre. **(2mks).**

d. State one role of the process being investigated in plants. **(1mk)**

2. Below is a diagram of a sperm cell.



(a) Identify parts labeled **X** and **Y**. **(2 marks)**

X

Y

(b) Explain how parts **W** and **Z** adapt the cell to its function. **(4 marks)**

W

Z

(c) Using letter **P** identify or label on the diagram the part of the cell rich in DNA. **(1 mark)**

(d) State the function of part **X**. **(1 mark)**

3. Polydactyl is a genetic disorder in which people inherit an extra digit. Polydactyl is caused by a dominant allele (B). The table below describes the different genotypes for polydactyl.

a) Complete the table below by giving the correct genotype, alleles of each genotype and the expected number of fingers per hand. (4mks)

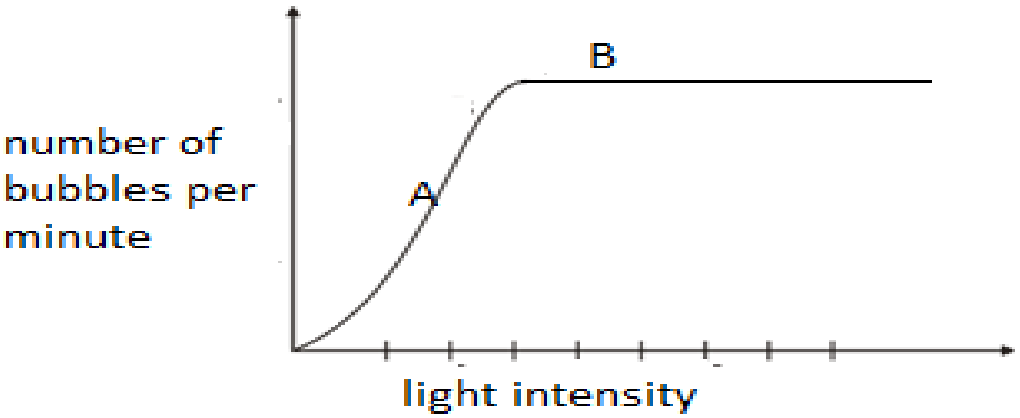
Genotype	Alleles	Expected number of digits per hand.
Homozygous dominant		Six
	bb	
Heterozygous.	Bb	

b) The table below shows results of marriages between various parents. Complete the table by writing the probability of each marriage producing a child with polydactyl. One has been done for you. **(2mks)**

Parental genotypes.	Probability of child with polydactyl
Bb X BB	
Bb X bb	0.5
Bb X Bb	

c) State the two types of variation **(2mks)**

3. Cuban pond weed (*Elodea cubiensis*) is a common water plant that produces tiny air bubbles of oxygen during photosynthesis. The number of bubbles produced per minute indicates the rate of photosynthesis. The graph shows how the rate of photosynthesis in the pond weed relates to light intensity.



a). write the equation to account for the air bubbles. **(1mk)**

b). Name the factor that affects photosynthesis at point A. Explain. **(2mks)**

c). Explain why the rate of photosynthesis does not increase any further at high light intensity.(point B) **(2mks)**

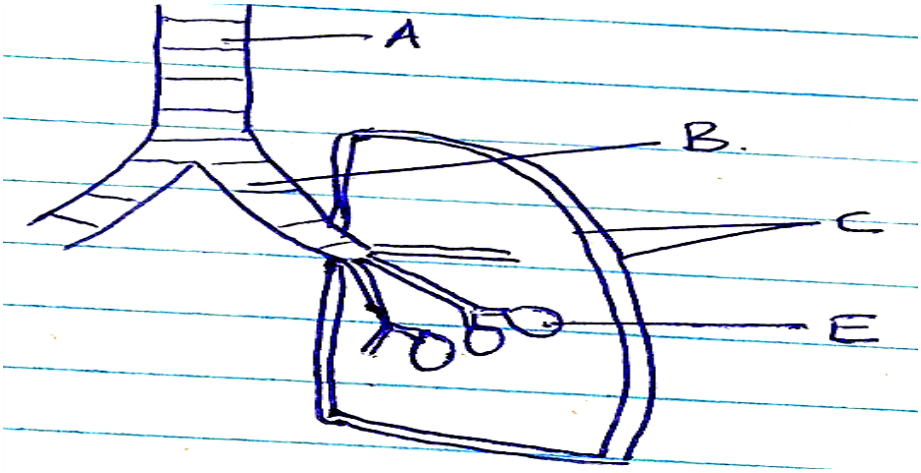
d). Explain the role of the following in photosynthesis.

i) Chlorophyll. **(1mk)**

ii) Water. **(1mk)**

e). Name one product of the light stage of photosynthesis used in the dark stage of photosynthesis. **(1mk)**

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



a) Name the part labeled A and B **(2marks)**
b) State the function of the part labeled C **(2marks)**
c) How is he part labeled E adapted to its function **(2marks)**
d) Identify the structure that perform the same function as one illustrated above in **(2marks)**
   i) Amoeba

   ii) Fish

SECTION B (40 Marks)

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

6. In an ecological study a certain insect population and that of predators was estimated in a certain grassland over a period of one year.

Month	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
No of insects	10	20	16	24	50	85	45	18	12	30	48	70
No of predator	10	12	8	10	16	30	10	4	2	2	5	20
Rainfall amount(mm)	20	6	55	350	500	250	12	10	25	190	240	30

a) Using the information above plot on the same axis the graph of number of insects and number of predators against time in months. **(7mks)**
b) Suggest what happens to the insect's population during dry month. **(2mks)**

c) Explain the relationship between the insect population and that of the predators. **(3mks)**

d) Suggest what happens to the predator's population during the dry month. **(2mks)**

Name the trophic level occupied by **(3mks)**

i) Predator.

ii) Insect.

iii) Grass.

e) Name the method used to estimate population of **(3mks)**

i). Predator.

ii. Insect.

iii. Grass.

7. State and explain various areas where knowledge about genetics is applied.**(20mks)**

8. a) Describe the process of fertilization in flowering plant. **(15mks)**

b) State the changes that take place in a flower after fertilization. **(5mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 10 PAPER 1

TIME: 2 HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. a. Name the external feature which is common in birds, fish and reptiles **(1mk)**

b. State two characteristics of fungi **(2mks)**

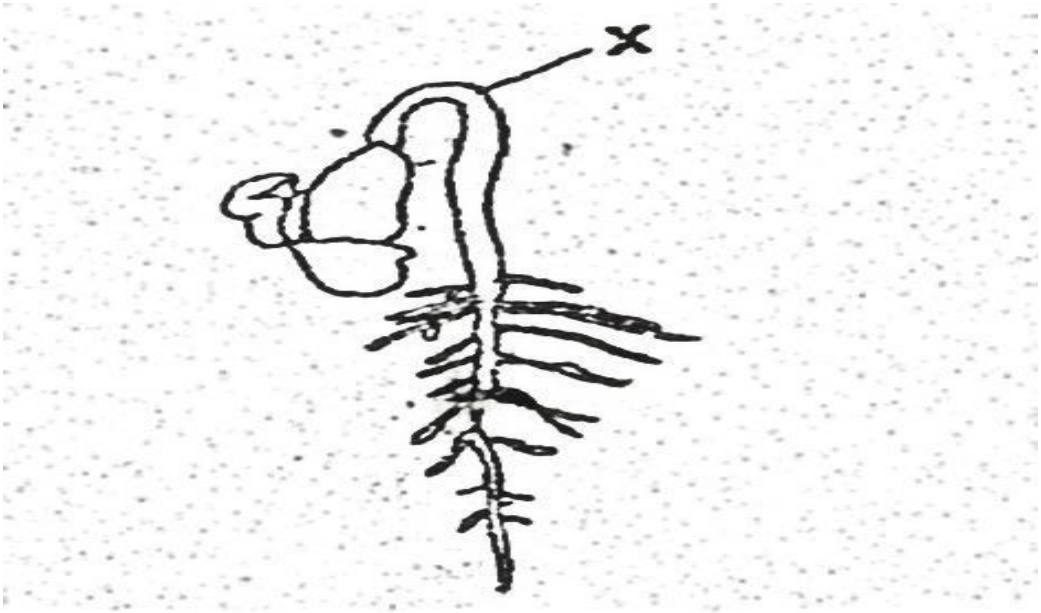
2. State the functions of the following parts of a light microscope **(2mks)**

a. Objective lens

b. Diaphragm

3. a. Define the term seed dormancy

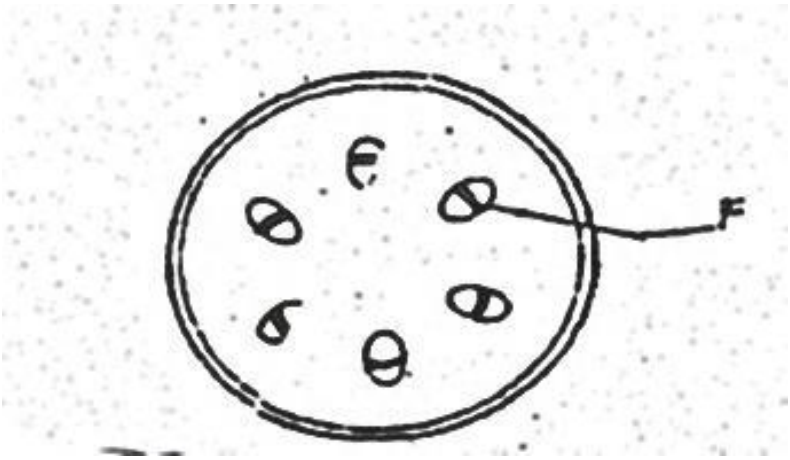
b.The diagram below represents a stage during germination of a seed



4. a. State two causes of chromosomal mutations **(2mks)**

b.Distinguish between continuous variation and discontinuous variations **(2mks)**

5. The diagram below shows a section through a plant organ



a. i. Name the class of the plant which the section was obtained **(1mk)**

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

b. State the functions of the part labeled F **(1mk)**

6. State the function of the following cell organelles \

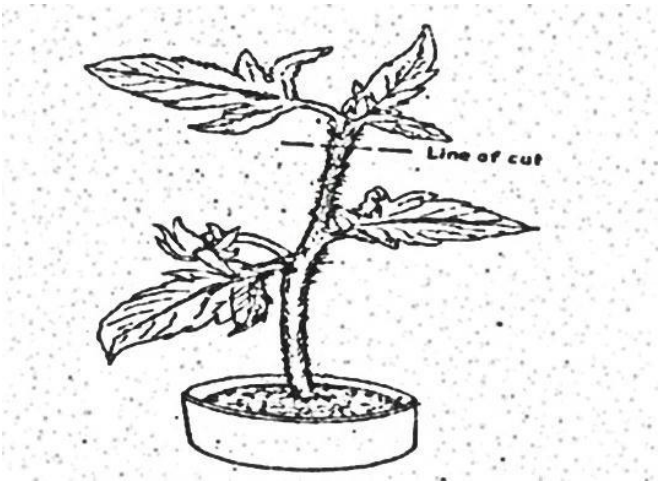
a. Ribosome **(1mk)**

b. Lysosomes **(1mk)**

7. a. Pregnancies continues if the ovary of an expectant mother is removed after 4 months explain **(2mks)**

b.What is the role of the testes in the mammalian reproductive systems **(2mks)**

8. In an experiment the shoot tip of a young tomato plant was decapitated as shown in the diagram below



a. State the expected results after 2 weeks **(1mk)**

b. Give a reason for your answer in (a) above **(2mks)**

9. a. Distinguish between diffusion and active transport **(2mks)**

b.State one role that is played by osmosis in **(2mks)**

i.Plants

ii. Animals

10.a. Name the gaseous exchange surface in insects **(1mk)**

b.How is the surface named in (a) above suited to its function

11. Explain why plants do not require specialized excretory organs **(2mks)**

12. Explain how the following factors affect the rate of photosynthesis

a. Concentration of carbon (iv) oxide **(1mk)**

b. Light intensity **(1mk)**

13. Explain what happens in human when concentration of glucose in the blood decreases below the normal level **(4mks)**

14. Explain how the carnassial teeth of a dog are adapted to their function **(2mks)**

15.a. State three structural differences between arteries and veins in mammals **(2mks)**

b.Name a disease that causes thickening and hardening of arteries **(1mk)**

16.from the equation given below, calculate the respiratory quotient (RQ)

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

Show your working **(2mks)**

b.Identify the substrate respired in the above equation **(1mk)**

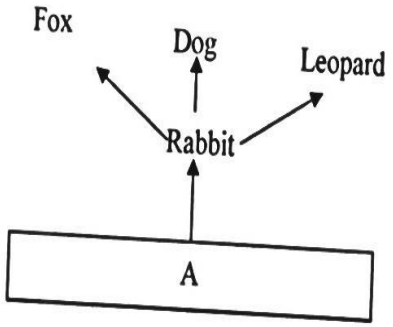
17.a. What is fertilization **(1mk)**

b.Explain how double fertilization takes place in plants **(2mks)**

18. In an experiment, the pituitary gland of a rat was removed

state the effect this will have on the quantity of urine produced by the rat **(1mk)**

19. The diagram below show part of a food relationship in an ecosystem



a. Name the food relationship shown in the diagram **(1mk)**

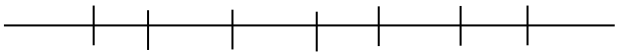
b. Name the trophic level occupied by organism A **(1mk)**

c. What is the main source of energy in the ecosystem shown in the diagram above **(1mk)**

20. Other than transport. State two other function of mammalian blood **(2mks)**

21. Below is a nucleic acid stand

A G U C A C G



a. name the nucleic acid **(1mk)**

b. give a reason for your answer in (a) above **(1mk)**

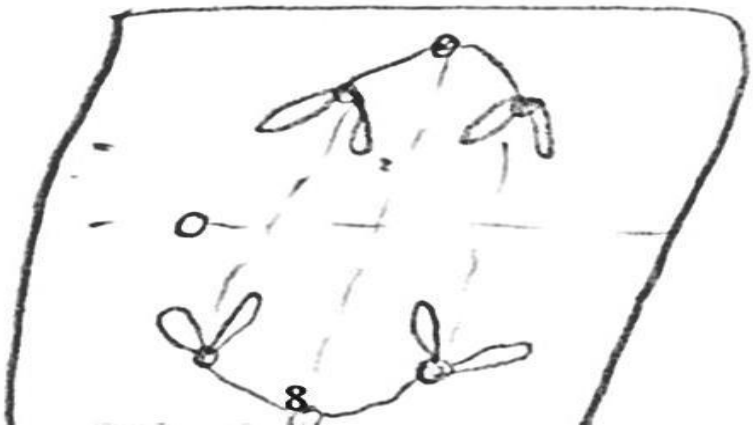
22. Name two structures of gaseous exchange in aquatic plants **(2mks)**

23. What is the significance of chiasma formation during meiotic cell division **(1mk)**

24. Define the term evolution **(1mk)**

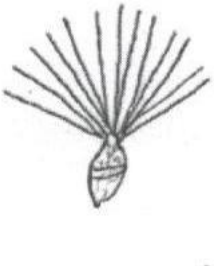
b. Give two evidence of organic evolution **(2mks)**

25. Identify the stage of cell division below **(1mk)**



26. State two characteristics of cells found at the apical meristems **(2mks)**

27. The diagram below represents a mature fruit of a certain plant



a. State the agent dispersal for the fruit **.(1mk)**

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

c. State two other characteristics of fruit and seed dispersal by the agent named in (a) **above (2mks)**

28. Explain how the following adaptations will reduce the rate of transpiration **(2mks)**

i. Sunken stomata

ii. Leaf folding

29. Name the disease caused by each of the following microorganism **(2mks)**

i. Plasmodium falciparum

ii. Entamoeba histolytica

30. State two properties of monosaccharaides **(2mks)**

KCSE FINAL PREDICTION

BIOLOGY

TRIAL 10 PAPER 2

TIME: 2 HOURS

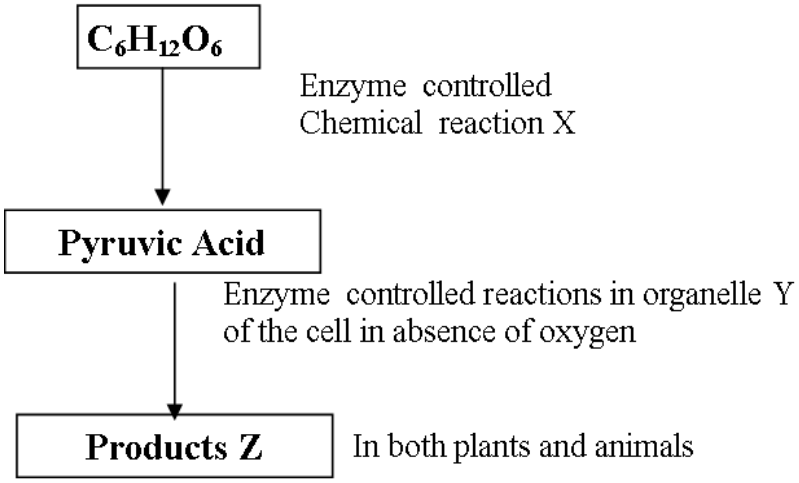
NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

Answer All the Questions

1. Study the flow chart below of a process that takes place in both plants and animals.



a)Name the above process. **(1mk)**

b)i) In the above process name the chemical reaction represented by X. **(1mark)**

ii) Name the part of the cell where the enzyme controlled reactions in b(i) above takes place. **(1mark)**

c) Name the products Z in

i) Plants……. **(1mark)**

ii) Animals…… **(1mark)**

d)What would be the fate of pyruvic acid if oxygen supply is availed in the mitochondria of an animal cell **(2marks)**

(e) Define the term oxygen debt **(1mark)**

2. .In a certain bird species red flight feathers is controlled by gene R while white flight feather is controlled by gene r. The heterozygous condition Rr results into pink flight feathers.

(a) Using a punnet square, find the genotype of a cross between pink flight feathered bird and white flight feathered bird. **(4 marks)**

(b) Which type of dominance is illustrated here**?** **(1 mark)**

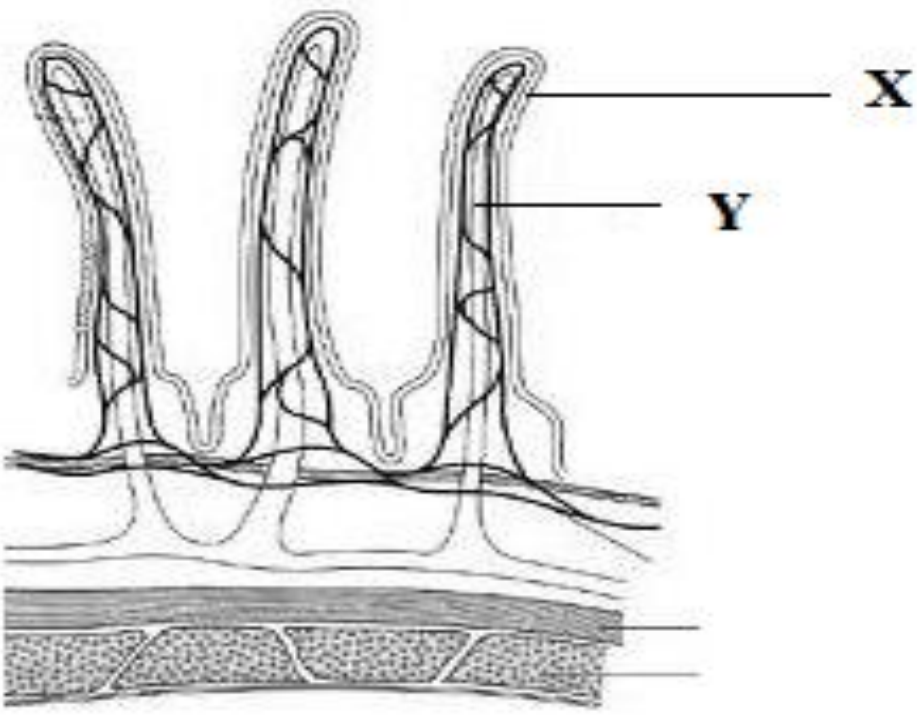
(c) i) Identify the nuclei acid whose base sequence is shown below. **(1 mark)**

G - A - C - U - A - G - C - G - U

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

(iii) If this nucleic acid was involved in protein synthesis, how many amino acid would be present in the protein synthesized. **(1 mark)**

3 .The diagram below represents a longitudinal section through the ileum wall.



a) Identify the structures labeled X and Y **(2 marks)**

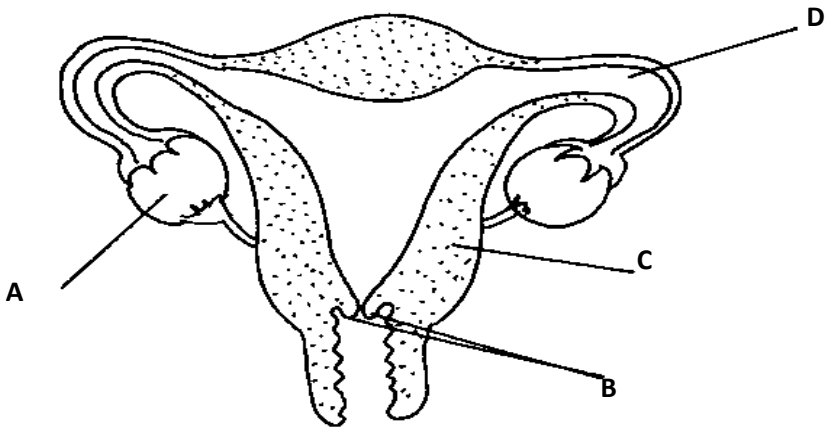
b) State one function of X and Y **(2 marks)**

c) State two functions of the ileum **(2 marks)**

d) Explain the role of the liver in digestion **(1 mark)**

e) State the endocrine (hormonal) role of pancreas in a mammal **(1 mark)**

4. The diagram below represents the female reproductive system.



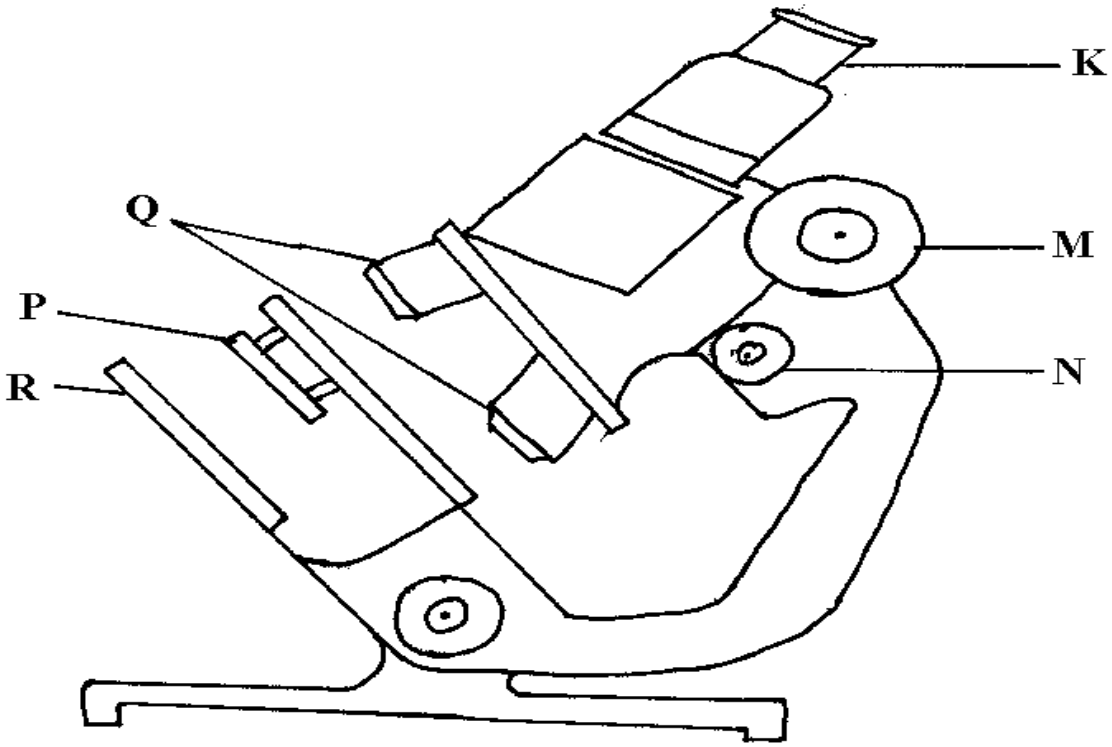
(a) Name the structures labeled **A** and **C** **(2 marks)**

(b) State the conditions that results if implantation occurs at point labeled **D**.
(1 marks)

(c) Name the hormone secreted by the part labeled **A** and for each give **one** function
(4 marks)

(d) What role does part labeled **B** play during pregnancy? **(1 mark)**

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



a) Name the parts labeled **(2 marks)**

K

M

b) State the functions of **(2 marks)**

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 labeled parts of the microscope would the student use to obtain:-

(i) A sharper outline of the features. **(1 mark)**

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

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…… (**1 mark)**

(ii)Staining the section**…….** **(1 mark)**

(iii)Putting the section in water**……** **(1 mark)**

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

6 During germination and growth of a cereal, the dry weight of the endosperm, the embryo and total dry weight were determined at two day intervals. The results are shown in the table below.

Time after planting (Days)	Dry weight of endosperm (mg)	Dry weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

a) On the same axes, draw graphs of dry weight of endosperm, embryo and the total dry weight against time. **(7marks)**

b) What was the total dry weight on day 5? …… (**1mark)**

c) Account for: i) Decrease in dry weight of endosperm from day 0 to day 10. (2marks)

ii) Increase in dry weight of embryo from day 0 to day 10. **(2marks)**

iii) Decrease in total dry weight from day 0 to day 8. **(1mark)**

iv) Increase in dry weight after day 8. **(1mark)**

d) State **two** factors within the seed and two outside the seed that cause dormancy.

i) Factors within the seed…… **(2marks)**

ii) Factors outside the seed. ……..... **(2marks)**

e) Give **two** characteristics of meristematic cells**…… (2marks)**

7. Describe how the mammalian skin is adapted to its functions **(20 mrks)**

8. a) Describe how xerophytes are adapted to living in their habitat. **(10 mks)**

b) Explain how an upright position is maintained in herbaceous plants. **(10 mks)**

THE END

THIS IS THE 1st SERIES OF FINAL KCSE PREDICTION BIOLOGY EXAMINATIONS TRIALS

A SET OF POSSIBLE KCSE QUESTIONS

CONTACT THE FOLLOWING OFFICIAL CONTACTS

FOR MORE LEARNING RESOURCES.

0746 222 000

FOR THE FOLLOWING;

- ✓ONLINE TUITION
- ✓PRIMARY SCHOOL EXAMS
- ✓REVISION NOTES
- ✓SERBOOKS GUIDE BOOKS
- ✓SCHEMES OF WORK
- ✓LESSON PLANS
- ✓SETBOOKS VIDEOS
- ✓TERMLY EXAMS
- ✓QUICK REVISION KITS
- ✓KCSE TOPICALS
- ✓KCSE PREMOCKS
- ✓CROSSCOUNTRY PREMOCKS
- ✓JOINT PREMOCKS
- ✓KCSE MOCKS
- ✓CROSSCOUNTRY MOCKS
- ✓JOINT MOCKS
- ✓KCSE POSTMOCKS
- ✓CROSSCOUNTRY PREDICTIONS
- ✓KCSE PREDICTIONS
- ✓KCSE REVEALED SETS
- ✓MWALIMU MOCKS SERIES
- ✓NATIONAL SCHOOLS MOCKS
- ✓SUBJECTS JOINT MOCKS
- ✓JOINT PREMOCKS
- ✓CBC RESOURCES

- ✓ **KASNEB RESOURCES**
- ✓ **COLLEGE MATERIALS**
- ✓ **UNIVERSITY EXAMS**

CALL/TEXT/WHATSAPP

0746 222 000

mwalimuagency@gmail.com

TO ALL KCSE CANDIDATES;

SUCCESS IN YOUR KCSE EXAMS.

BY; MWALIMU AGENCY TEAM.

CAUTION TO KCSE CANDIDATES:

IN THE EVENT YOU REALIZE PART/ALL OF THESE QUESTIONS WERE DIRECTLY OR INDIRECTLY LIFTED IN THE FINAL KCSE EXAMS, PLEASE, DO NOT PANIC!

KILA LA HERI

success