KCSE BIOLOGY REPLICA SERIES 2022

SEPTEMBER-DECEMBER 2022.

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KCSE REPLICA TRIAL

EXAMS 1-10

PAPER 1 AND 2

FOR MS

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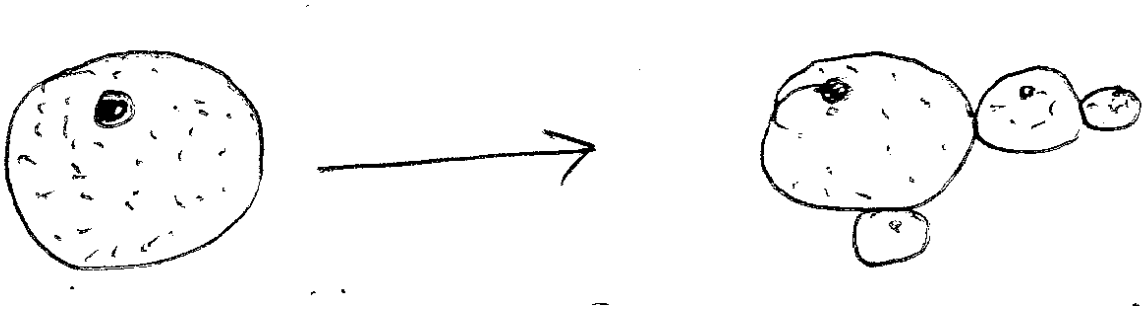
KCSE REPLICA 1
PAPER 1

1. (a). State the meaning of the following terms. (1mark)
   (i) Science -
   (ii) Biology- (1 mark)
   (b) Explain the following braches of biology. (3 mark)
   (i) Zoology -
   (ii) Entomology –
   (iii) Morphology –

2. The diagram below illustrates a process in an organism of a given species

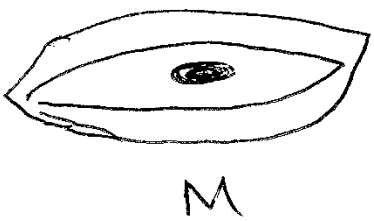


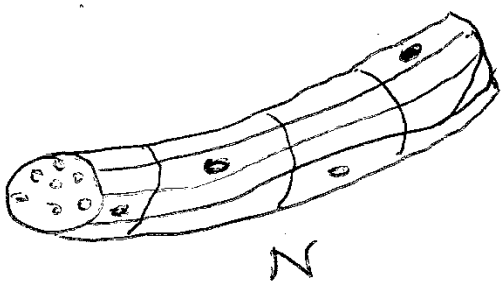
a) Identify the process taking place in the organism above. (1 mark)
b) State two economic importance of the organism above. (2 mark)

3. HIV/AIDS is a major killer disease with no known treatment. Anti-Retroviral drugs are used to manage it.

   (a). What is the role of anti-Retroviral drugs in HIV/AIDS management. (1 mark)
   (b). Suggest two ways of controlling the spread of HIV/AIDS. (2 marks)

4. Name two bones that articulate to form a ball and socket joint at the hip. (2 marks)
5. The figures below illustrates specialized cells in an animal's body.





(i). Identify the cells M and N. (2 marks)

M –

N –

(ii). State the structural differences between M and N. (2 marks)

(iii). Which of the above specialized cells is found in the gut. (1 mark)

6. Explain why tracheids are not efficient in transporting water up the plant. (2 marks)

7. Insect's blood is noted to lack a respiratory pigment. Explain. (2 marks)

8. Give two destinations of food translocated from the leaves of plants. (2 marks)

9. Name the organelle that is likely to be found in abundance in

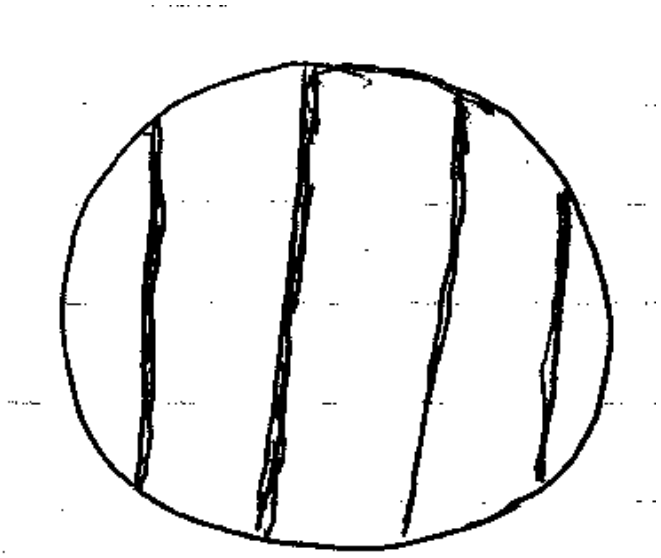
a.) An enzyme secreting cell. (1 mark)

……

b). Cell producing lipid related secretions (1 mark)

……

10. A form one student trying to estimate the size of onion cells observed the following on the microscope field of view. (2 marks)



If the student counted 20 cells across the field of view. Calculate the size of one cell in micrometers. (3 marks)

11.a). Name the cells that secrete mucus in the human alimentary canal (1 mark)

……..

(b). Explain the role of hydrochloric acid in protein digestion in the stomach of mammals. (2 marks)

12. Assume you are a nutritionist, name the kind of vitamins you would recommend to patients with the following conditions

a) Poor night vision. (1 mark

b) Bleeding gums (1 mark)

c) Excessive bleeding after an injury. (1 mark)

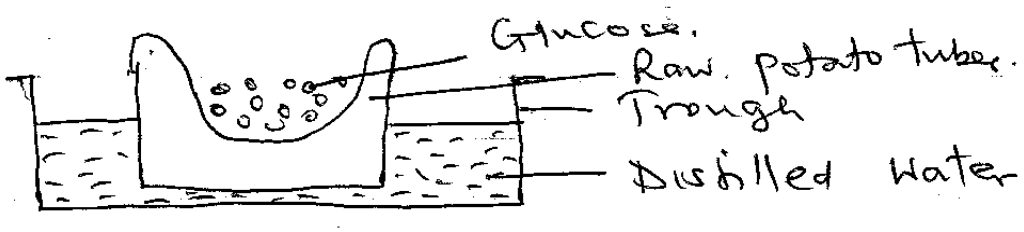
13. State the characteristics that distinguish the following organisms into their respective classes,millipedes,spider and Tsetsefly (3 marks)

14. Name two classes of phylum Arthropoda with cephalothorax (2 marks)

15. (a). Name the main group of organisms which comprises the kingdom monera. (1 mark)

(b). State any three ways in which the organism; named in (a) above affect human lives. (3 marks)

16. (a). The experiment illustrated below was set up to investigate a certain physiological process using a raw Irish potato tuber.



(i). Suggest a possible physiological process that was being investigated. (1 mark)

(ii). Explain the results obtained in the above experiment after a few hours. (2 marks)

(iii). State the observations that would have been made if the experiment was repeated using boiled potato. (2marks)

(b). Explain why growing grass die a few days when salt is sprinkled on it. (3 marks)

17.Give an example o a sec-linked trait in human one

(i). Y- chromosome- (1 mark)

(ii). X-Chromosome- (1 mark)

18. The diagram below represents a portion of a certain nucleic acid

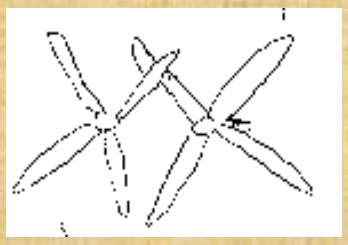
G	A	C	C	A	U	U	C	G	A

With reason identify the type of nucleic whose portion is shown above

Identify- (1 mark)

Reason- (1 mark)

19. The diagram below show a pair of homologous chromosomes. Study them and answer the questions that follow.



(i). State the ge

20. The table below shows the percentage composition of carbon (IV) oxide and Oxygen in inhaled and exhaled air. Inhaled air contain oxygen 20% and carbon (IV) oxide 0.04%.

Gas	Inhaled air	Exhaled air
Oxygen	20%	17%
Carbon (IV) Oxide	0.04%	40%

Explain the differences in the percentage of the two gases in inhaled and exhaled air

(a). Oxygen. (2 marks)

(b). Carbon (IV) oxide. (2 marks)

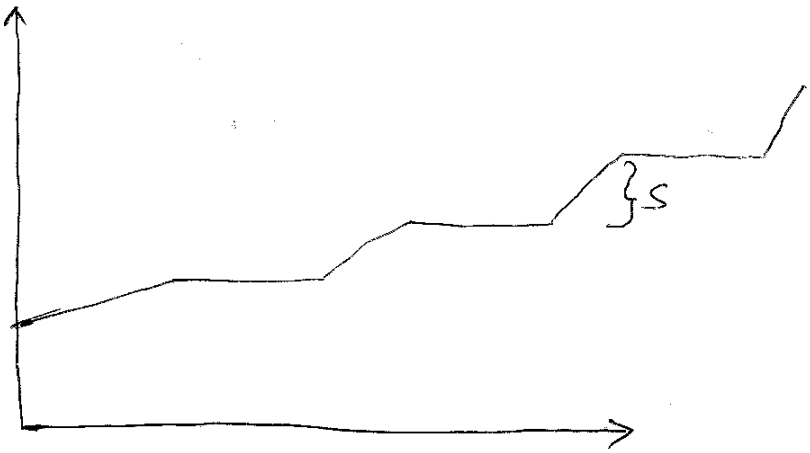
21. Give the forms in which the following gases are transported in blood. (3 marks)

(a). Oxygen

(b). Carbon (IV) Oxide

(c). Carbon (II) Oxide

22. The following graph represents a growth pattern observed in a group of animals.

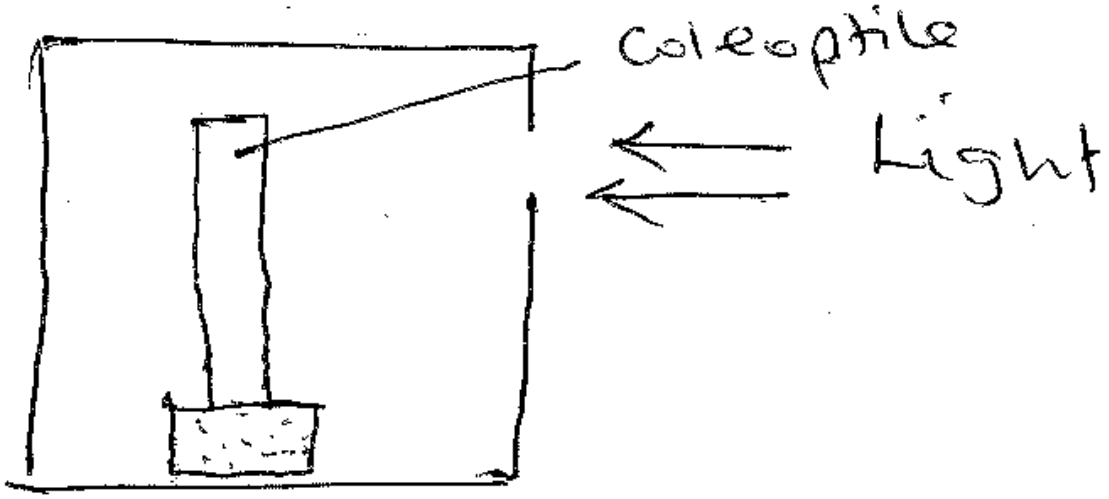


(a). Name the type of growth shown above. (1 mark)

(b). Name the phylum of animals whose members display the growth pattern named in (a) above. (1 mark)

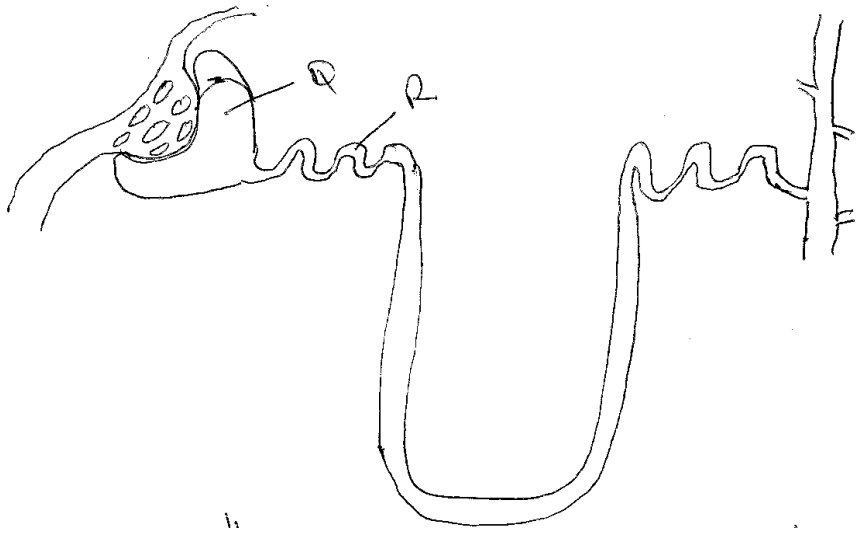
(c). Identify the process which lead to increase in body size at part marked S. (1 mark)

23. The diagram below show a tip of a plant coleoptile with light coming towards it from one direction.



(a). How would the plant respond to light. (1 mark)
(b). Give the name of such a response. (1 mark)
(c). What is the advantage of plant responding in this way? (2 marks)

24. The diagram below illustrates parts of a nephron from a mammalian kidney.



(a). Name the fluid found in part labelled Q. (1 mark)
(b). Identify the process that lead to the formation of fluid named in (a) above. (1 mark)
(c). Which two hormones exert their effect in the nephron? (2 marks)

25. Name the habitat of the following plants. (2 marks)
(i). Xerophytes –
(ii). Halophytes –

PAPER 2

SECTION A – (40 MARKS)

Answer All Questions In This Section In The Spaces Provided.

1. (a)What is meant by the term sex linkage? (1 mark)

……

……

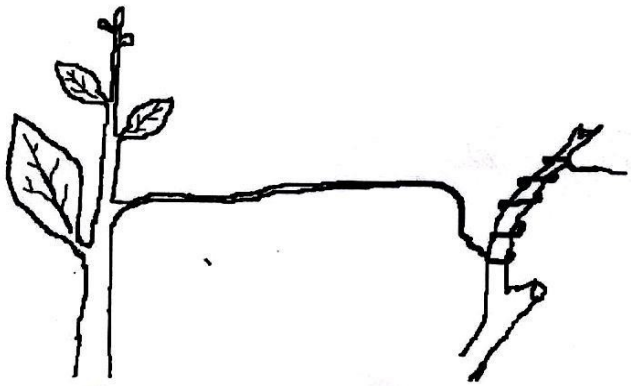
(b) Name two sex-linked traits in humans (2 marks)

……

……

(c) In *Drosphilamelanogaster*, the inheritance of eye colour is sex-linked. The gene for the red eye is dominant. A cross was made between a homozygous red-eyed female and a white eyed male. Work out the phenotypic ratio of F1 generation. (Use R to represent the gene for the red eyes) (5 marks)

2. A response exhibited by a certain plant tendril is illustrated below.



a) (i) Name the type of response. (1 mark)

……..

(ii) Explain how the response named in (a) (i) above occurs. (3 marks)

……

……

……

a) What is the importance of tactic response to microscopic plants? (1 mark)

……

……..

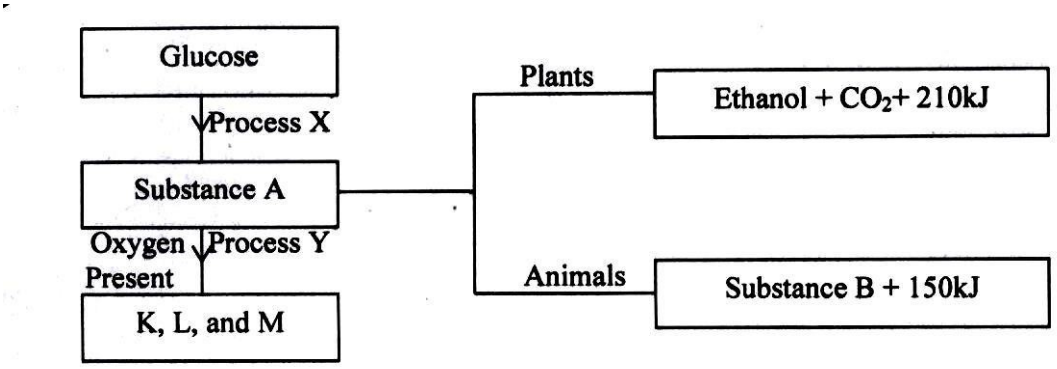
b) State **three** applications of plant hormones in Agriculture. (3 marks)

……

……

……

3. The diagram below represents a simple respiratory pathway in cells



a) Name the process marked **X** and **Y**. (2 marks)

X ……

Y ……

b) State **two** differences between process X and Y. (2 marks)

……

……

c) State the name of substance B and condition under which it is formed. (2 marks)

……

……

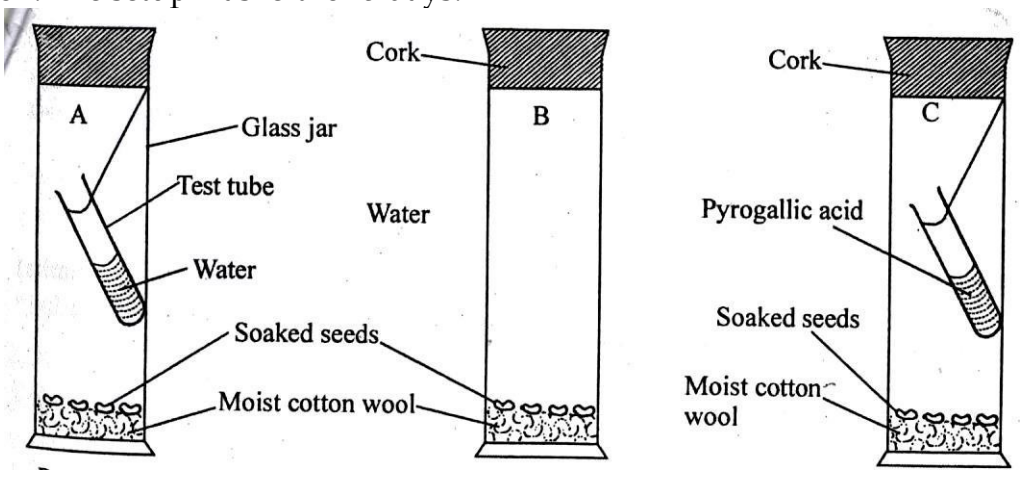
d) Explain how body size affects the rate of respiration in animals. (2 marks)

……

……

……

4. The diagram below represents a setup to investigate the conditions necessary for seed germination. The setup was left for 5 days.



a) What conditions were being investigated in the experiment? (2 marks)

……

……

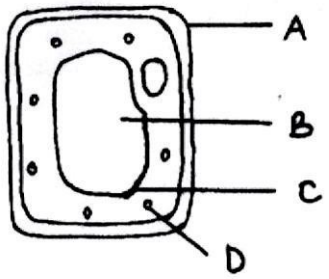
b) Explain the role of water during seed germination. (3 marks)

……
……
……

c) Account for the expected results in each setup after 5 days. (3 marks)

……
……
……
……

5. Examine the diagram below and use it to answer the questions that follow.



a) Name the parts labeled. (3 marks)

B……..…
C……..
D……..

b) What is the substance that makes up part labeled A? (1 mark)

……

c) Name the process by which mineral salts move into structure B. (1 mark)

……

d) Explain what happens when a red blood cell is put in distilled water. (3 marks)

……
……
……
……

SECTION B – 40 MARKS

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

6. The data below shows the rate of photosynthesis at different temperature in attached leaves of three East African plants. (Crotolarie, Gynandropsis and Amaranthus species) respectively which were grown outside with the same condition while water and carbon (iv) oxide are not limiting factors in this experiment.

Rate of photosynthesis was expressed in terms of carbon (IV) oxide uptake in mg/mm^2/hr at varius temperatures as tabulated below.

Temperature ^{0}C	**Rate of Photosynthesis (mg/mm^2/hr)**		
	Gynadropsis sp	Crotolasis sp	Amaranthus sp

5	-	20	-
10	22	40	10
15	50	49	27
20	60	64	42
25	80	48	55
30	85	45	54
35	80	42	50
40	73	31	45
45	66	15	40
50	2	-	11

a) Represent the results graphically (rate of photosynthesis against temperature)

b) Using the graph in (a) above indicate optimum temperature for the Gynandaropsis and Amaranthus species (2 marks)
- Gynandaropsis
  ……
- Amaranthus……

c) Give a reason why Gynandaropsis and Aaranthus could not function photosynthetically at 5^{o}C. (1 mark)
……..

d) What are the possible ecological habitats for the following plants (2 marks)
(i) Amaranthus……
(ii) Crotolaria……

e) At what temperature was the amount of carbon (IV) oxide around the leaf of Gynandaropsis highest? (1 mark)
……..

f) What raw material required in the light stage of photosynthesis. (1 mark)
……..

g) Name the parts of chloroplasts in which the following stages of photosynthesis take place. (2 marks)
(i) Light stage
……..
(ii) Dark stage
……..

h) State one structural similarity and difference between chloroplast and mitochondria. (2 marks)
Similarity
……..
Difference
……..

i) What is the compensation of photosynthesis? (1 mark)
……
……....

7. (a) Explain the role of mammalian skin in thermoregulation. (10 marks)
(b) Describe how the alveolus is adapted to perform its functions. (10 marks)

8. (a) Discuss the evidence of organic evolution. (10 marks)
(b) Describe how the xerophytes are adapted to their habitat. (10 marks)

PAPER 3

1. provided with the specimen labeled M-soaked millet. Grind them using pestle and mortar, add some water to get fine solution label four clean test tubes; A, B, C and D. Put about 4ml of the solution into each of the four test tubes.

(a). To solution in test tube A, add some few drops of iodine. Shake the solution to mix well. Pour some little solution onto a white tile.

(i). Record your observation. (1 mark)

……

(ii). Account for your observations in a) (i) above. (1 mark)

……

(b). Into solution in test tube B, add about 2ml of Benedict's solution. Place it in a boiling water bath.

(i). After about 3 minutes, record your observation. (1 mark)

……

(ii). What is your conclusion from observation in (b) i) above?

……

a) For the remaining test tubes;-

(c). To each of test tube C, add about 3ml of solution labeled K. To test tube D and about 3ml of solution K and about 2ml of solution labeled L. Place both test tubes C and D in a water bath. Maintain the water bath at 37^{o}C. Allow it to stand in the water bath for 30 minutes. After 30 minutes, remove the test tubes. Add about 2ml of Benedict's solution to each test tube and shake well. Place the two test tubes in a boiling water bath. After about 5 minutes record your observations in the table below. (4 marks)

Test tube	Observation	Conclusion
C		
D		

d). Account for your observations in the test tubes C and D. (2 marks)

……

……

……

e). i). Why was set up placed at 37^{o}C? (1 mark)

……

(ii). Suggest identify of solutions K and L. (2 marks)

K …….. L ……..

2. You are provided with a piece of animal organ labelled C

(a). Identify the organ. (1 mark)

……

(b). Explain why malfunctioning of this organ causes;

(i). Impairment of blood sugar regulation. (2 marks)

……

……

(ii). Impairment of food digestion. (2 marks)

……

……

(c). Cut specimen C into two equal pieces, immerse one of the pieces in water inside a boiling tube and boil it for five minutes.

Put 10ml of hydrogen peroxide in one boiling tube and label it D1, then put another 10ml of hydrogen peroxide into the other boiling tube and label it D2.

Drop the fresh piece of organ C into D1 and the boiled piece into D2.

(i). Record your observation:

D1 (1 mark)

……

……

D2 (1 mark)

……

……

(ii). Which homeostatic function of the organ C is being investigated. (1 mark)

……

……

(iii). Account for the observation made in

D1 (2 marks)

……

……

D2 (2 marks)

……

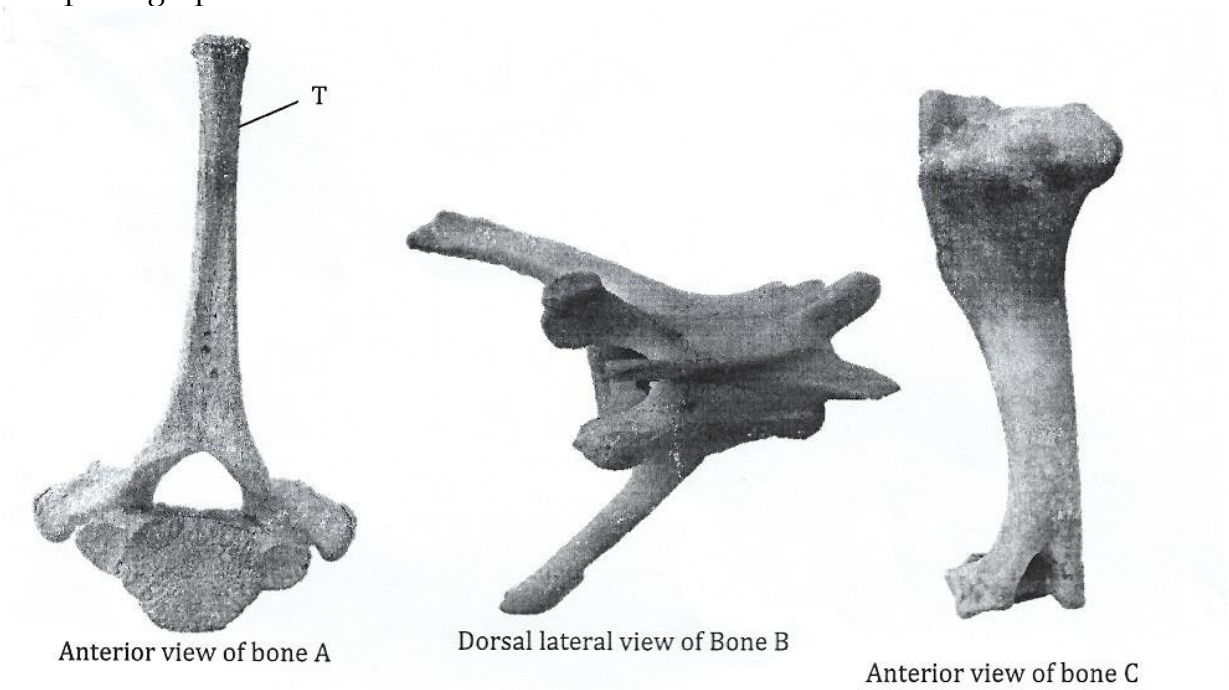
……

(d). Name two diseases that affects organ C. (2 marks)

……

……

3. The photographs below shows bones obtained from different regions of a mammalian body. The photographs are in different views.



Anterior view of bone A

Dorsal lateral view of Bone B

Anterior view of bone C

(a). Identify the bones. (3 marks)

A ……

B ……

C ……

(b). Name the regions from which bone B was obtained from. (1 mark)

……

……

(c). State two distinguishing features of the bone in photograph labeled B. (2 marks)

……

……

……

……

(d). Name the part labelled T in the photograph of bone A and state its significance. (2 marks)

……

……

(e). With reason state the type of joint formed at the distal and proximal and of specimen C. (4 marks)

(i) Distal end ……..

Reason ……

(ii). Proximal end ……

Reason ……

(f). Name the bone that articulates with the proximal end of the bone in photograph labelled C. (1 mark)

……

KCSE REPLICA 2
PAPER 1

1. Name the antigens present in red blood cells of a person whose blood group is B positive. (2mks)

……

2. Give reasons for the following structural modifications in axial skeleton of humans
   (i) Fused sacral vertebrae (1mk)

……

……

   (ii) Long transverse process in lumbar vertebrae. (1mk)

……

……

3. (a) What is adaptive radiation? (1mk)

……

……

   (b) State two ways in which Homo sapiens differs from Homo habilis (2mks)

……

……

……

……

4. State three characteristics of class Reptilia. (3mks)

……

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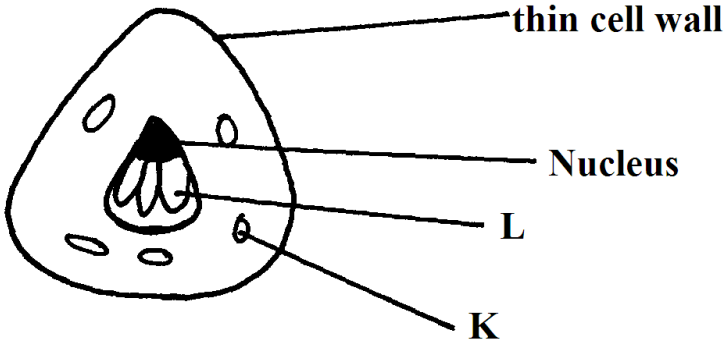
……

……

……

5. The diagram below represents the structure of a yeast cell as seen under a light microscope.



   (a) Name parts labeled (2mks)
   L……...
   K……..

6. (a) Which part of plant normally shows
      (i) Increased growth at lower auxin concentration (1mk)

……

……

      (ii) Decreased growth at lower auxin concentration (1mk)

……

……

7. State the functions of the following parts of a light microscope.

(i) Fine adjustment knob (1mk)

……

……

(ii) Condenser (1mk)

……

……

8. Give a reason for the following features present in human trachea

(i) Ring of cartilage (1mk)

……

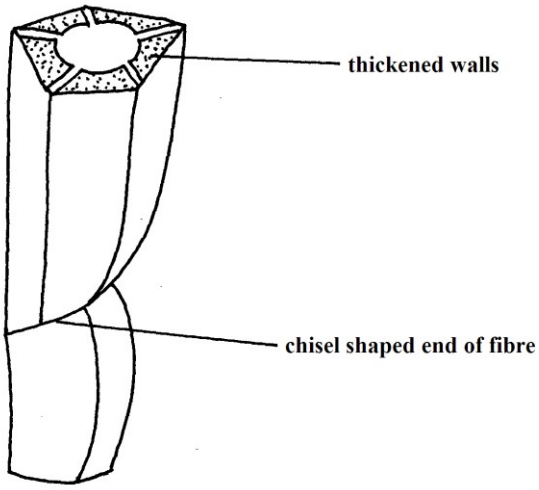
……

(ii) Presence of cilia (1mk)

……

……

9. The diagram below shows a plant supportive tissue



(a) Identify the tissue (1mk)

……

……

(b) State two similarities between tissue named in 9(a) above and one conducting water in dicotyledonous plant. (2mks)

……

……

……

……

10. A wild beast in Masai Mara National Park was found to be infested with a lot of ticks. State the trophic level occupied by the following organisms:

(a) (i) Wild beast (1mk)

……

……

(ii) Ticks (1mk)

……

……

(b) Sketch a pyramid of numbers to represent above feeding relationship. (1mk)

11. (a) Name the causative agent of the following diseases in humans.

(i) Bilharziasis (1mk)

……

……

(ii) Syphillis (1mk)

……

……

(b) Describe the following defects:

(i) Varicose veins (1mk)

……

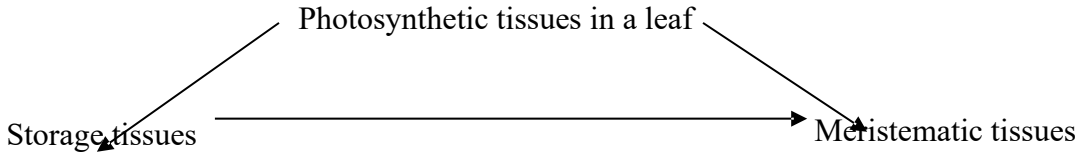
……

(ii) Thrombosis (1mk)

……

……

12. The flow chart below shows the movement and fate of carbohydrate synthesized by green plants.



(a) Name the type of carbohydrate that is

(i) Transported from leaf to other parts of plant (1mk)

……

……

(ii) Found in storage tissues (1mk)

……

……

(b) Name two main photosynthetic tissues found in a leaf (2mks)

……

13. State the roles of the following cell organelles in a cell

(a) Lysosomes (2mks)

……

……

……

……

(b) Centrioles (1mk)

……

……

14. Name the physiological process involve in the movement of the following substances in and out of the cell.

(a) Mineral salts (1mk)

……
……

(b) Water (1mk)
……
……

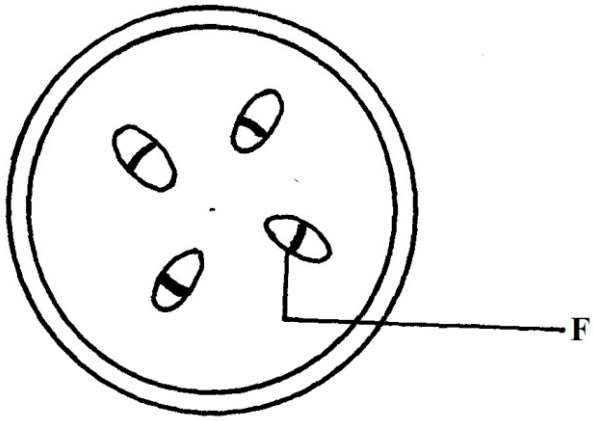
15. Below is the dental formula of an organism

$$i\frac{3}{3}\ C\frac{1}{1}\ Pm\frac{4}{4}\ m\frac{2}{3}$$

(i) Calculate the total number of teeth in the jaw of the animal (2mks)

(ii) With a reason, identify the type of dentition for the organism (2mks)
……
……
……
……

16. The diagram below shows a section through a plant organ



(a) (i) Name the class of the plant from which the section was obtained (1mk)
……
……

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

17. (a) Name two structures for gaseous exchange in aquatic plants. (2mks)
……
……
……
……

(b) State one adaption of the above named structures. (1mk)
……

……

18. During a biological trip, plants that had flowers drew the attention of students
(a) Name the subdivision of the plants (1mk)
……
……
(b) Name two possible characteristics that students would use to conclude that they were insect pollinated. (2mks)
……
……
……
……

19. Define the following terms
(a) Homologous structures (1mk)
……
……
(b) Vestigial structures (1mk)
……
……

20. Name the type of responses exhibited by the following
(a) Pollen tube growth towards the embryo sac
(1mk)
……
……

(b) Maggot moving from the lit part of boiling tube to the part painted black
(1mk)
……
……
(c) Folding of the leaves of the **Mimosa Pudica** plant on touch
(1mk)
……
……

21. Insulin is a hormone synthesized using bacteria DNA. It is possible to obtain from hospitals because of the new technology
(a) Name the technology used in the case above. (1mk)
……
……
(b) Why were bacteria preferred in the medicine production (2mks
……
……
……
……

22. (a) State the role of the following parts of ear in the hearing process
(i) Ear drum (1mk)
……
……

(ii) Cochlea (1mk)

……

……

(b) Explain why the body temperature of a healthy human being may rise up to 39^0C on a hot humid day. (3mks)

……

……

……

……

……

……

23. Explain what happens to human body when glucose level is above normal (3mks)

……

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……

……

……

……

24. Name three mechanisms that ensure cross pollination takes place in flowering plants. (3mks)

……

……

……

……

……

……

25. State the functional difference between sensory and motor neurons (1mk)

……

……

26. Give two reasons why class insecta is the most numerous among members of phylum arthropoda. (2mks)

……

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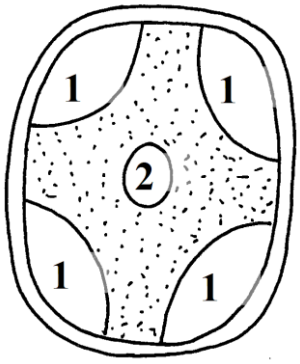
……

……

27. The diagram below shows the appearance of a plant cell after it had been placed in a strong salt solution



(a) Name the process that occurred in the cell shown above. (1mk)

……
……

(b) (i) Which substance is present in the regions marked 1? (1mk)

……

(ii) Give reasons for your answer in b(i) above (2mks)

……
……

28. State two roles of a fruit to a plant (2mks)

……
……

29. What is the importance of the following in an ecosystem?

(i) Bacteria and fungi (1mk)

……
……

(ii) Predators (1mk)

……
……

30. Outline three roles of active transport in the human body. (3mks)

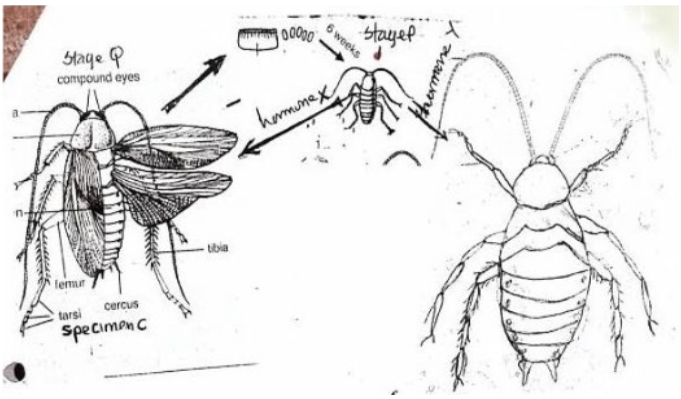
……
……
……

PAPER 2

SECTION A [40Marks]

Answer all questions in the spaces provided

1. The photograph below shows an organism undergoing a certain process. Examine the external features of the organism and answer the following questions.



(a) i. Identify the class to which the organism above belongs (1Mark)

……

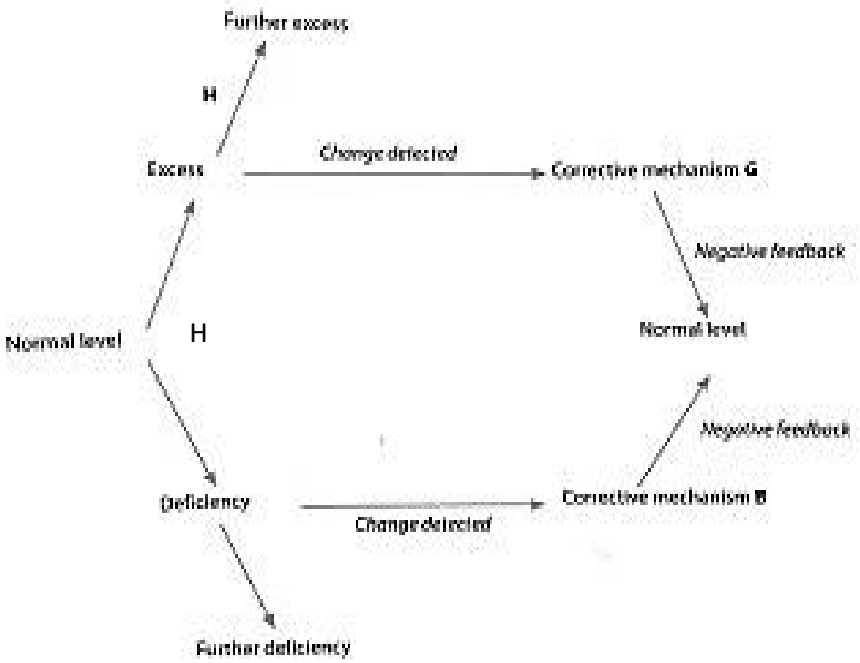
ii. Give **two** reasons for your answer in (a)i. above. (2 Marks)
……
……
……

(b)i. Identify the type of metamorphosis illustrated above. (1Mark)
……

ii. Give a reason for your answer in {d}i. above. (1Mark)
……
……

(c)Name the stages **P** and **Q**. (2Mark)
P: ……
Q: ……

2. Below is an illustration showing the mechanism of blood sugar regulation in the body. Use it to answer the following questions.



(a)State the process that can lead to an increase in glucose level.
(1Mark)
……

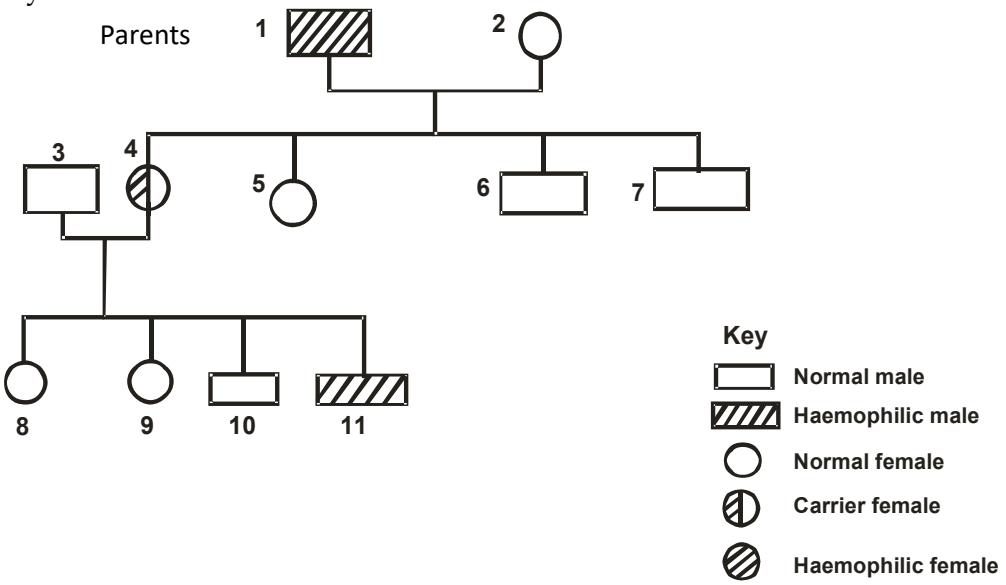
(b)What type of feedback mechanism is represented by **H**? (1Mark)
……

(c)State **three** corrective mechanisms carried out at **G**. (3Marks)
……
……
……
……

(d)Name the condition that may result from further excess. (1Mark)
……

(e)Name the hormone that would be responsible for correcting the deficiency. (1Mark)
……
(f)What is the disadvantage of low blood glucose level in blood. (1Mark)
……
……

3. The pedigree chart below illustrates the inheritance of haemophilia in a given a given family.



a) Suggest the possible genotype of: (2 Marks)
Individual ……
Individual 4 ……
b) Using a punnet square, work out the possible phenotypes of offspring's, if individual 4 married a haemophiliac male. (4 Marks)
……
……
……
……
……
……
……
c) Explain why there are no carrier males. (1Mark)
……
……
d) Name a condition in man that is due to chromosomal mutation. (1Mark)
……

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

Time of day	12AM	3AM	6AM	9AM	12PM	3PM	6PM	9PM	11PM

Carbohydrates formed during photosynthesis (mg)	0	0	5	30	60	30	5	0	0
Carbohydrates used during respiration (mg)	10	10	10	10	10	10	10	10	10

a) Account for the levels of carbohydrates.

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

……

……

……

(ii) Between 3.00a.m to 12.00noon. (2 Marks)

……

……

……

……

b) How could foggy weather influence the net amount of carbohydrates formed over the 24 hour period? (1 Mark)

……

……

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

……

……

……

d) In which form are carbohydrates stored in Fungi. (1 Mark)

……

5. a)Active yeast cells were added to dilute sugar solutions in a container. The mixture was kept in a warm room. After a few hours bubbles of a gas were observe escaping from the mixture.

i) Write down the word equation to represent the reaction. (1 Mark)

……

……

……

ii) Give **two** economic importance of the chemical reaction in industry? (2 Mark)

……

…..

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……

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b) State **two** application of the above process in agriculture. (2 Mark)

……

…

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……

……

c) What is oxygen debt? (1 Mark)

……

…

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……
……

d) Give **two** stages of aerobic respiration? (1 Mark)

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…
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……
……
……

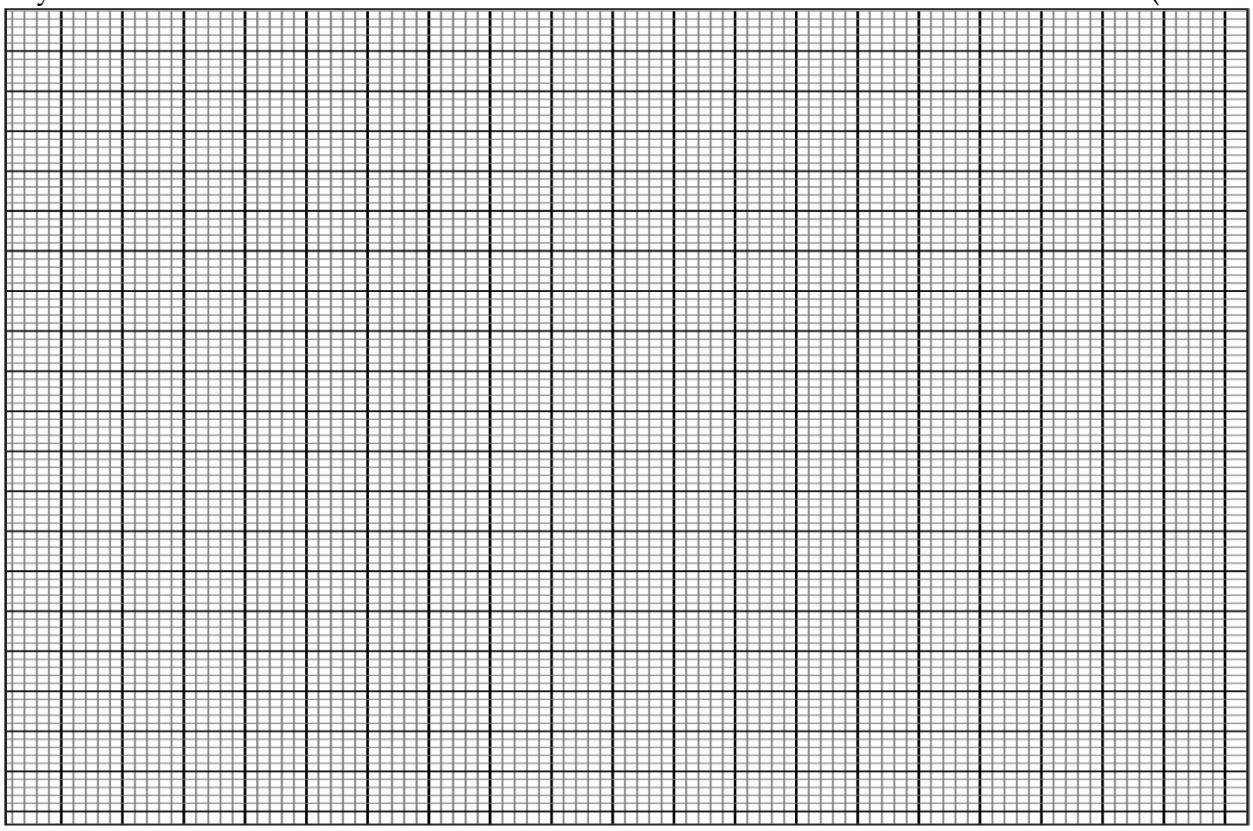
SECTION B [40Marks]

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

6. In a study on immunity, two groups of mice were immunized with sheep blood. One of the groups was given 5 doses of a drug Tinocordine prior to immunization. The second group was not treated with Tinocordine. Blood was collected from each group every third day for one month. The results were shown in the table below.

Number of days after immunization	*Antibodies produced after immunization*	
	Tinocordine treated mice	*Non-Tinocordine treated mice*
3	15	5
6	20	5
9	30	15
12	60	25
15	122	30
18	250	30
21	122	30
24	60	30
27	37	22
30	27	5

(a)Plot graphs using the same axes of antibodies produced after immunization against number of days after immunization. (8 Marks)



(b)Determine the rate of antibody production between day 13 and 17 in Tinocordine treated mice. (2 Marks)

……
……
……
……

(c)What type of immunity will be developed by the mice? (1 Mark)

……

(d)Name three diseases whose spread is controlled by vaccination in human beings. (3 Marks)

……
……
…….
……
….

(e)State two other was of controlling highly infectious diseases apart from vaccination. (2 Marks)

……
……
……

(f)i. Give a reason why **AIDS** can't be easily detected by normal blood test.(1 Mark)

……
……

ii. State three ways of controlling **AIDS**. (3 Marks)

……
……
……

7. (a)State how each of the following food substances are assimilated in the body. (6 Marks)

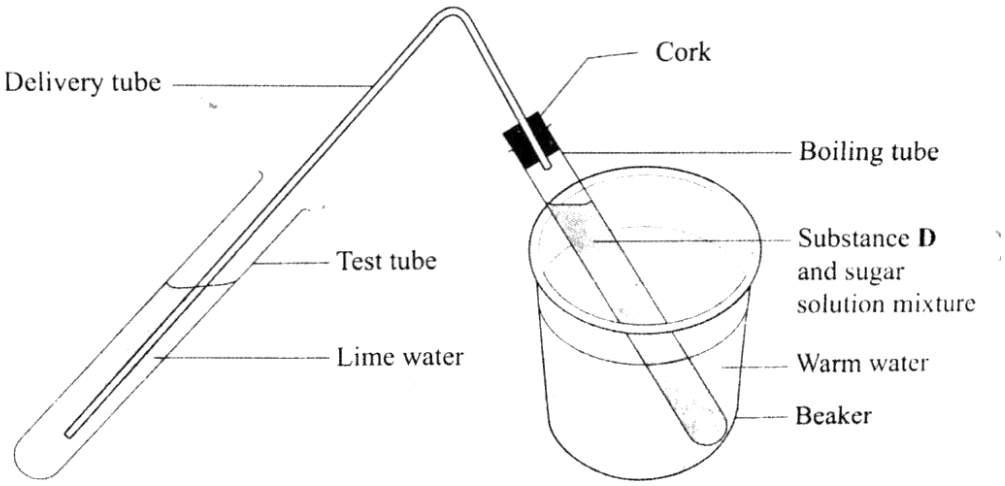
   i. Glucose
   ii. Amino acids
   iii. Fatty acids and glycerol

(b) Descibe the adaptation of the ileum to its functions. (14 Marks)

8. Explain how desert plants are adapted to their habitat. (20 Marks)

PAPER 3

1. (a) You are provided with solutions labelled Q and R, a substance labelled D and a delivery tube fitted with a rubber bung/cork.
   I. Label solution Q as lime water.
   II. Label solution R as 10% sugar solution.
   III. Add substance D to the 10% sugar solution.
   IV. Tightly close/plug the boiling tube with the rubber bung/cork fitted with a delivery tube.
   V. Dip the other end of the delivery tube in the test tube containing lime water.
   VI. Put the boiling tube in the warm water bath at 40oC and allow the set up to stand as shown in the diagram below.
   VII. Observe the set up for about 15 minutes.



i) State the observations made in the lime water. (2mks)

……

……

ii) Explain the observations made in the lime water. (2mks)

……

……

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

……

iv) Write a word equation for the physiological process investigated. (1mk)

……

……

v) Why was the warm water bath used in the experiment? (2mks)

……

……

……

b) Put a drop of the contents in the boiling tube on a microscope slide. Stain with a drop of methylene blue and cover with a cover slip. Observe it under a light microscope using low, medium and high power objective lences.

i) Draw and label one of the structures observed under the high power objective lens. (3mks)

ii) State the magnification of your drawing. (1mk)

……

……

……

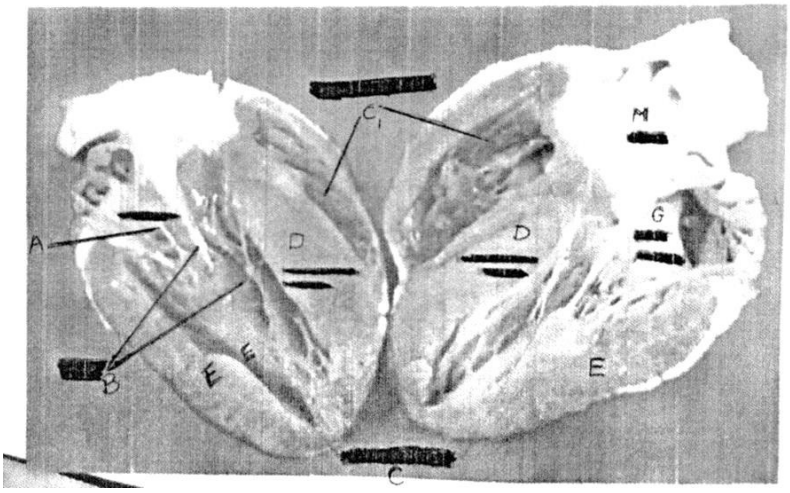
iii) State the identity of substance D. (1mk)

……

……

……

2. The photograph below is of a mammalian heart that has been cut open to expose the inner parts. Study it and answer the questions that follow.



a) Name the parts labelled D and E. (2mks)
D: ……
E: ……

b) State the role of part D. (1mk)
……
……

c) Account for the structural differences between the parts marked C and E. (3mks)
……
……
……

d) State the function of;
i) Valve A (1mk)
……
…… ……..
ii) Part B (1mk)
……
……

e) i) Name the part marked G. (1mk)

……
……

ii) Account for the structural differences between the parts marked G and E. (3mks)
……
……
……
……
……

i) Name the blood vessel marked M. (1mk)
……..

ii) State two defects of the circulatory system. (2mks)
……
……
……
……

3. You are provided with specimens labelled E and F.
   a) i) Name the sub-division to which the specimens belong. (1mk)
   ……
   ii) Using observable features on the specimens, give two reasons for your answer in in (a) (i) above. (2mks)
   ……
   ……..

   b) State the differences between the;
   i) Leaves of specimens E and F. (5mks)

LEAF E	LEAF F
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

   ii) Stems of specimens E and F (2mks)

STEM E	STEM F
1.	
2.	
3.	
4.	
5.	

   c) Using observable features on the specimen, state the adaptation of the stem of specimen E to its habitat. (2mks)

KCSE REPLICA 3

PAPER 1

1. Explain the meaning of the following branches of biology.
   a) Cytology (1mark)

……...

   b) Mycology (1mark)

……...

2. State **three** reasons why it's necessary to classify living organisms. (3marks)

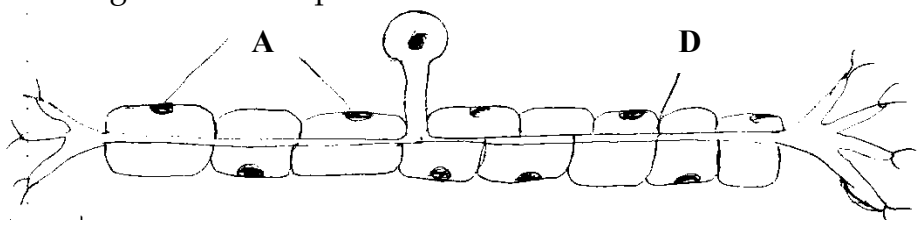
……...

……...

……...

……...

3. The diagram below represents a neuron.



   a) i) Identify the neuron. (1mark)

……...

   ii) Give a reason. (1mark)

……...

……...

   b) Identify the parts labeled A and D. (2marks)

   A ……

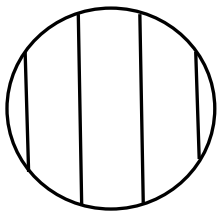
   D ……

   c) State the function of neuron. (1mark)

……...

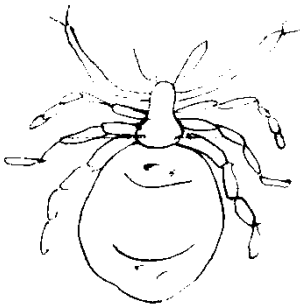
……...

4. A form one student trying to determine the size of onion cells observed the following on a microscopes field of view.



   If the student observed 2 cells across the field of view calculate the length of one cell in micrometers (3marks)

5. The diagram below represents a certain organism collected by a student on his way to school



a) State the class to which the organism belongs (1mark)

b) Give **two** reasons for your answer 5(a) above (2mark)

……

……

6. What is meant by the following terms as used in ecology?

i) Biomass (1mark)

……

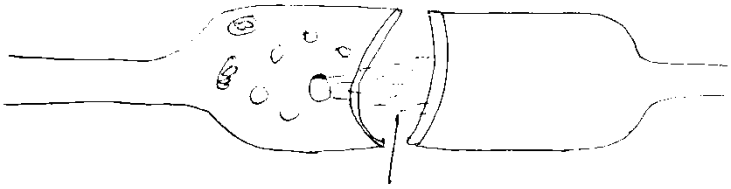
……

ii) Ecosystem (1mark)

……

……

7. The diagram below represents a synapse



P

a) Indicate the direction of the impulse on the diagram (1mark)

b) State **two** significances of a synapse in the body (2marks)

……

……

……

8. Name a tissue whose cells are thickened with

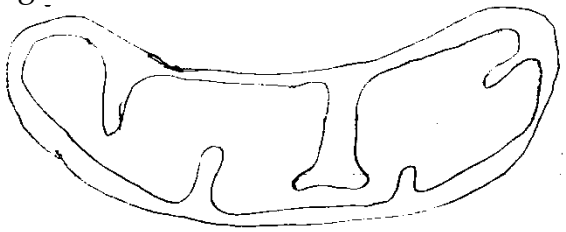
a) Cellulose and pectin (1mark)

……

b) Lignin (1mark)

……

9. The diagram below shows the structure of an organelle



a) State the function of the organelle (1mark)

……

……

b) State **one** adaptation of the above organelle to its function (1mark)

……

……

c) Give the function of the following cell organelles

i) Lysosomes (1mark)

……

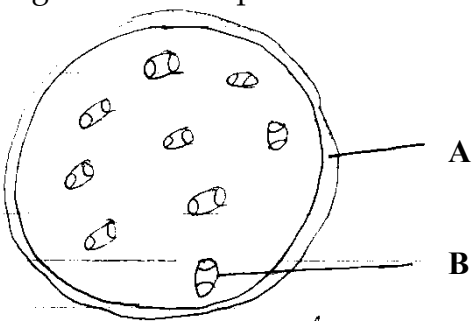
……

ii) Golgi bodies (1mark)

……

……

10. The diagram below represents across section of a certain plant



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

A ……

B ……

b) i) State the class to which the plant above belongs (1mark)

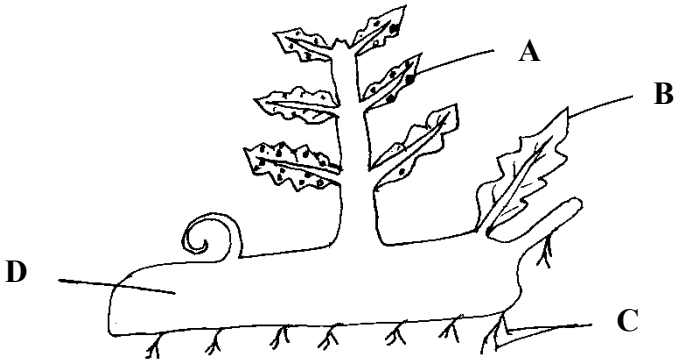
……

ii) Give a reason (1mark)

……

……

11. During research on different types of plants students found a plant that looked like the one shown below



a) Identify the plant. (1mark)

……

……

b) Name the parts labeled A, B, C and D. (4marks)

A ……

B ……

C ……

D ……

c) State the division to which the plant belongs. (1mark)

……

12. Why do you think we experience more discomfort in hot humid weather than we do in hot dry weather (3marks)

……...
……...
……...
……...

13. Explain why a water logged soil does not support plant growth. (3marks)

……...
……...
……...
……...

14. Name the carbohydrate that is.

a) Found in abundance in mammalian blood. (1mark)

……...

b) Stored in a mammalian liver. (1mark)

……...

15. Liver damage leads to impaired digestion of fats. Explain. (2marks)

……...
……...
……...
……...

16. The letters 'N' and n represents the dominant and recessive genes for hemophilia respectively.

Write down the genotype of the following (3marks)

a) Homozygous dominant_____

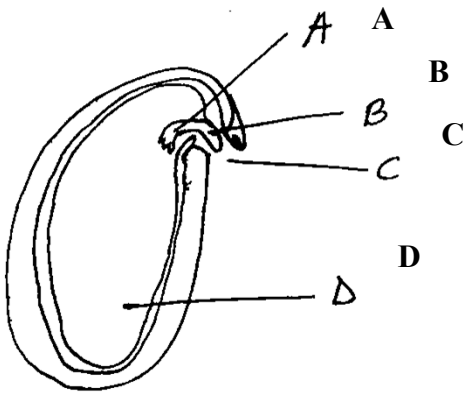
b) Homozygous recessive_____

c) Heterozygote_____

17. Give **three** adaptations of human male gamete to its functions. (3marks)

……
……...……
……...……
...……

18. The diagram below represents a longitudinal section of a bean study it and answer the questions tha follow:



a) Identify the parts labeled A to D. (2marks)

A _____
B _____
C _____
D _____

b) Give the role of the plant labeled D. (1mark)

……...
……...

c) What type of germination would the seed shown above undergo? (1mark)

……...
……...

19. a) A person who is blood group AB has an advantage over a person who is blood group O. Explain. (2marks)

……...
……...

b) Give **two** reasons for screening blood before transfusion. (2marks)

……...
……...

20. a) Define immunity. (1mark)

……...
……...

b) Distinguish between natural immunity and acquired immunity. (1mark)

……...
……...
……...
……...

c) Identify **one** immunisable disease in Kenya. (1mark)

……...
……...

21. State the causative agent of;

i) Cholera (1mark)

……...

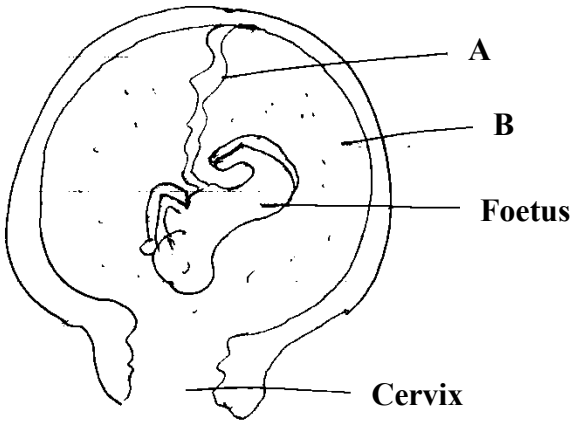
ii) Amoebic dysentery. (1mark)

……...
……...

22. Explain why it difficult to calculate the respiratory quotient (RQ) in plants. (2marks)

……...
……...

23. The diagram below represents a stage in the development of human foetus.



a) State **one** function of each of the structures labeled A and B. (2marks)

A _____

_____

B _____

_____

b) Apart from the size of the foetus what else from diagram illustrates that birth was going to occur in the near future.

……...

……...

24. Give the reasons why Lamar's theory on natural selection in organic evolution was discarde. (2marks)

……...

……...

25. Explain why the following process is essential in living organism.

a) Reproduction (1mark)

……...

……...

b) Excretion (1mark)

……...

……...

25. Explain why there are only a few days in each menstrual cycle when fertilization can occur. (2marks)

……...

……...

26. 27. Study the bio-chemical reactions given below.

$C_6H_{12}O_6 + C_6H_{12}O_6 \xrightarrow{I} C_{12}H_{22}O_n + H_2O$

$C_{12}H_{22}O_{11} + H_2O \xrightarrow{II} C_6H_{12}O_6 + C_6H_{12}O_6$

a) Identify the process marked I and II (2marks)

I _____

II _____

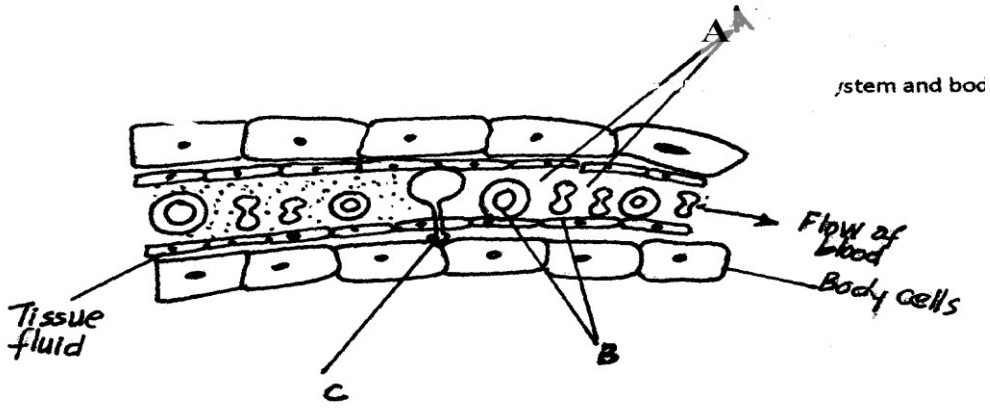
b) Explain how the process marked II can be carried out in a laboratory. (1mark)

……...

……...

PAPER 2

1. The diagram below shows the exchange site between circulatory system and body cells.



a) State **two** adaptations of the capillaries. (2mks)

.....

.....

.....

.....

b) (i) Name the blood cells labeled B. (1mk)

.....

.....

(ii) State the gas that diffuses from B to the tissue cells. (1mk)

.....

.....

c) State **two** functions of the part labeled A. (2mks)

.....

.....

.....

d) Name the blood vessel with the highest concentration of;

Oxygen. (1mk)

.....

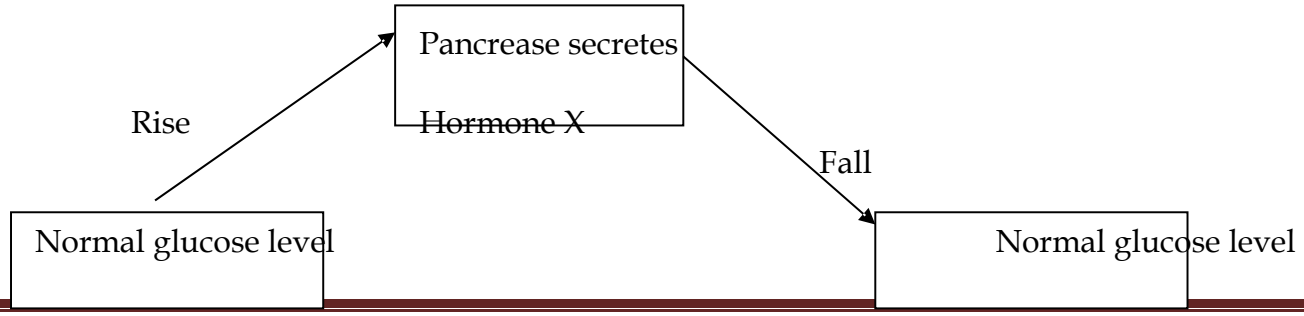
.....

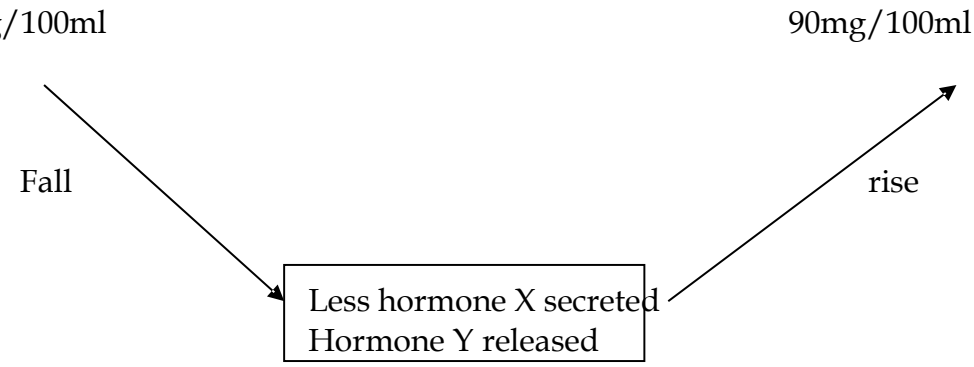
Urea. (1mk)

.....

.....

2. The diagram below shows how blood glucose in mammalian body is regulated.





(a) Name the hormone X and Y (2mks)

X _____

Y _____

(b) State two ways by which hormone X lowers glucose level in the blood when it rises above 90mg/100ml (2mks)

.....

.....

.....

.....

(c) Name the organ that produces hormone Y (1mk)

.....

.....

(d) Suppose there is deficiency of hormone X, state the disease the person would suffer from (1mk)

.....

.....

(e) Explain how the disease mentioned in (d) above can be controlled. (2mks)

.....

.....

.....

.....

3. 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 his trait; whereas persons with frontal hairline may occur in families in which one or even both parents have windows peak. Using B and b to symbolize genes for this trait.

a) Determination the f1 generation if a homozygous windows peak male parent is married to a Homozygous frontal hairline female parent. (4mks)

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.....

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.....

b) State two causes of variations. (2mks)

.....

.....

.....

.....

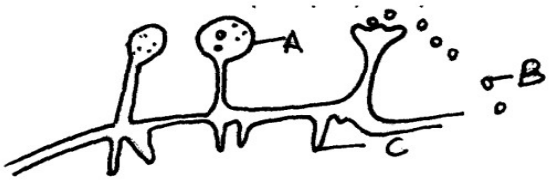
c) Name two examples of discontinuous variation. (2mks)

.....

.....

.....

4. The drawing below represents a mature bread mould (rhizopus).Study it and answer the questions which follow.



a) Name the structures labeled A, B and C. (3mks)

A.....

B .....

C.....

b) Identify the type of asexual reproduction represented in the diagram (1mk)

.....

.....

c) Give one function of structure C. (1mk)

.....

.....

.....

d) Define the term fertilization. (1mk)

.....

.....

.....

e) Compare an ovum cell and a zygote. (2mks)

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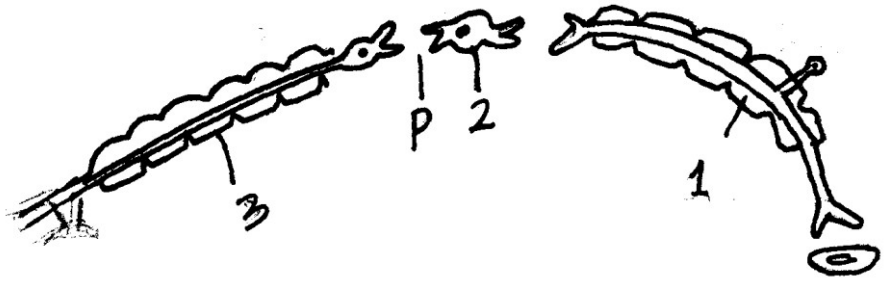
5. The diagram below shows three different types of neurons along a reflex.



a) Identify the neuron labeled 1, 2 and 3 (3mks)
1.....
2.....
3.....

b) Using arrow show the direction of impulse transmission on the diagram. (1mks)

c) Name the part of the spinal cord where the cell bodies of neuron 2 and 3 are located. (1mk)

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

d) Describe the transmission impulses across the part labeled P. (3mks)

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

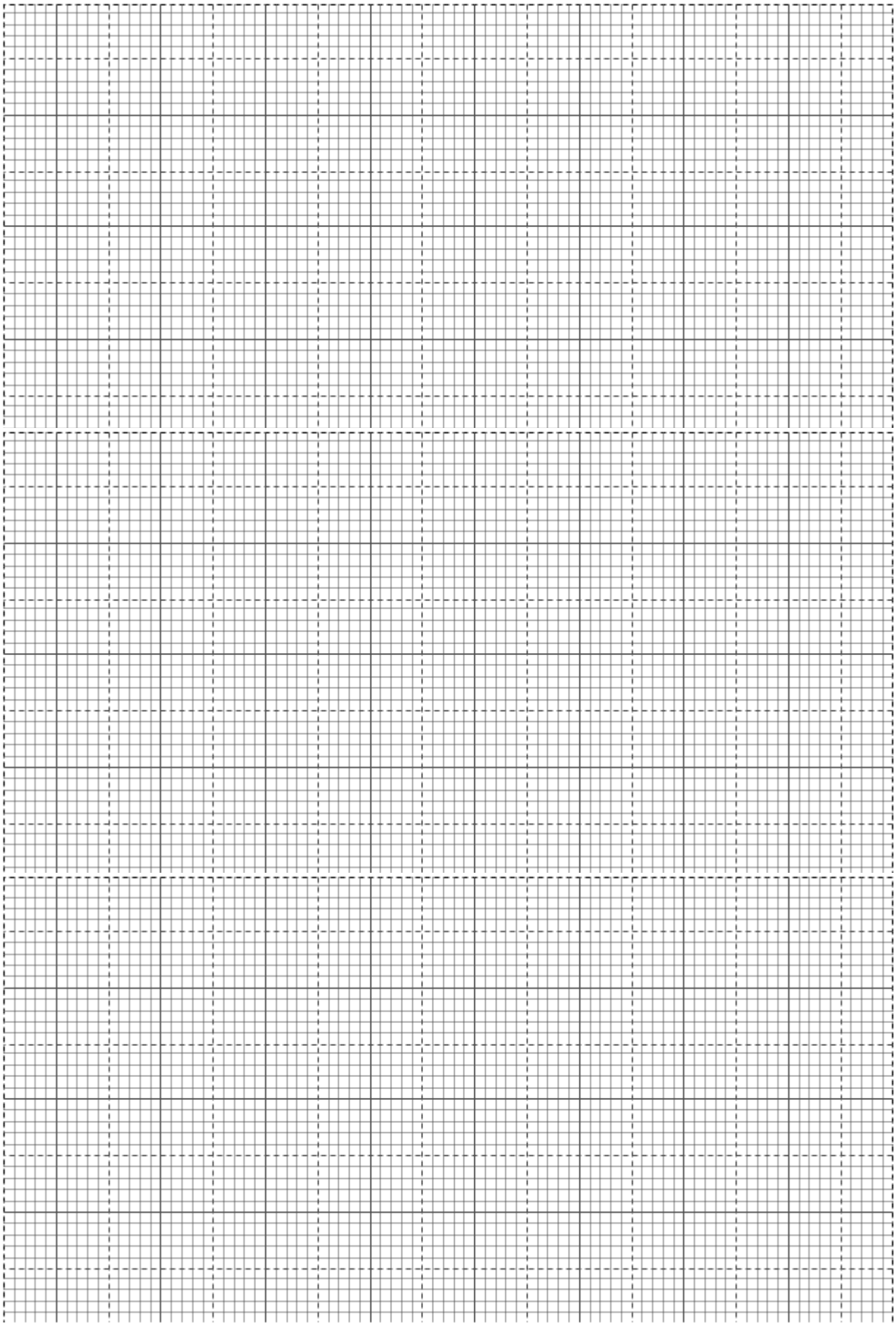
SECTION B

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



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 (2marks)

.....

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.....

.....

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

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.....

.....

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

.....

.....

.....

.....

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

.....

.....

.....

.....

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

i. Within the seed. (2marks)

.....

.....

.....

ii. Outside the seed (2marks)

.....

.....

.....

e) Give two characteristics of meristematic cells (2marks)

.....

.....

.....

.....

7. Explain how <u>abiotic</u> factors affect plants. (20marks)

8. (a) Discuss eye accommodation. (10mks)

(b) Discuss the process of hearing in man. (10mks)

PAPER 3

1. You are provided with solution labeled **K**

(a) Using the reagents provided test for the food substances found in solution K. Record the food you have tested for, procedure observation and conclusion in the table below (10mks)

Food substance	Procedure	Observation	Conclusion

(b)(i) Name an enzyme that may be required to digest the food substance found in solution **K** in a human being. (1mk)

……

……

(ii) State the name of the part of alimentary canal in which the enzyme named in (b)(i) above is found (1mk)

……

……

1. You are provided with solution labeled **K**

(a) Using the reagents provided test for the food substances found in solution K. Record the food you have tested for, procedure observation and conclusion in the table below (10mks)

Food substance	Procedure	Observation	Conclusion

(b)(i) Name an enzyme that may be required to digest the food substance found in solution **K** in a human being. (1mk)

……

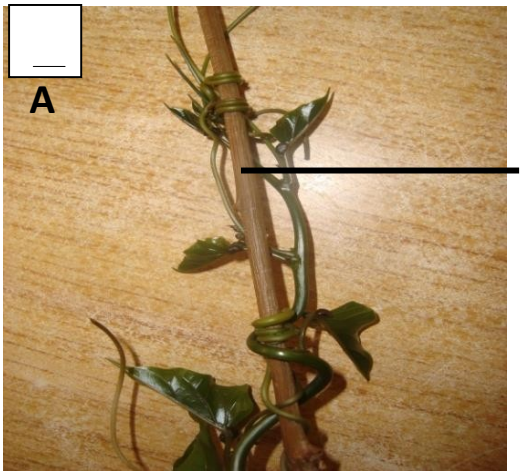
……

(ii) State the name of the part of alimentary canal in which the enzyme named in (b)(i) above is found (1mk)

……

……

2. **(a)** Study photograph **A** below which shows a plant specimen and an associated sisal pole study and answer the questions that follow



(i) What name is given to the coiled part of the plant specimen shown in photograph**A**? **(1 mark)**

……

(ii) Name the type of response exhibited by the coiled part of the plant specimen in photograph **A** **(1 mark)**

……

(iii) Specify the stimulus responsible for the response named in **(a)(ii)** above **(1 mark)**

……

(iv) Explain how the response exhibited by the coiled part of the plant specimen in photograph **A** occurred
(3 marks)

(v) State the biological significance of the response described in **(iv)** above to the survival of the plant
(1 mark)

(b) Study photographs **B1** and **B2** below carefully and answer the questions that follow. The part in **B2** was extracted from the specimen in**B1**

(i) Identify the agent of pollination of the specimen shown in the photographs above
(1mark)

……

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

……

(iii) Describe the pistil of specimen **B1** **(2 marks)**

……

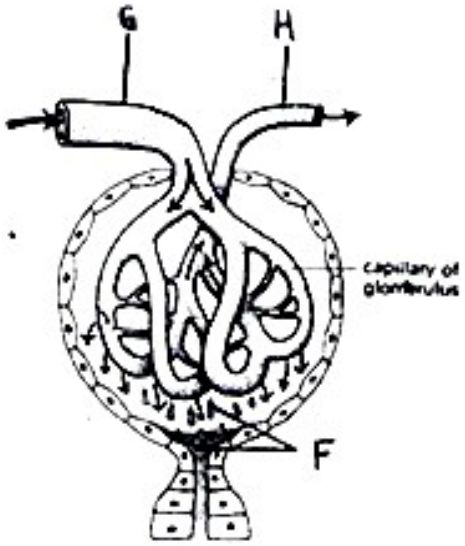
……

(iv) What is the name given to the type of pistil found in specimen **B1**? **(1 mark)**

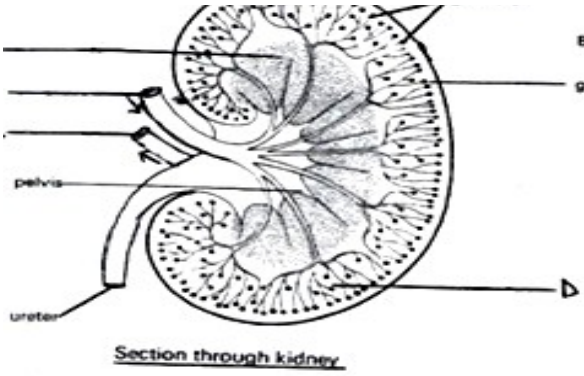
……

(v) Describe the external features of the leaves of the plant from which specimen **B1** was obtained
(3marks)

3. The diagram below shows structures which occur in a mammalian kidney.
Study the figure carefully and answer the questions that follow.



Capillary of glomerulus



Section through kidney

i) Name the parts marked (2 marks)

A.....

D.....

ii) Identify the blood vessels labeled: (4 marks)

B.....

C.....

G.....

H.....

b) i) Name the filtrate labeled F (1 mark)

ii) Explain how the filtrate named in (b) (i) above is formed (3 marks)

c) Explain the difference in structure E in a desert and a fresh water animal. (2 marks)

d) Name the hormone which regulates reabsorption of sodium ions in the kidney tubules. (1 mark)

KCSE REPLICA 4

PAPER 1

1. A form one girl observed a bird laying eggs in a nest which later hatched into chicks. Name two characteristics of living things that she concluded from the observations (2marks)

……

……

2. Name the stage in meiosis where chromosomes number is reduced by a half (1mark)

……...

3. State two characteristics of organisms that belong to the same species (2marks)

……

……

4. a) Live specimens should always be returned to their habitats whenever possible. What is the biological importance of this practice? (1mark)

……

b) Why is a dissecting pin important in biological experiments? (1mark)

……

5. Mutations form basis for variations. Name the type of mutation that cause the following human disorders

(a) Albinism (2marks)

……

(b) Down syndrome

……

6. a) During a field trip a plant that had flowers drew the attention of a student. Name the division of the plant.

…… (1mark)

b) Students observed an animal with the following features

- Dorsoventrally flattened body
- One pair of legs per segment
- Poison claws on the head

i) Name the class to which the animal belongs. (1mark)

……

ii) State the mode of feeding of the animal (1mark)

……

7. Study the process below and answer the questions that follow

Glucose $\xrightarrow{\text{process P}}$ Pyruvic acid + Energy.

a) Name the process P (1mark)

……

b) Name the part of a cell in which the process named in (a) above occurs (1mark)

……

8. Account for the following observations.

a) When fish is taken out of water it dies (2marks)

……

……

c) The palisade cells are closely packed together (1mark)

……

…

9. a) Give the significance of the following features of the red blood cells.

Being biconcave in shape. (1mark)

……

b) Lacking mitochondria (1mark)

……

10) A person fell from the third floor of a building and had part of his brain damaged. Name the part of the brain damaged if the person suffers from the following

a) Loss of speech (1mark)

……

b) Inability to regulate body temperature (1mark)

……

c) Lack of balance (1mark)

……

11. In body cells of all organisms chromosomes occur in pairs. Members of each pair have a characteristic length and shape.

a) What is the scientific name of such a chromosome pair? (1mark)

……

b) What name is given to a cell that contains one member of each pair of chromosomes? (1mark)

……

c) Name the part in humans where meiosis takes place (2marks)

……

……

12. Small birds like the European robin puff up (swell up) their feathers during winter. Explain the significance of the behavioral response.
(3marks)

……

……

……

……

13. Name the most appropriate tool that biology students can use for collecting (2marks)

i) Crawling animals

……

ii) Stinging organisms

……

14. During a microscopy class a student was unable to see the field of view. State two possible adjustments she needed to make to ensure that the field of view became visible. (2marks)

……

……

……

15. Name the apparatures used to measure the following abiotic factors.
(2marks)

i) Penetration of light in water

……

ii) Light intensity

……

16. A lion is an exclusive carnivore. State two dental adaptations it has to its mode of feeding (2marks)

……
……
……
……

17. a) State an example of structures in animals whose development demonstrates adaptive radiation (1mark)

……

b) Treatment of malaria is still a challenge in the world despite the invention of many antimalarial drugs. Explain. (3marks)

……
……
……

18. Name two processes that brings about the translocation of manufactured food (2marks)

……
……

19. Name the disorder of the blood described by the following symptoms (2 marks)

a) In ability of the blood to clot.

……

b) Crescent shaped red blood cells with abnormal haemoglobin.

……

20. Explain how a nerve impulse is passed across a synapse (3marks)

……
……
……
……

21.a) A large crocodile can survive on 20kg meat for a year. A small sized lion cannot. Explain (3marks)

……
……
……

b) Name the part of the body that helps in insulation in the following: (2marks)

i) Birds

……

ii) Mammals

……

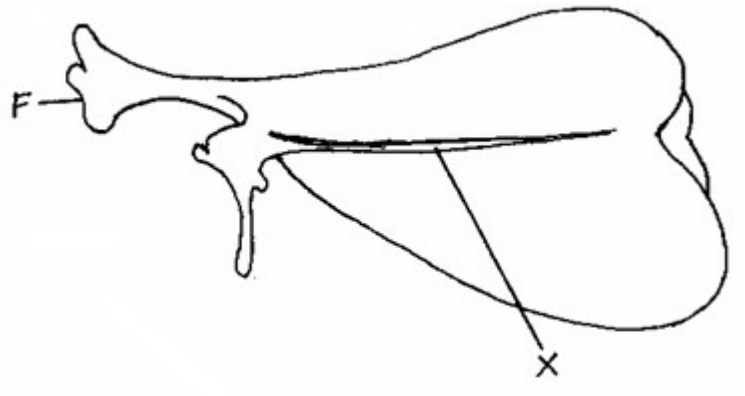
22. Name **two** types of valves in the heart. (2 marks)

……..
……

23. Sometimes when one stands up very quickly after a long period of sitting, she may feel faint or dizzy. Explain. (2 marks)

……..
……
……

24. The diagram below represents a bone of a mammal



(a) Identify the bone. (1 mark)

(b) Name the part marked **X**. (1 mark)

(c) Name the bone that articulates at the part labelled **F**. (1 mark)

(d) State two ways in which the bone is adapted to its function. (2 marks)

25. a) Under which of the following magnifications would one see a larger part of the specimen X 40 or X 500? Give a reason. (2 marks)

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

26. State two characteristics of mammals that are not externally visible (2marks)

27. State three uses of digested food in the bodies of animals (3 marks)

28. Which cell organelle is present in large numbers in cells that produce Insulin? Give a reason for your answer (2marks)

29. Give three advantages of fossil records (3marks)

30. What is the significance of diffusion to plant pollination? (1mark)

31.a) Explain why it is not advisable to put a patient on a drip of distilled water for rehydration (3marks)

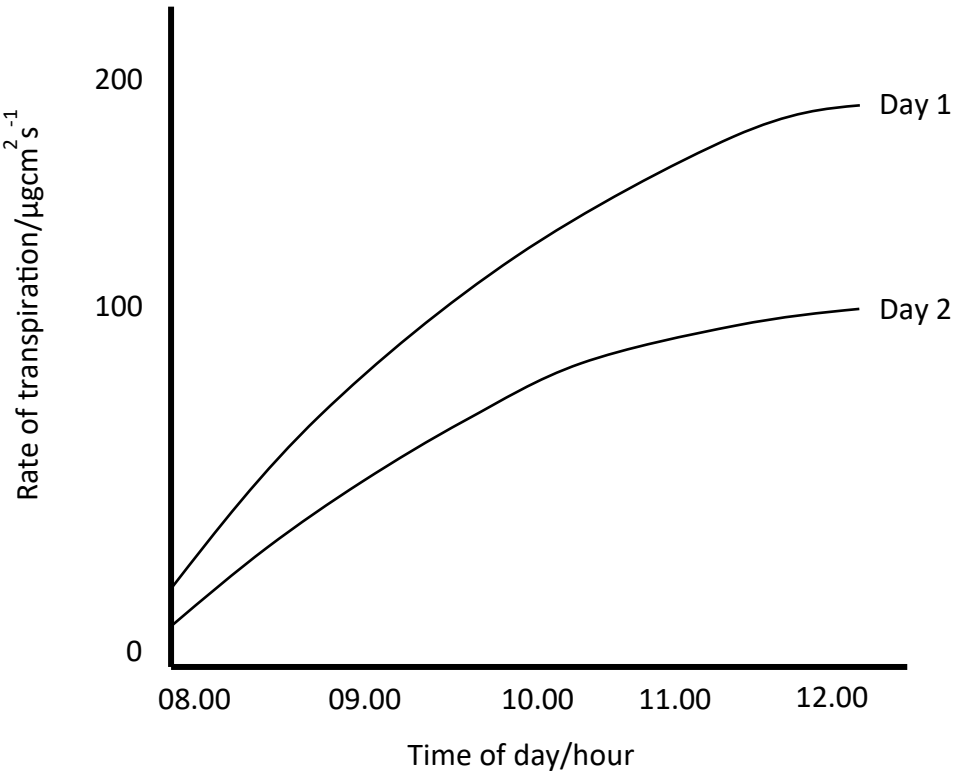
b) Name the physiological process by which water molecules move from one cell to the other (1mark)

PAPER 2

A (40 marks)

*Answer **all** the questions in this section in the spaces provided.*

1. The graph below shows the rate of transpiration of the same plants on two consecutive mornings, day 1 and 2.



a) (i) Give two environmental factors that could account for the difference between day 1 and day 2 (2mks)

……

……

(ii) Explain how the environmental factors named (a) (ii) above could have caused the difference between day 1 and day 2. (2mks)

……

……

……

……

b) Name two forces involved in movement of water up the xylem. (2mks)

……

……

c) Name the strengthening material found in the following tissue in a stem:

i) Sclerenchyma (1mark)

……

ii) Collenchyma (1 mark)

……

2. a) A young mother delivered a baby at Muranga Hospital, which was taken to the nursery shortly after delivery. When she was brought the baby later, she felt that it was the wrong baby. When she got home, she decided to contest the issue in a court of law. The blood tests showed that she was blood group AB and her husband was group O and the baby was blood group O. Use a genetic cross to find out if her claims were true. (5mks)

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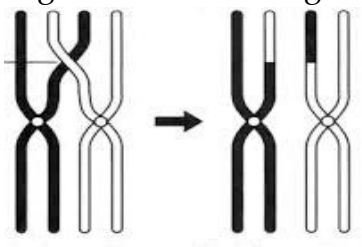
b) The figure below is a diagram of a pair of homologous chromosomes during meiosis.



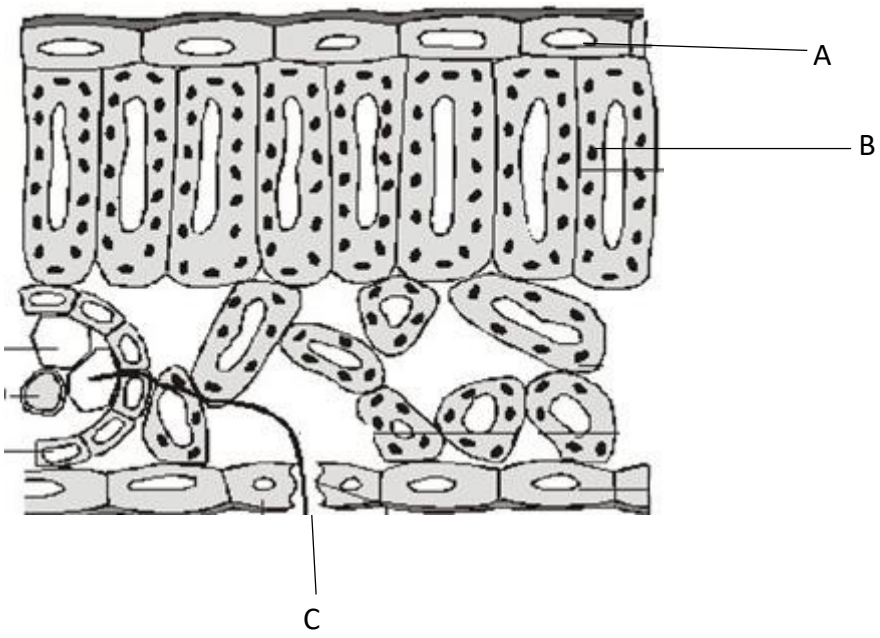
i) Name the process shown above (1mk)

……
……

ii) Explain the effect of the process named in (b) (i) above on linked genes. (2mks)

……
……
……
……

3. The diagram below shows a vertical section through the part of a leaf of a mesophyte.



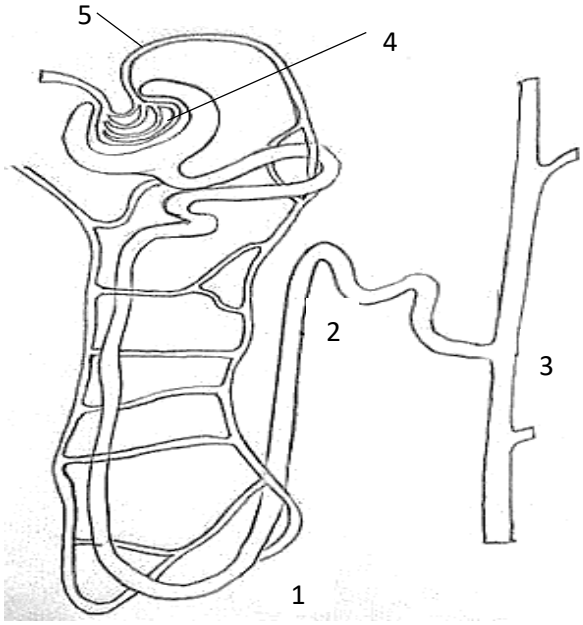
a) Label cell A and organelle B (2marks)
A-……
B-……...

b) State two functions of the part labelled C. (2mks)
……
……
……

c) Give two differences between the structure shown above and that of a floating hydrophyte. (2marks)
……
……
……
……

d) Give two observable features that adapts the structure above to photosynthesis. (2 marks)
……
……
……
……

4. Below is a diagram of a mammalian nephron. Use it to answer the questions that follow.



a) Name part 4. (1mark)
……

b) Explain what happens to the concentration of sodium ions between 1 and 2. (2 marks)
……
……
……
……

c) i) Name the hormone that controls the amount of urine produced in the kidneys. (1 mark)
……
……

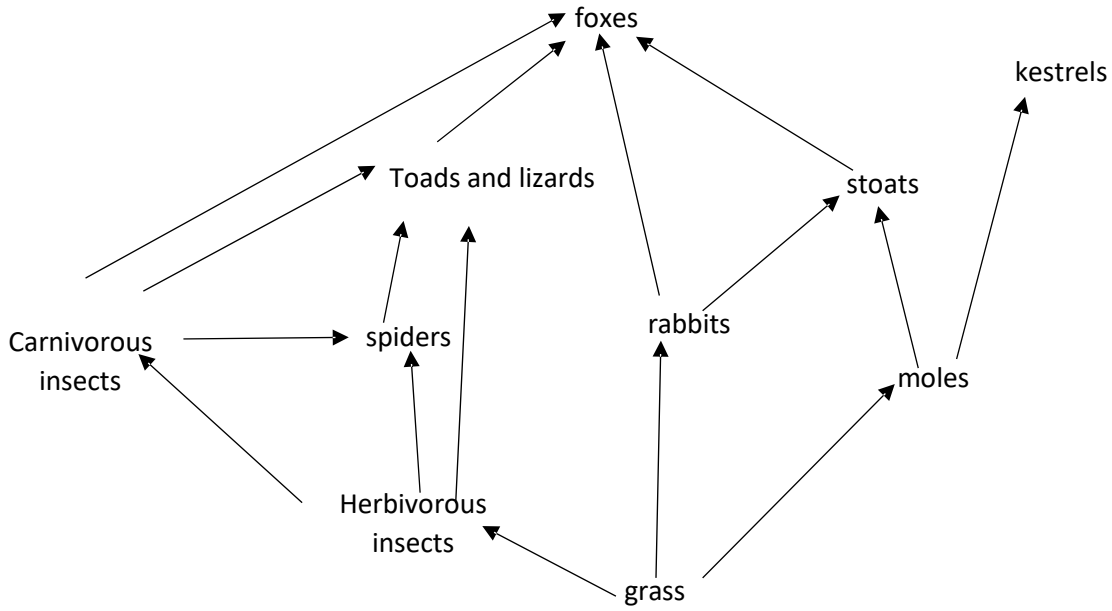
ii)How will the concentration of urine be affected at region 3 in the absence of the hormone mentioned in (c) (i) above. (2mks)

……
……
……..

d) What will happen at point 4 if there was partial constriction at point 5? (2marks)

……
……
……
……

5. The diagram below shows a food web. Study it and answer the questions that follow.



a) Write two food chains with foxes as the quaternary consumer. (2mk)

……
……

b) Name the organism with

i) The highest biomass (1 mark)

……

ii) The highest number of predators (1 mark)

……
……

c) State two possible effects on the ecosystem if kestrels migrated. (2 marks)

……
……
……

d) Explain why primary productivity reduces with increase in depth in an aquatic ecosystem. (2marks)

……
……

……
……

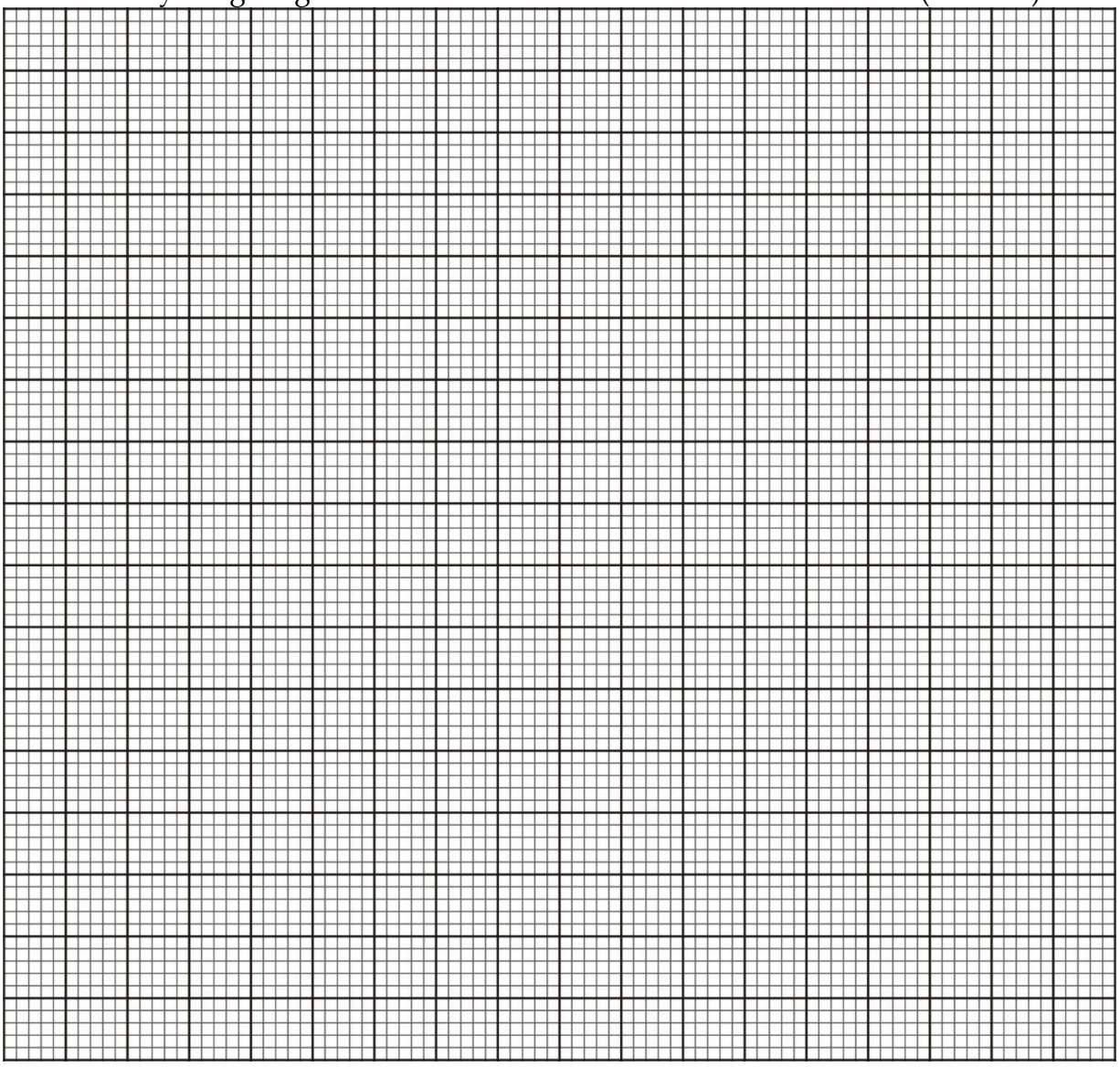
SECTION B

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

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

Time after planting	Dry weight of endosperm	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. (8 marks)



b) What is the total dry weight on day 5? (1mark)

……

c) Account for:

i) Decrease in dry weight for endosperm from day 0 to 10. (2 marks)

……

……

……

……

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

……

……

……

……

iii) Decrease in total dry weight from day 0 to day 8. (2 marks)

……

……

……

……

iv) Increase in total dry weight after day 8 (1 mark)

d) State two factors that causes seed dormancy in each of the following:

i) Within a seed (2 mark)

……

ii) Outside a seed. (2 mark)

……

7. a) A student sitting under a shade of a tree, on a sunny day, shifted the eyes from looking at an aero plane in the sky to reading a page on her book. Describe the changes that occurred in her eye. (15 marks)

b) Explain how a neuron is adapted to its function. (5marks)

8. a) Describe digestion of milk in the stomach (10 marks)

b) Describe assimilation of the end products of digestion in mammals. (10 marks)

PAPER 3

1.You are provided with solution W ,Solid Q, Iodine solution ,Benedict's solution, Hydrochloric acid and Water bath.

a)Using reagents provided carry out tests to determine the food substance present in solution W Record the procedure ,observation and conclusion in the table below

Food test	Procedure	Observation	Conclusion

6mks

b)Label three test tubes as A, B and C. Place 3ml of Solution W into each test tube. Divide solid Q into three equal portions.

To the test tube A add one portion of solid Q and shake thoroughly

To the test tube B add the second portion of Solid Q shake thoroughly and heat to boil.

To the test tube C add the third portion of solid Q, followed by 8 drops of 2M hydrochloric acid and shake to mix.

Place the three set ups into a water bath maintained at 37^{o}c for 40 minutes.

Add equal amounts of Benedict's solution to each of three test tubes and heat to boil. Record your observation.

Set up A ……1mk

B ……1mk

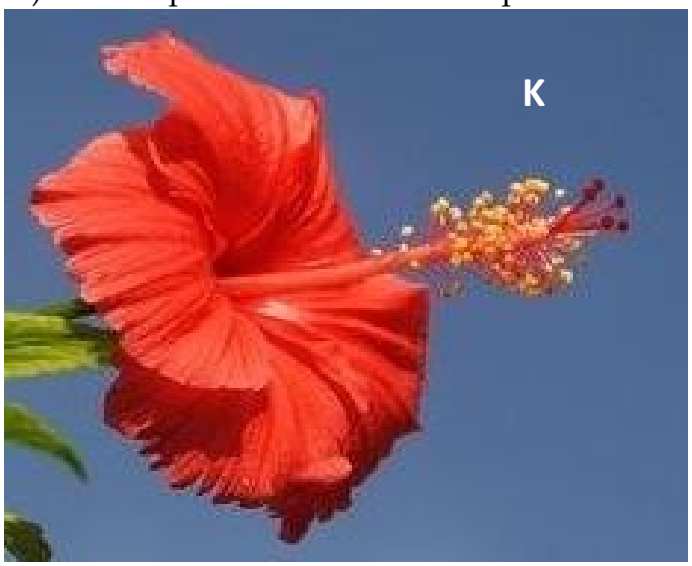
C ……...1mk

Account for your observations above 3mks

c) Name any other factor that affects the reaction above. (1mk)

d) Give a reason why temperature of the water bath was maintained at 37^{o}c (1mk)

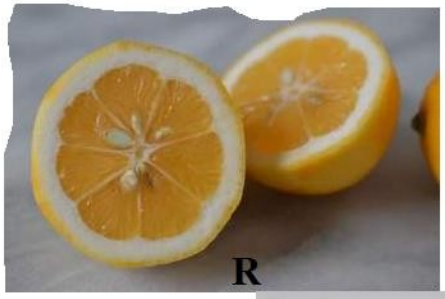
2 .a) You are provided with Flower specimen **K**. Use it to answer the questions that follow

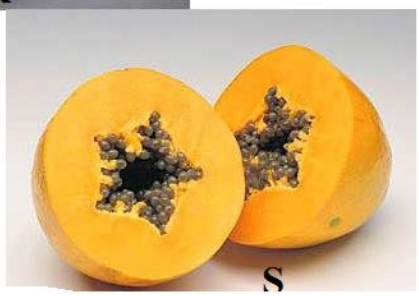


i) Name the type of gynoecium in the flower.(1mk)

ii) With a reason state the agent of pollination.
Agent of pollination……1mk
Reason …….. 1mk

b) The photographs labelled **Q, R**,and **S** are sections of some plant parts.





(i) Name the type of placentation in the specimens shown in photographs **Q, R** and **S** .With Reasons (6 marks)

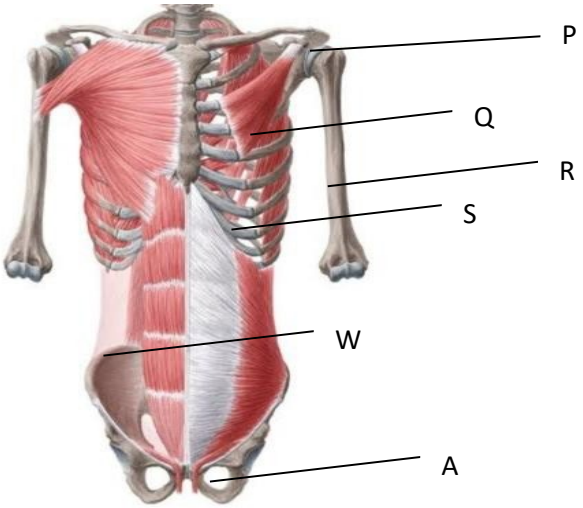
Fruit	**Placentation**	Reason
Q R S		

(ii) Giving a reason in each case, name the mode of dispersal of the specimen in photograph **Q** and **S** (4marks)

Q

Mode……...……
Reason
……
……
S
Mode……..……
Reason
……
……
iii) What type of fruit is R .Give a reason.(2mks)

3. The diagram below represents a section of human skeleton and muscles.



a)i)Name the parts labelled :
W……..1mk
S…….1mk
R…….1mk
Q ……..…….…… 1mk
ii) What is the significance of part A (1mk)

(iii)Describe the role of Q during inhalation. (2mks)

(iv)Name the type of muscle on the diagram above.(1mk)

v)What type of joint is at P. (1mk)

b)Name the bone that articulate with R at:
i)Proximal end (1mk)

ii)Distal end (1mk)

KCSE REPLICA 5

PAPER 1

1.a) Define the term specimen. (1mk)

.....

b) 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)

.....

b) Name the structures from which the air bubbles were coming from. (1mk)

.....

c) 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)

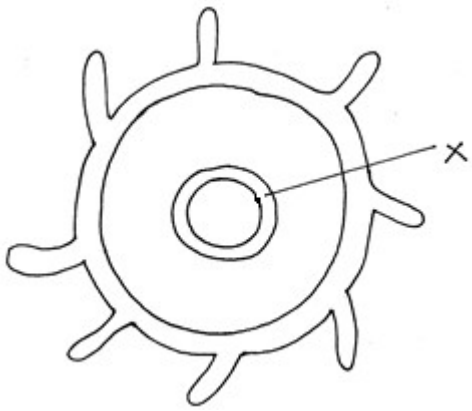
Enzyme

.....

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

i) Name part X (1mks)

.....

ii) 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)

.....

.....

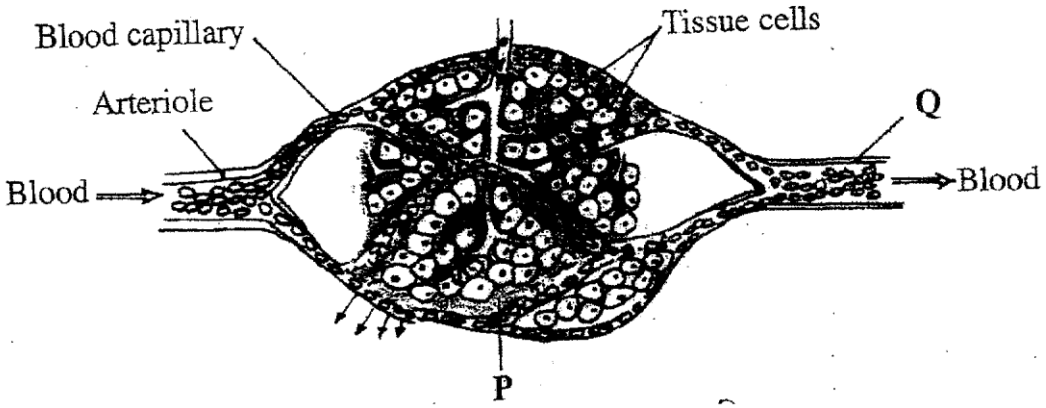
.....

.....

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)

.....

.....

.....

.....

c) 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. (1 mks)

.....

.....

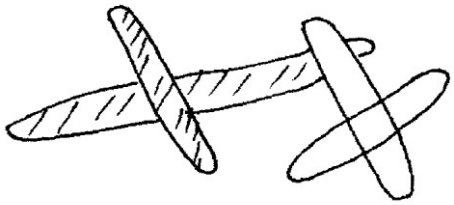
.....

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.



i) State the phenomenon shown above. (lmk)

.....

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

.....

iii. 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)

.....

.....

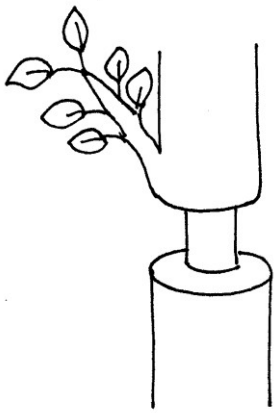
.....

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. (1mk)
.....

c) What is the importance of the renal tubules being long? (1mk)
.....
.....
16. What is the role of the following hormones in human reproduction?
i) Follicle stimulating hormone in male (1mk)
.....
.....
ii) Luteinizing hormone during menstrual cycle. (1mk)
.....
.....
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

a) i) Write the complimentary DNA stand. (1mk)

.....

ii) Write the mRNA strand of the strand in (a) above. (1mk)

.....

b) Name the site for protein synthesis in a cell. (1mk)

.....

c) State one disorder caused by non-disjunction mutation. (1mk)

.....
.....

19. i) State the importance of rings of chitin in the tracheal system of insects. (1mk)

.....

ii) Explain the significance of maintaining a steep concentration gradient in the respiratory surfaces of animals. (1mk)

.....
.....

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

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

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

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

21. Name the branch of biology that deals with;

a) Relationship between antelopes and gazelles in their environment. (1mk)

.....

b) Study of Ebola virus. (1mk)

.....

c) Explain what would happen if a given of living things lose their ability to reproduce. (1mk)

.....
.....

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

i) Boiling the leaf in hot water. (1mk)

.....
.....

ii) Destarching (1mk)

.....
.....

iii) Boiling the leaf in methylated spirit. (1mk)

.....

23. Explain why osmosis is a special type of diffusion. (1mk)

.....

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

PAPER 2

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	✓	X	✓	✓
lipase				
Protease				

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

……

……

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

……

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

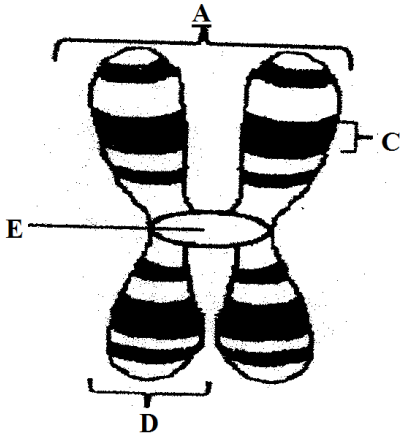
……

e) 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)

D……

E……

b) Name:

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

……

……

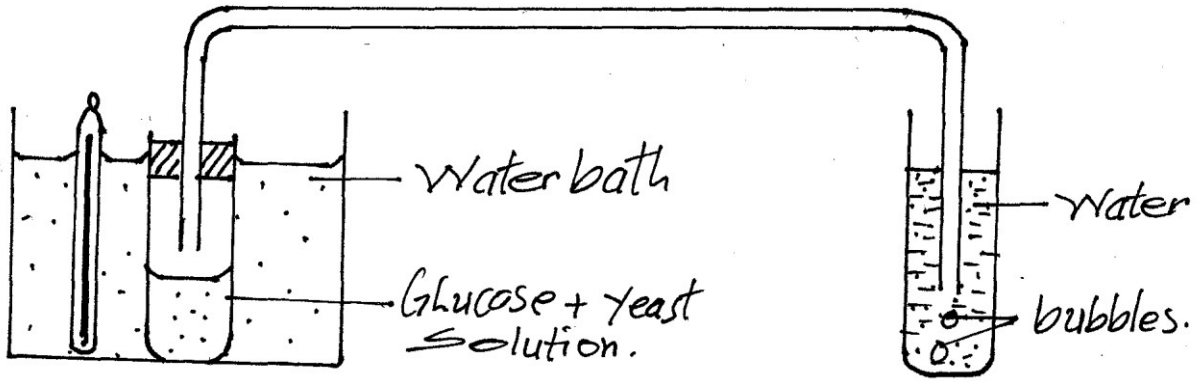
ii) The process whereby DNA makes an identical copy of itself. (1mk)

……

……

c) 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.

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

ii) 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)

……

……

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

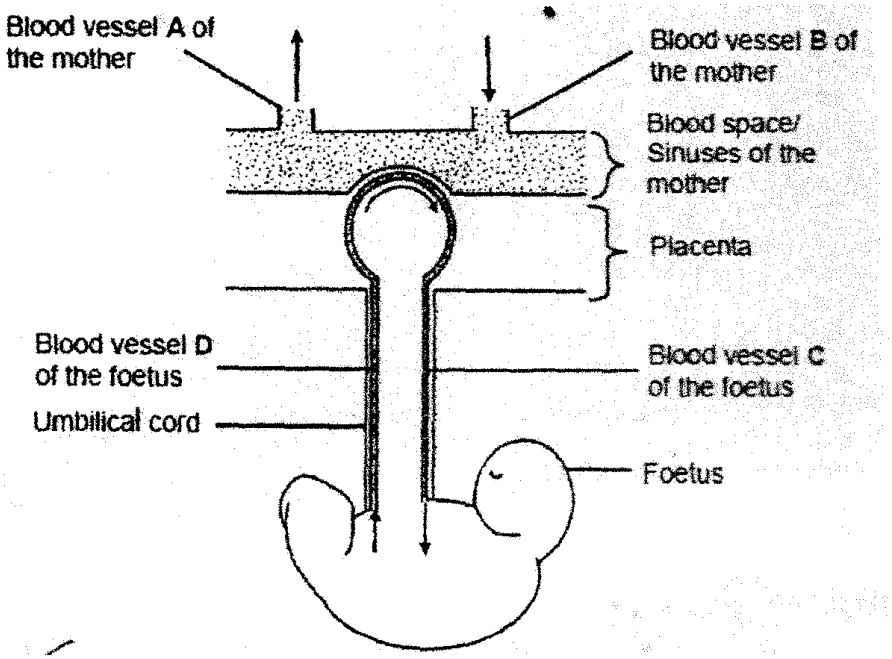
……

ii) 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)

C……
D……

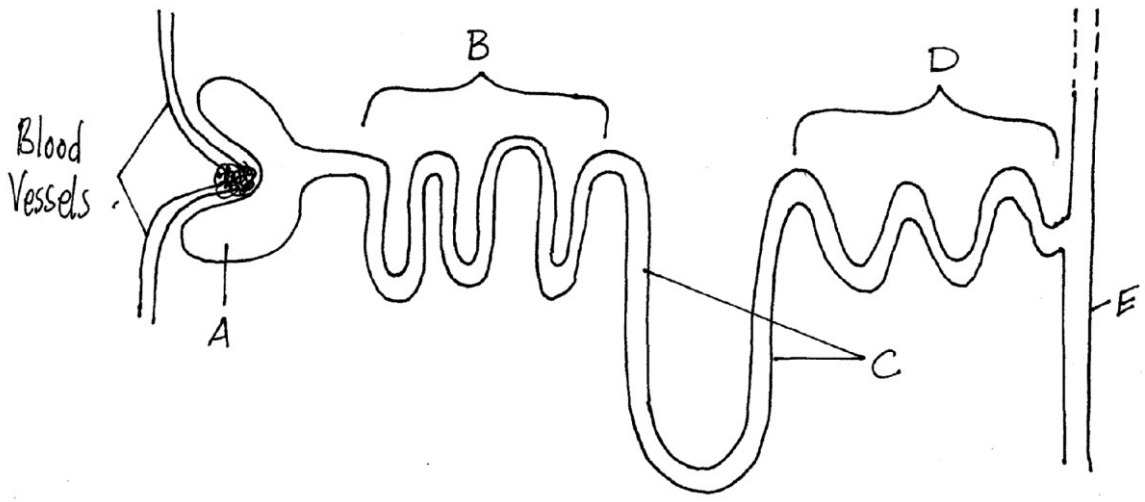
b) ii) State two differences between the composition of blood found in blood vessel C and blood found in blood vessel D. (2mks)

C	D

c) 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)

D……

E……

ii) 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)

……

……

c) 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 in the spaces provided after question 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)

PAPER 3

1. You are provided with Irish potato tuber; dilute Hydrogen peroxide solution, washing up solution, solutions labelled K, PH 4, solution labelled L of PH 7, and solution labelled M of PH 9. You are also provided with 10mI measuring cylinder, white tile, glass rod, scalpel, stop watch, test tubes in a test tube rack.

Peel the potato tuber and cut a piece measuring lcm3. Crush it on a white tile using the glass rod to obtain a paste. Divide the paste into 3 portions and use them as follows.

i) Put $2cm^3$ of solution K into a 10ml measuring cylinder. Add one portion of the potato paste into the cylinder containing solution K. Read and record the volume of the mixture in the table below. Add one drop of the washing up solution. Add lcm^3 of hydrogen peroxide solution into the mixture and immediately start a stop watch. At the end of 2minutes read the mark to which the foam rises and record in the table below. Clean and rinse the measuring cylinder with distilled water.

ii) Put $2cm^3$ of solution L into a 10ml measuring cylinder. Add the second portion of the potato paste into the cylinder containing solution L. Read and record the volume of the mixture in the table below. Add one drop of the washing up solution. Add lcm^3 of hydrogen peroxide solution into the mixture and immediately start a stop watch. At the end of 2minutes read the mark to which the foam rises and record in the table below. Clean and rinse the measuring cylinder with distilled water.

iii) Put $2cm^3$ of solution M into a 10ml measuring cylinder. Add the third portion of the potato paste into the cylinder containing solution M. Read and record the volume of the mixture in the table below. Add one drop of the washing up solution. Add lcm^3 of hydrogen peroxide solution into the mixture and immediately start a stop watch. At the end of 2minutes read the mark to which the foam rises and record in the table below.

a) Complete the table below by calculating the volume of the foam produced in each of the solutions using the data obtained in (i), (ii) and (iii)(3mks)

	SOLUTION K	SOLUTION L	SOLUTION M
Volume of the solution + Potato portion			
Volume of the solution + potato portion + foam			
Volume of the foam			

b) Explain the observation made when hydrogen peroxide was added to the mixture (2mks)

.....

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.....

c) Account for the difference in the volume of the foam that was produced in solution K and solution M (2mks)

.....

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.....

.....

.....

d) Cut a piece of potato measuring lcm^3 from the remaining potato .Use the reagent provided to test for the food substance (3mks)

Test	Procedure	Observation	Conclusion

2. You are provided with photographs of specimen Q and N together with actual specimens H, K and P. specimen H is a complete plant while K is a portion of a different plant. Observe the specimens and the photographs and use them to answer the questions that follows.

a) State two observable differences between the leaves of H and K. (2mks)

.....

.....

.....

b) Explain how the stem of specimen H adapts the plants to photosynthesis (2mks)

.....

.....

.....

.....

c) State the ecological importance of specimen H (1mk)

.....

d) Describe how specimen K is adapted to its habitat (2mks)

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.....

e) Explain the consequences of spilling common salt to the soil in which specimen H is growing. (2mks)

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.....

f) With a reason identify the subdivision from which specimen H and K belong (2mks)

.....

.....

.....

.....

g) Cut a longitudinal section of specimen P. using the observable features.

i) Identify the type of placentation (1mk)

.....

.....

ii) With a reason classify the type of fruit to which it belongs. (2mks)

.....

.....

.....

.....

.....

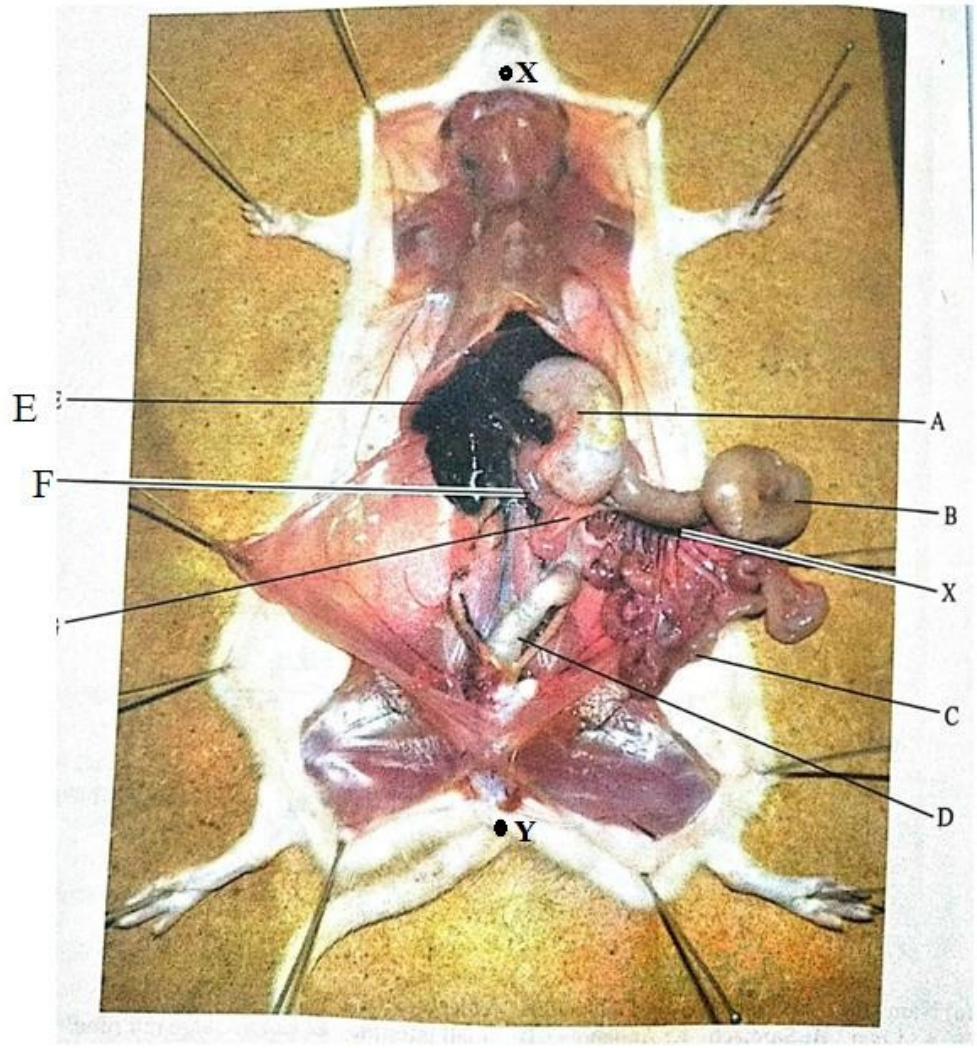
h) Use the photographs of Q and N to complete the table below (4 mks)

PHOTOGRAPH N

PHOTOGRAPH Q

SPECIMEN	MODE OF DISPERSAL	ADAPTIVE FEATURE
Q		
N		

3. Below is a photograph of a dissected rat with abdominal organs spread out. Examine it



a) State two characteristics that distinguish the dissected animal into its taxonomic class. (2mks)

.....

.....

.....

b) Name the parts labelled (3mks)

i) B

.....

ii) C

.....

iii) F

.....

c) State

i) Two functions of part labelled A (2mks)

.....

ii) The function of D (1 mk)

.....

.....

.....

d) Other than homeostasis and excretion state two functions of structure E (2mks)

.....

e) Given the magnification of the specimen in the photo as X 0.67, calculate the length of the rat from X to Y (2mks)

KCSE REPLICA 6

PAPER 1

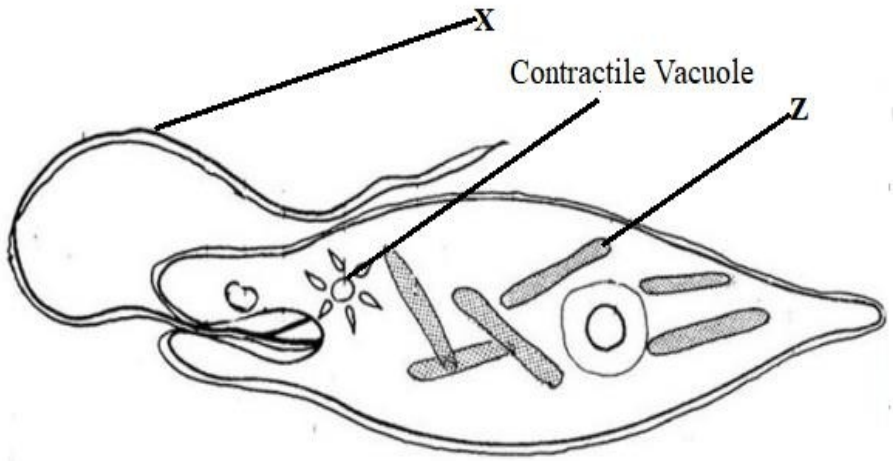
1. The study of biology enhances international cooperation, as countries work together to solve environmental problems. Name 2 biology related international conventions that help solve environmental problems. (2 marks)

   ……..
   ……..
   ……....

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)

   ……..

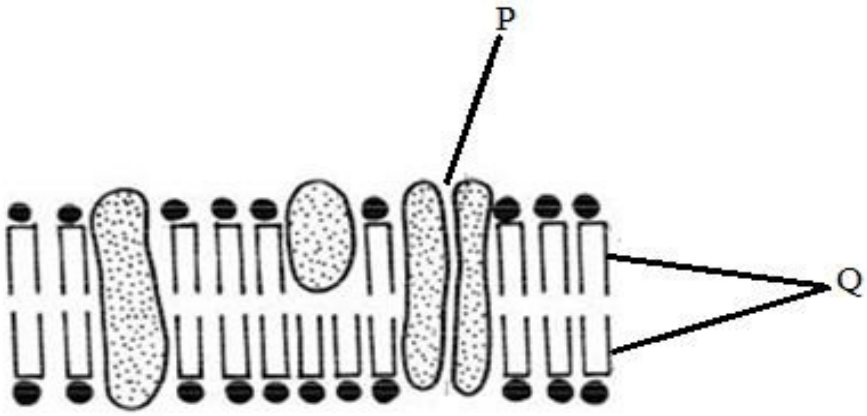
   b) Name the structures labelled X (1 mark)

   ……..

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

   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)

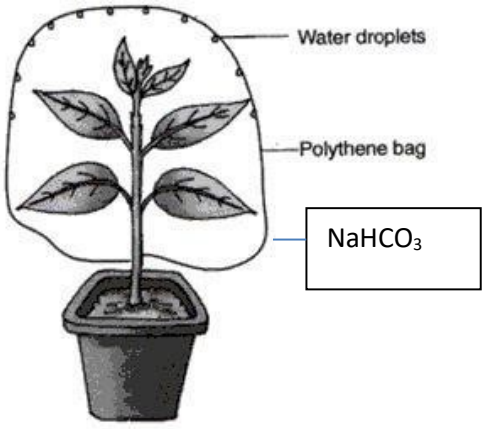
……
……
……

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

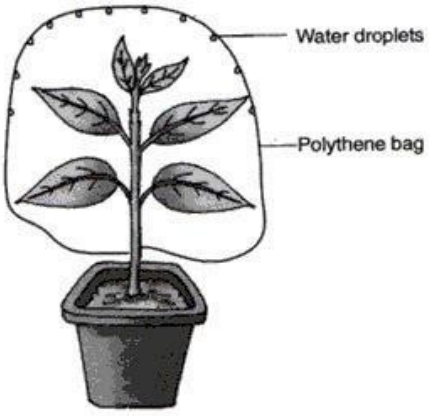
a) What is the aim of the experiment? (1mark)
……
b) Which specialised tissue was removed in the above experiment? (1mark)
……
c) How is the tissue named above adapted to perform its function? (1mark)
……
d) Predict in diagrammatic form the fate of the trunk after 3 weeks? (1 mark)

.....

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)

.....……

.....……

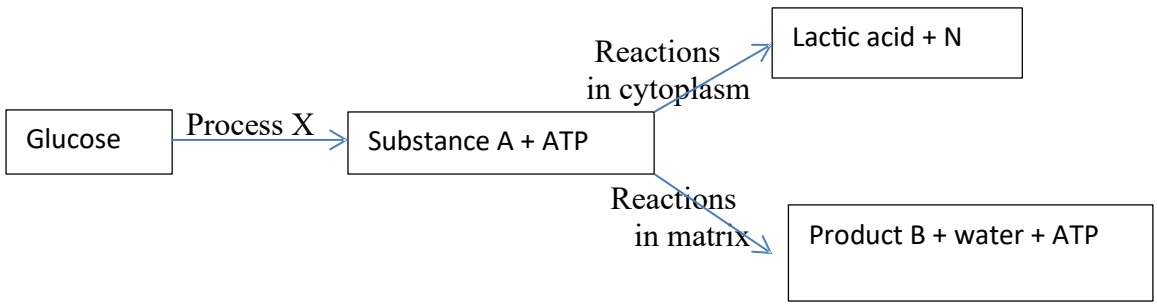
.....……

.....……

.....……

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)

.....

.....

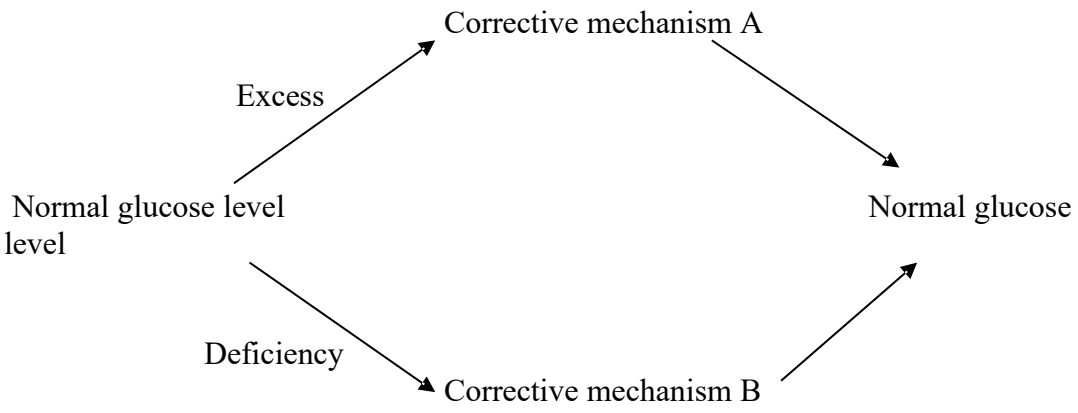
(b) Struggle for existence

.....

.....

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



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

……

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

……

(c) 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)

……

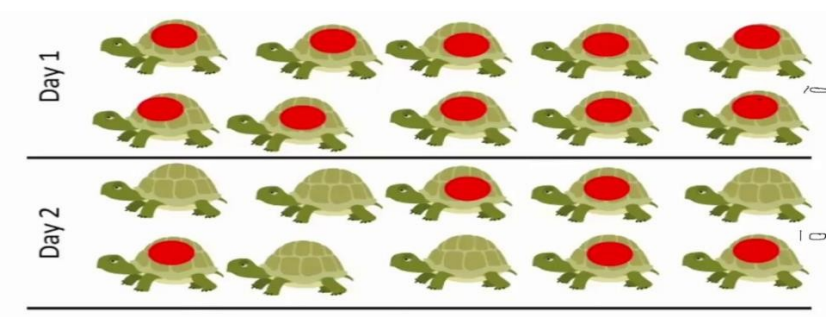
(b) Give **two** reasons for your answer in (a) above (2 marks)

……
……
……
……
……

(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 marks)

……
……
……
……
……
……
……
……

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

……
……
……
……
……
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……

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

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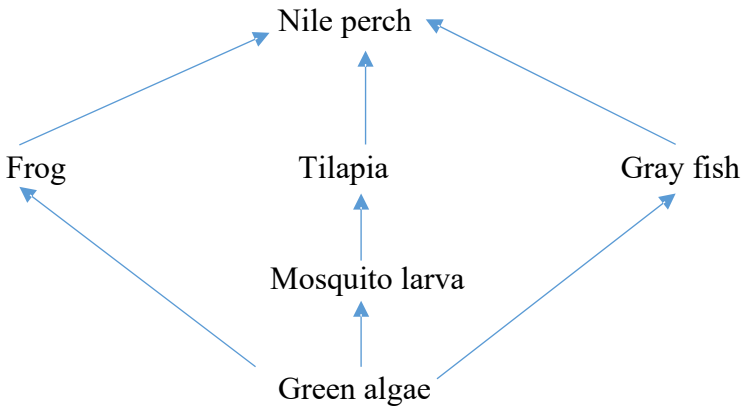
……
……
……

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)

……

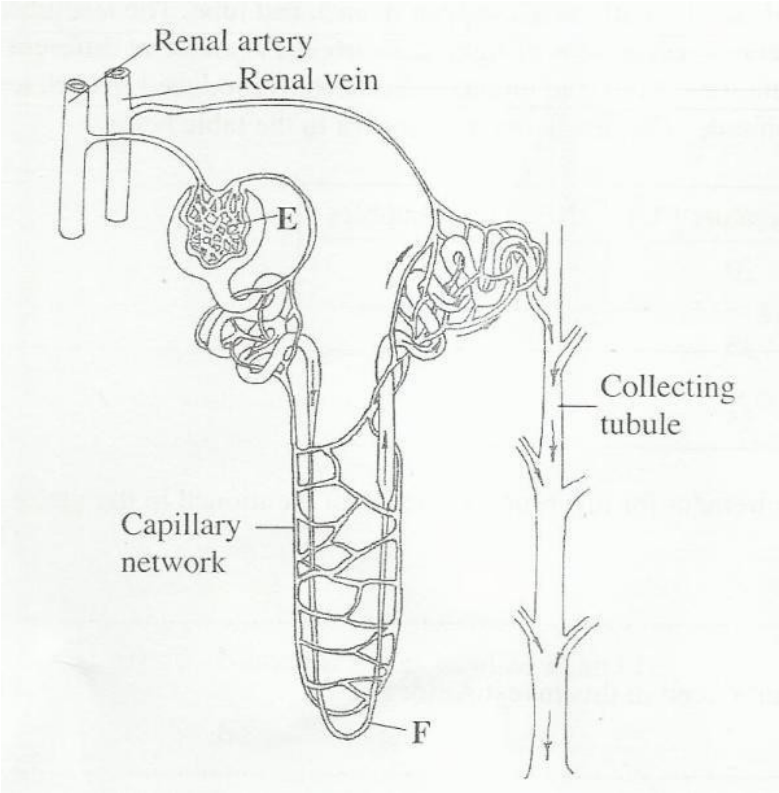
d) What will be the benefit of controlling malaria in the above ecosystem using biological control (2 marks)

PAPER 2

SECTION A (40 MARKS)

Answer all the questions in this section in the spaces provided:

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.

a) 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)

……

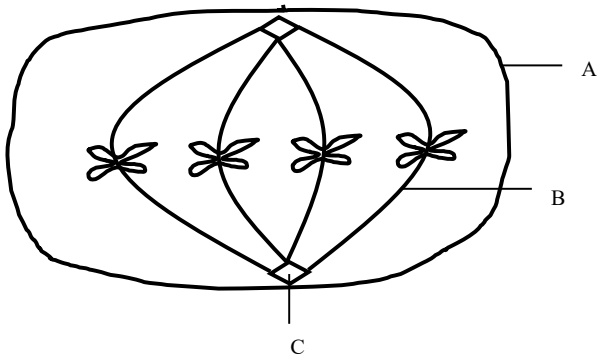
ii) Work out a cross between the man and woman (3marks)

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

……

c) 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.



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

.....

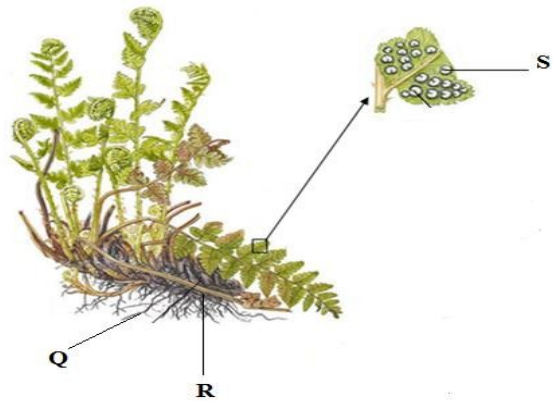
.....

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

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

(d) 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)

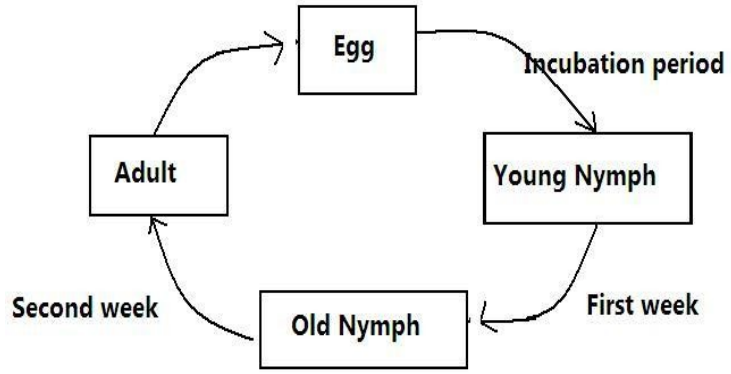
(c) Name the two body forms of the organism in its alternation of generation. (2 marks)

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

i) Vascular cambium (2marks)

ii) Cork Cambium (2marks)

b) The diagram below shows a life cycle of a cockroach



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

(i) First week (1mark)

.....

.....

(ii) Second week (1mark)

.....

.....

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

.....

.....

c) 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** in the spaces provided after question **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)

.....

.....

(iii) 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 marks)

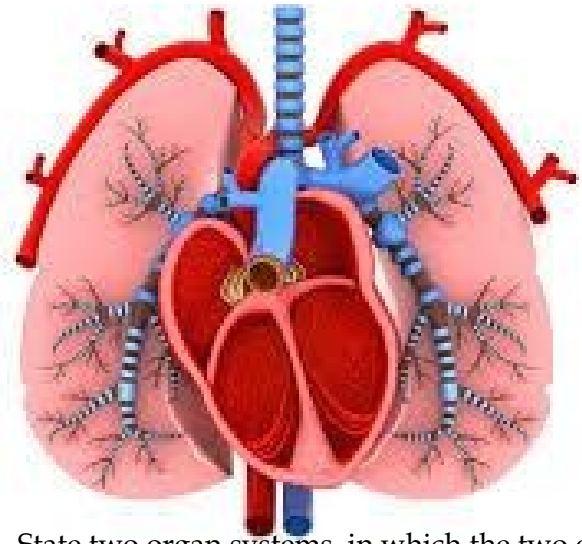
8. Describe the

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

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

PAPER 3

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



a) State two organ systems in which the two organs in the photograph above are found. (2mks)

b) Label on the photograph the following structures. (4mks)
(i) Bronchi
(ii) Left ventricle
(iii) septum
(iv) trachea

c) State one feature of the following structures identified in(b) above and give the importance of the features. (4mks)

structure	feature	Importance
Left ventricle		
Trachea		

d) Use an arrow to show the flow of carbon (iv) oxide molecule thorough the chambers of the heart towards the lungs. (1mk)

e) State one observable features of lungs in the photograph above that suits them to their function. (1mks)

2) You are provided with the following. Solution **P**, **Q** and **Z**.
(a) (i) Put 2 cm^3 of solution **P** into two test tubes labeled **A** and **B**. Add three drops of iodine solution into test tube **A**. Observe and record. **(1 mark)**

(ii) To test tube **B**, add an equal amount of Benedict's solution. Heat to boil. Record your observation. **(1 mark)**

(iii) From the results in (a) (i) and (ii), identify solution **P**. **(1 mark)**

(iv) Put 2cm^3 of solution **Z** into a clean test tube labeled **C**. Add equal volume of Benedict's solution. Heat to boil. Record your observation **(1 mark)**

(v) Open the visking tubing provided and tie one end tightly, Pour solution **P** into the visking tubing and add 1cm^3 of the solution **R**. Tie the other end of the visking tubing and ensure there is no leakage at both ends. Pour solution **Z** into a clean beaker till it is half full. Immerse visking tube in the solution **Z** in the beaker. Allow it to stand for 30 minutes. After 30 minutes, take 2cm^3 of solution **Z** from the beaker into a clean test tube labeled **D**. Add equal amount of Benedict's solution. Heat to boil. Record your observation. **(1 mark)**

(vi)Account for the observation made in (v) above. **(3 marks)**

(vii) What is the identity of solution **R?** **(1 mark)**

(viii) State **one** factor that can affect the process demonstrated in 2a **(v)** above **(1 mark)**

b) Use the reagents provided to test for the food substance in solution Q.

Food substance	procedure	observation	conclusion

(4mks)

3. The photograph below shows specimen L. You are also provided with other two specimens labeled **k** and **M**. Study them then answer questions that follow:
Photograph L.

a) Identify the specimens. (3mks)

K

L

M

b) State **two** adaptive characteristic features of the specimen **L**. **(2mks)**

c) State two observable differences between specimen L and M. **(2mks**

Bone L	Bone M

d) (i) Draw and label the anterior parts of specimen K. (3mks)

(ii)State ways by which specimen K is adapted to its functions. (2mks)

(iii) Name the bone that articulates with specimen K at the:

Proximal end (1mk)

Distal end (1mk)

KCSE REPLICA 7
PAPER 1

1. During a field trip, Moses a teacher in charge of careers in his school observed that Martha administered two panadols three times after every 8 hours to a friend who complained of stomach crumps while Michael administered first aid to lame sheep hurt by others in the field. State the careers the teacher would recommend to:
   a) Martha (1 mark)
   ……
   b) Michael (1 mark)
   ……..

2. (a)What's binomial nomenclature (2 marks)

   ……
   ……
   ……
   (b)Fungi that are parasitic to plants produce hyphae called haustoria which penetrate into the host's cells. Give **two** functions of the haustoria (2 marks)

   ……
   ……
   ……

3. The figure below is an electron micrograph of an organelle that is found in many cells.

   a) Name the organelle (1 mark)
   ……..

   b) What is the importance of the infoldings in the inner membrane (1 mark)
   ……
   ……..
   c) Give **one** example of cells where you would expect to find many such organelle (1 mark)
   ……

4. In an experiment, equal volumes of blood were incubated for one hour with different salt concentrations. After the incubation, the number of red blood cells in each set up was determined. The results are as shown below.

Set up	Final salt concentration	Number of red blood cells after incubation
A	0.9%	Normal
B	0.5%	Fewer than normal
C	0.3%	None

a) Account for the results in set up A and C (3 marks)

……
……
……
……
……
……

b) What observations would you expect to make with regard to the number and shape of the red blood cells if the experiment was repeated with a salt concentration of 1.4% (2 marks)

……
……
……

5. Addition of large amounts of salt to the soil in which plants are growing kills the plants. Explain (3 marks)

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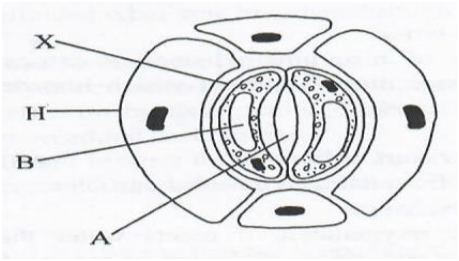
……
……
……

6. Examine the diagram below and answer the questions that follow. It's an important structure for gaseous exchange in plants.



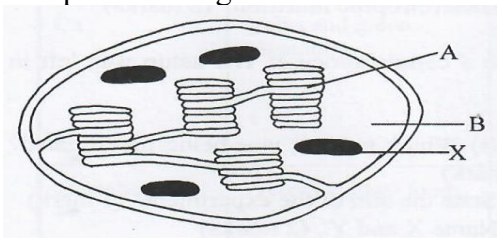
a) Identify the structure (1 mark)

……..

b) How is cell **X** adapted to perform its functions (2 marks)

……
……
……
……
……

7. The diagram below represents a plant cell organelle



a) Name the organelle (1 mark)

……

b) Name the substance stored in the granules marked X (1 mark)

……..

c) In which of the labeled parts does:

(i) Photolysis occur (1 mark)

……

(ii) Carbon (IV) Oxide fixation occur (1 mark)

……..

8. Explain the following:

a) Proteolytic enzymes in the gut digest proteins but don't digest the wall of the gut (1mark)

……
……
……

b) If you stand on your head, it is still possible to swallow food (2 marks)

……
……
……

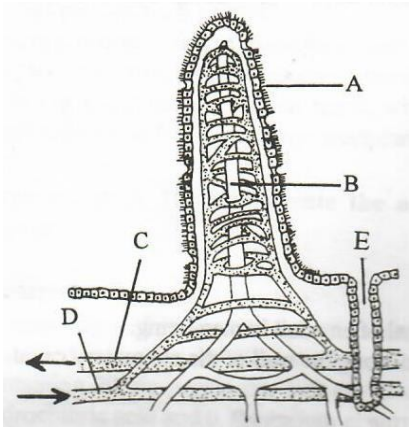
c) Liver damage leads to impaired digestion of fats (2 marks)

……
……
……

9. Distinguish between a co enzyme and a co factor (1 mark)

……
……
……
……

10. The figure below is a diagram of a section of the small intestine



a) Identify the section (1 mark)

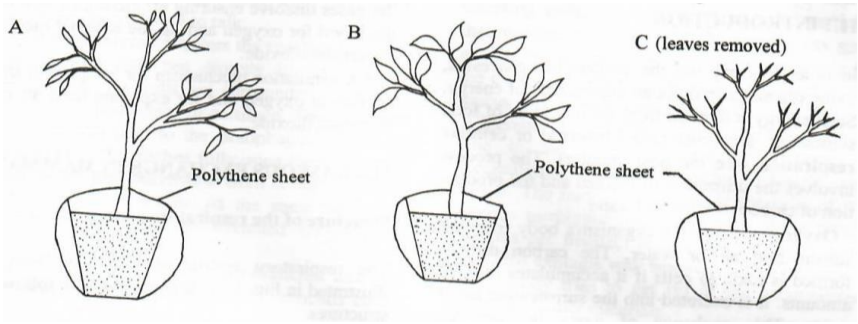
……..

b) (i)What's the importance of the intestinal section named in (a) above (1 mark)

……
……
(ii)Giving reasons, state whether this section comes from the duodenum or ileum
(2 marks)
……
……
……

11. Give reasons for the following:
    a) A surgeon normally wears a mask over his nose and mouth during an operation
    (2 marks)
    ……
    ……
    ……
    b) When one has a wound, it is advisable to clean it, apply antiseptics and dress it
    (3 marks)
    ……
    ……
    ……
    ……

12. The diagrams below illustrate an experimental set up to investigate a certain physiological process. Plant **A** is a xerophyte. Plants **B** and **C** belong to the same species and are mesophytes. All the three were weighed and then kept in open daylight for four hours and then weighed again.



    a) What physiological process is being investigated (1 mark)
    ……..
    b) Suggest the expected results at the end of the experiment (3 marks)
    ……
    ……
    ……
    c) Account for the results you have given in (b) above (3 marks)
    ……
    ……
    ……
    ……
    d) What is the role of the polythene bag (1 mark)
    ……
    ……

13. A female human being was found to have an extra sex chromosome in her cells.
    a) Give the total number of chromosomes in female individual's cells (1 mark)

……..

b) Explain the possible cause of this condition (2 marks)

……

……

……

c) State **two** physical characteristics observed in the female individual with such a condition (2 marks)

……

……

……

14. (i)Give **two** types of fossils (2 marks)

……

……

……

(ii)State **Three** methods of fossil formation (3 marks)

……

……

……

15. Outline the adjustments that occur to the heartbeat before, during and after a 100 metre race (4 marks)

……

……

……

……

16. Distinguish between agglutination and blood clotting (1 mark)

……

……

……

17. The following are text messages on a cell phone that represent gene mutation

	Intended message	Actual message
I	Buy me a skirt	Buy me a shirt
II	Auntie is staying	Auntie is straying

a) Identify the type of gene mutation represented in each case (2 marks)

I …….

II ……...

b) State two disadvantages of genetically modified plant products (2 marks)

……

……

……

……..

18. The wings of birds and those of insects are superficially similar but their internal structure is completely different.

a) Name the type of evolution that led to the similarity in the two types of wings (1 mark)

……..

b) Explain how the similarity in the wings of the two group organisms came about (2 marks)

……
……
……..

19. Name the type of tooth in carnivores mainly used for crushing bones and shearing meat off bones (1 mark)

……

20. In what ways do the following adaptations help a bony fish to swim?

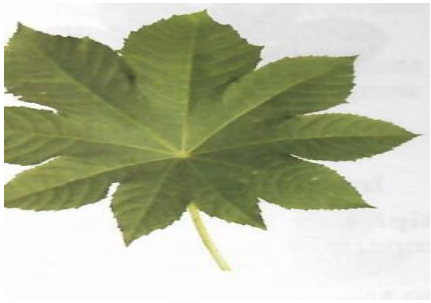
a) Swim bladder (1 mark)

……
……

b) Streamlined body (1 mark)

……
……..

21. The photograph below was obtained from a certain branch of a tree. Examine it.

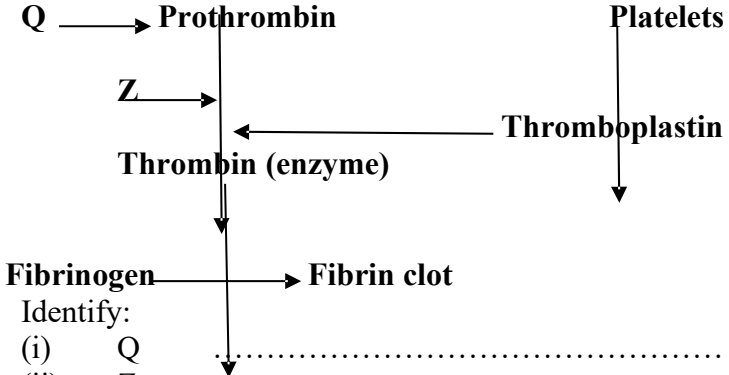


a) What type of leaf is it? (1 mark)

b) Give two reasons for your answer (2 marks)

……
……
……

22. The chart below illustrates how clotting of blood occurs in the human body.



a) Identify:

(i) Q …… (1 mark)

(ii) Z …… (1 mark)

b) How can the effects of excessive bleeding be reversed. Give **three** ways (3 marks)

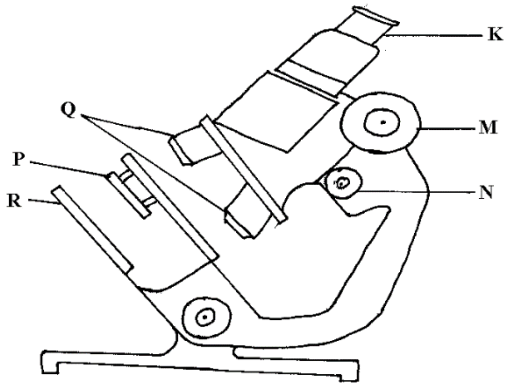
……
……
……
……**THIS IS THE LAST PRINTED PAGE!**

PAPER 2

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided.

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



(b) Name the parts labeled (2 marks)
K ……
M ……

(c) State the functions of (2 marks)
P ……
Q ……

(d) 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:-

(v) A sharper outline of the features. (1mark)
……

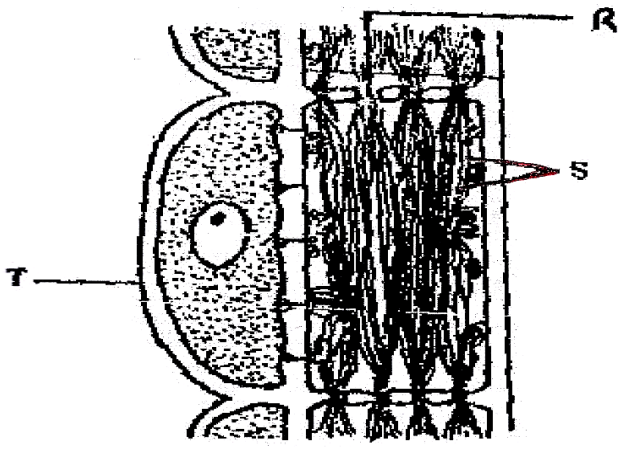
(vi) Give the formula used to calculate magnification in a light microscope. (1mark)
……

(e) 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. (1mark)
……
……

(ii) Staining the section. (1mark)
……
……

2. The diagram below represents part of phloem tissue.



a. Name the structures labeled R and S and the cell labeled T. (3 marks)

R: ……
S: ……

Cell labelled T: ……

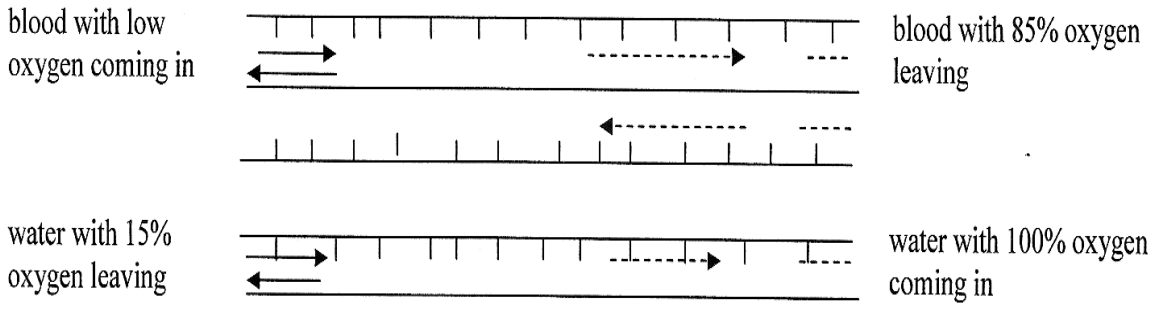
b. State the function of the structure labeled S (1 mark)
……

c. Explain why xylem is a mechanical tissue. (2 marks)
……
……
……

d. (i) State the effect of removal of the cell labeled T. (1 mark)
……
……

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

3. The diagram below shows how gaseous exchange occurs across the gills of a fish.



From the diagram above, water and blood flow in opposite direction.

i) Give the term used to describe this type of flow. (1mk)
……

ii) Explain the significance of this type of flow. (2mks)
……
……
……

a. Name **two** organs in human beings that display the flow system named in (a) (i) above.
b. (2 mks)
……
……
……

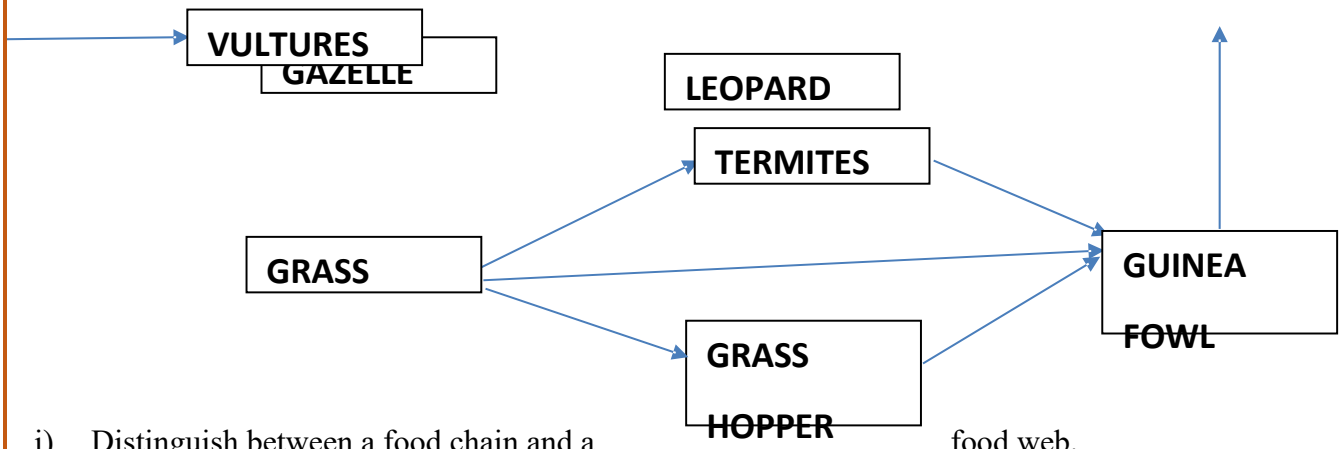
iii) Explain why the gills of a fish are:

a) Highly vascularized. (1mk)
……
……

b) Thin walled (1mk)
……
……

c) Moist (1mk)
……
……

4. The figure below represents a food web in a closed ecosystem.



i) Distinguish between a food chain and a food web. (2marks)

……
……
……

ii) Write a food chain in which the vultures are the secondary consumers. (1mark)

……
……

iii) What would be the effect of introduction of locusts into the ecosystem? (2marks)

……
……
……
……

iv) What would be the effect of removal of grass from the habitat? (1mark)

……
……
……

v) State the trophic level occupied by the leopards in the above food web. (1mark)

……
……
……

vi) State one importance of decomposers in an ecosystem. (1marks)

……
……
……

5. In certain breeds of mice, a pure breeding black mouse was crossed with a pure breeding white mouse. The off springs had a coat with white and black strands that appeared grey in color.

a) Using letter B to represent the gene for black coat color and W to represent the gene for white coat color. Work out the genotype of F2 generation. (4 marks)

b) What is the phenotypic ratio of F2 generation? (1 mark)

……
……
……

c) Give one example of a trait in human beings where genes behave in the same as described in (a) above (1 mark)

……
……
……

d) Klinefelter's syndrome is where a person has genotype XXY.

i) What is the sex of this person? (1 mark)

……
……
……

ii) What is the total number of chromosomes in such a person? (1 mark)

……
……

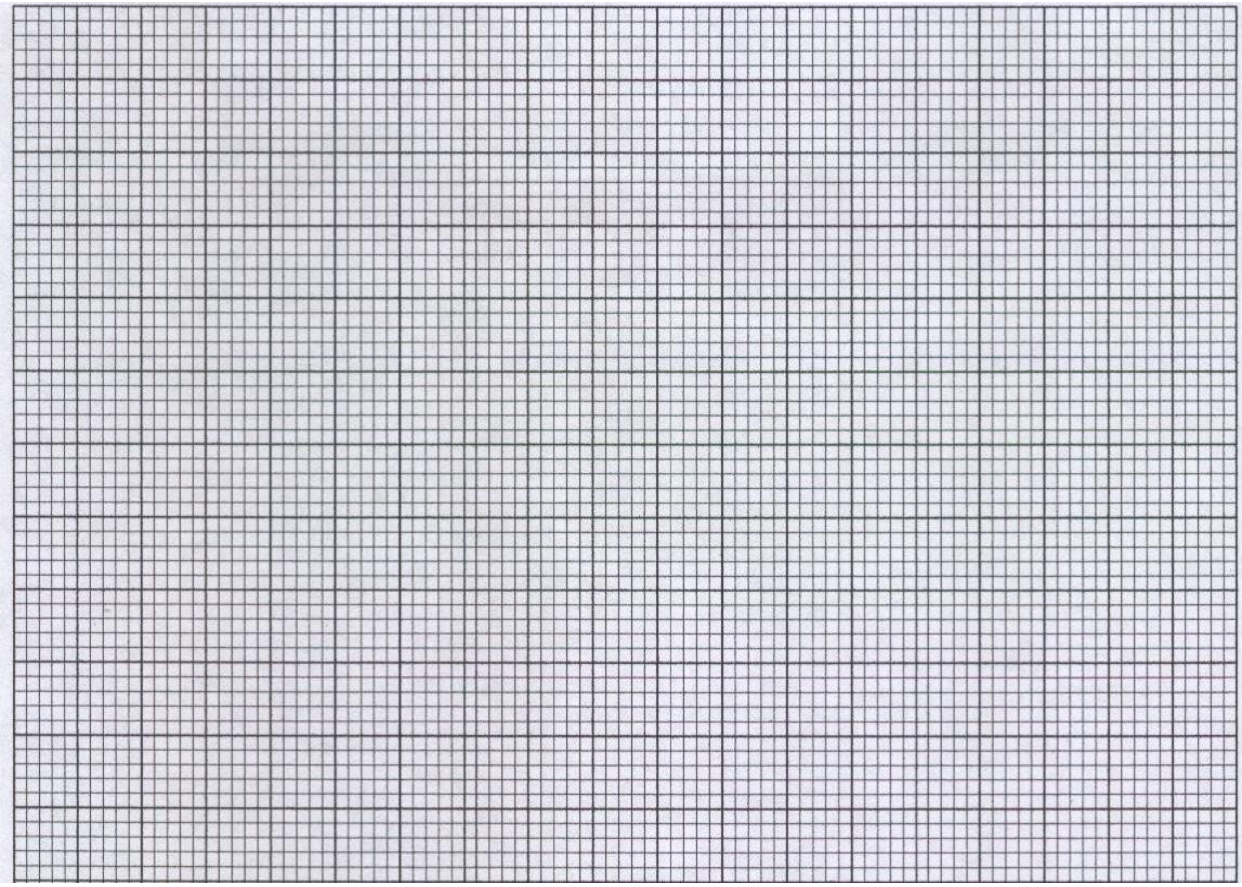
SECTION B: 40MARKS

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

6. An investigation was carried out to determine the concentration of various substances in a river following the discharge of untreated sewage into the river. The results are shown in the table below.

Distance downstream in kilometres	0.0	0.5	1	2	4	6	8	10	12	14	16
Concentration of oxygen (mg/L)	10.0	10.0	8.8	5.8	5.0	4.0	5.0	6.0	8.2	9.4	10.0
Concentration of organic matter (mg/L)	10.0	10.0	16.0	15.2	14.2	13.4	12.6	12.4	11.6	10.0	10.0
Concentration of nitrates (mg/L)	10.0	10.0	10.6	12.2	14.2	15.0	15.2	14.6	12.6	11.4	10.0

a) Using the same axes, draw graphs of concentration of named substances in water against kilometers. (7marks)



b) Identify the point of sewerage discharge. (1mark)

……

……

c) Account for the changes in the concentration of;

i) Organic matter. (2marks)

……

……

……

……

……

ii) Dissolved oxygen (2marks)

……

……

……

……

iii) Nitrates (2marks)

……

d) Explain how heavy metals in industrial effluents may accumulate in bodies of humans to toxic levels. (2marks)

……

……

e) State four human activities that affect population of animals in game parks. (4marks)

7. (a) State the functions of the mammalian skin. (4mks)
   (b) Describe how the human skin is adapted to its functions (16mks)
8. Describe how fruits and seeds are suited to their modes of dispersal (20mks)

PAPER 3

1. You are provided with the following;
   i) Hydrogen peroxide
   ii) Specimen K
   iii) Pestle and mortar
   iv) 4 test tubes
   v) A scalpel
   vi) Source of heat
   vii) Test tube holder

   Using a scalpel, obtain three peeled cubes from specimen K measuring about 1cm x 1cm x 1cm. For the first cube, you are required to boil it in water for five minutes. For the second cube, you are required to crush it into a paste. For the last cube, you are required to use it as it is.

   Label three test tubes A, B and C and put 2ml of hydrogen peroxide in each test tube. To test tube A, add the boiled cube and record your observation.
   To test tube B. add the crushed paste and record your observation.
   To test tube C, add the unboiled cube remaining and record your observation.

   a) Complete the table below (3mks)

Test tube	Observation
A	
B	
C	

   b) Explain your observation in test tube A (1mk)
   ……
   ……
   ……

   c) Between test tubes B and C, in which test tube was the volume of foam produced the highest? Explain (3mks)
   ……
   ……
   ……
   ……
   ……
   ……

   d) Apart from temperature, state four other factors that affect the rate of enzyme controlled reactions (4mks)
   ……
   ……
   ……
   ……

   e) State any 4 properties of enzymes (4mks)
   ……
   ……

……..
……

2. You are provided with solution labeled **J**, use the reagents provided to test for the food Substances.

(a) Use the iodine solution to test for the food substance in solution **J**.

Food substance (1 mark)
……
Procedure (1 mark)
……
……
……
……

Observation (1 mark)
……
……

Conclusion (1 mark)
……
……
……
……

(b) Use Benedict's solution to test for the presence of the food substance in solution **J**.

Food substance (1 mark)
……
Procedure (1mark)
……
……
……

Observation (1mark)
……
……
……

Conclusion (1 mark)
……
……
……

(c) Use DCPIP solution provided to test for the presence of the food substance in solution **J**

Food substance (1 mark)
……
Procedure (1 mark)
……
……

Observation (1mark)
……
……
……
……

Conclusion (1mark)

……
……
……
……

(d) When testing for non-reducing sugars explain the role of the following substances.

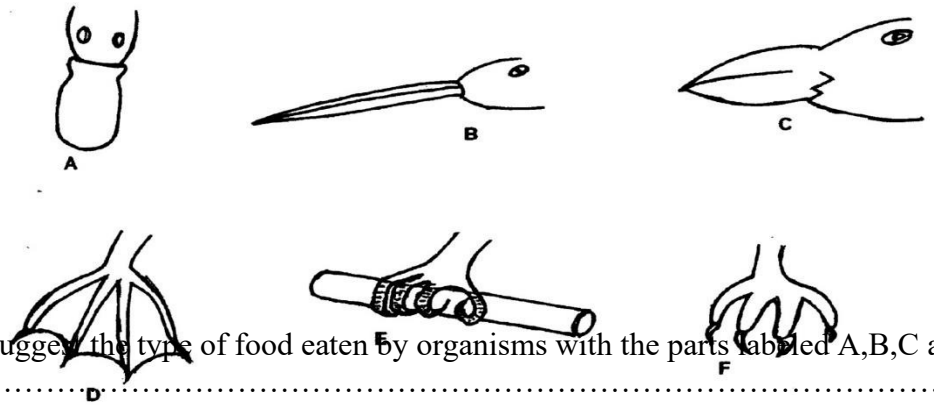
(i) Dilute hydrochloric acid. (1mark)

……
……
……

(ii) Sodium hydrogen carbonate (1mark)

……
……
……

3. The diagrams below represent body parts of some organisms (animals). Study them and answer the question that follows.



(a) i) Suggest the type of food eaten by organisms with the parts labeled A,B,C and F (4mrks)

……
……
……
……
……
……

ii) With reasons, suggest the likely habitat of the organism from which the parts labeled D and E were obtained. (4mrks)

……
……
……
……

(b) (i) Suggest the type of evolution that is exemplified by the organisms labeled D, E and F. Give reason for your answer. (2mks)

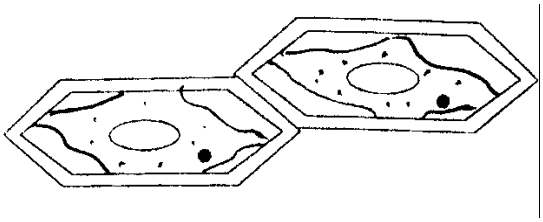
……
……
……
……

(ii) Suggest the significance of the above named type of evolution for the organism (2mks)

……
……
……
……

KCSE REPLICA 8
PAPER 1

1. Study the diagram below showing a portion of an onion epidermis that had been irrigated with a certain solution X.



a) In <u>one</u> word describe the condition of the cells (1mk)

---

b) Describe the process that lead to the condition named above. (3mks)

---

2. The following reaction may proceed in forward or backward direction

Glucose + fructose ⇌ sucrose + water.

a) What term is used to refer to the backward reaction. (1mk)

---

b) In which part of alimentary canal does the backward reaction occur? (1mk)

---

c) Name the enzyme that catalyzes the backward reaction. (1mk)

---

3. A certain metabolic pathway takes the following sequence.

J → K → L → M → N

At the start of the experiment an inhibitor was added to the reactants. After the experiment it was found out that there was the same concentration of J, more than normal concentration of K, near absence of L, M and N. When L was added to the inhibitor set M and N were detected.

a) At what stage of the reaction sequence did the inhibitor have its effect? (1mk)

---

b) Explain how the inhibitor affected the reaction. (1mk)

---

c) What is the identity of substance L? (1mk)

---

4. After fertilization of an ovule, which parts develops into: -

a) Testa (1mks)

---

b) Endosperm (1mk)

5a) Explain two roles of diffusion in human beings. (4mks)

---

bi) Name the process through which a plant takes up some mineral ions against a concentration gradient. (1mk)

---

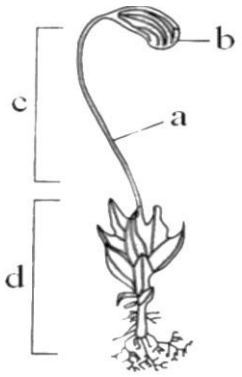
ii) State two factors that may affect the process named in b(i) above. (2mks)

---

c) Distinguish between haemolysis and plasmolysis. (1mk)

6.An insect landed on a leaf of an insectivorous plant. Consequently, the leaf closed with its spines interlocking trapping the insect inside it. Name the response exhibited by the leaf. (1mk)

7.The figure below represents a plant.



a) State the division it belongs to. (1mk)

---

b) Label the parts labeled (2mk)

a. ---

b. ---

c) State the role of part labeled **d** in the life cycle of the organism. (1mk)

---

8. State any two adaptations of the cardiac muscle that enable it to undergo systole. (2mks)

i) ----------

----------ii) ----------

---------- ----------

9.A respiratory substrate has the formula $C_{57}H_{110}O_6$.

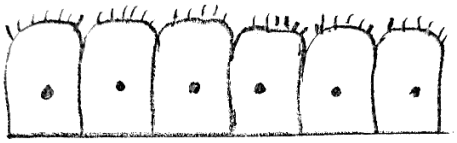
a) Write a balanced equation to represent its complete oxidation to carbon dioxide and water. (1mk)

b) Why are carbohydrates and not lipids the first choice respiratory substrates? (2mks)

---

c) Calculate the RQ from the equation in (a) above. (2mks)

10. Below is a diagram of a group of cells of a specific tissue.



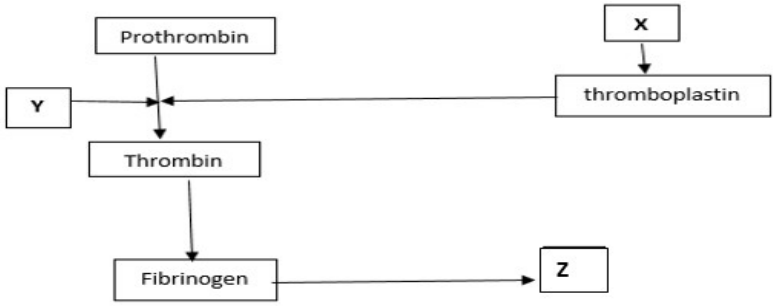
i) Name the tissue (1mk)

---

ii) This tissue lines the trachea and bronchi. Suggest its function in these structures. (1mk)

---

11. Study the flow chart below which represents a physiological process in mammals



ai) Name blood components represented by **X.** (1mk)

---

ii) What is the significance of product represented by **Z**. (2mks)

---

b) Under what condition is thrombokinase released by the platelets? (1mk)

---

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

---

b) Which portions of the human nephron are only found in the cortex? (1mks)

13.A potted plant is transferred from outside on a sunny and windy day, to a dark room.

a) Briefly explain the effect this is likely to have on:

i)The rate of loss of water from its leaves. (3mks)

---

ii)The rate of water absorption. (2mks)

14.Give a reason why urine of a mammal does not contain amino acids. (1mks)

15.a) In what form is energy stored in muscles? (1mk)

---

b) State the role of insulin in human body. (3mks)

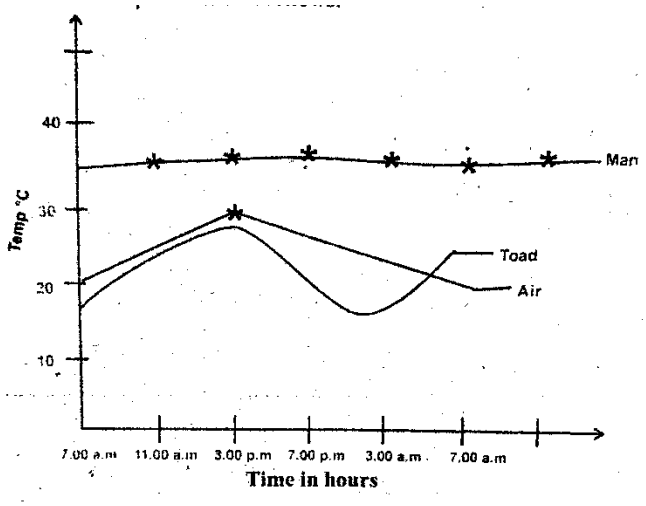
16.Name the processes that take place in the liver to bring about differences between blood in the Hepatic portal vein and that in the hepatic vein. (3mks)

i) ---

ii) ---

iii) ---

17. The graph below shows how the body temperature of a toad and man varies with time in hours. Study it and answer the questions that follow.



a) What is the relationship between the body temperature of the toad and that of the atmospheric air? (1mk)

---

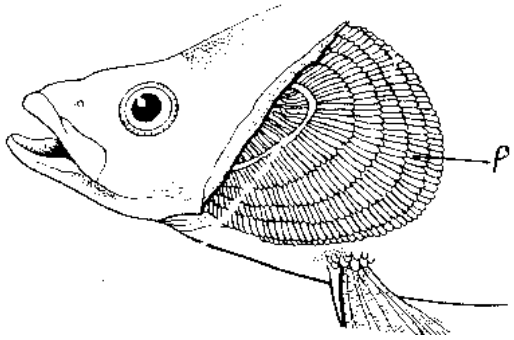
b) State two corrective measures that maintains man's body temperature at norm even when the environmental temperature is below 30^0C. (2mks)

---

c) Give one behavioral adaptation observed in a lizard when the environmental temperature is above 39^0C. (1mk)

---

18. The figure below shows the exposed breathing apparatus of a fish.



a) Name the structure that was removed to expose the apparatus. (1mk)

---

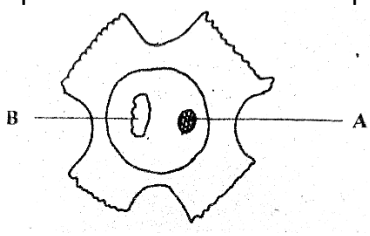
b i) Name structure P. (1mk)

---

ii) State two structural adaptations of the respiratory surface in insects. (2mks)

---

19. The following is a reproductive structure of a plant.



a) Identify the structure. (1mk)

---

b) Name the sub-division of the plants that produces the above reproductive structure. (1mk)

---

ci) Name structure B. (1mk)

---

ii) What is the function of structure A? (1mk)

20.Nucleic acids are made up of nucleotides that bears a sugar component.

a) Name the sugar component found in: - (2mks)

i) DNA fragment ----------

ii) RNA fragment ----------

b) The following nucleotide sequence was found in a segment of DNA: - **A G C C T.**

Write down the complementary base sequence in the corresponding m RNA segment during transcription. (1mk)

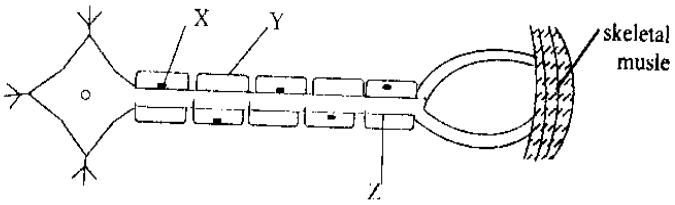
---

c) A point mutation altered the base sequence from the original to **G G C C T**.

Identify the type of gene mutation. (1mk)

---

21. Below is a drawing of a cell.



a) With two reasons, identify the cell. (3mks)

Identify. ----------

Reasons:

i) ----------

---

ii) ----------

---

b) Which of the three structure X, Y and Z speeds up transmission of the impulse. (1mk)

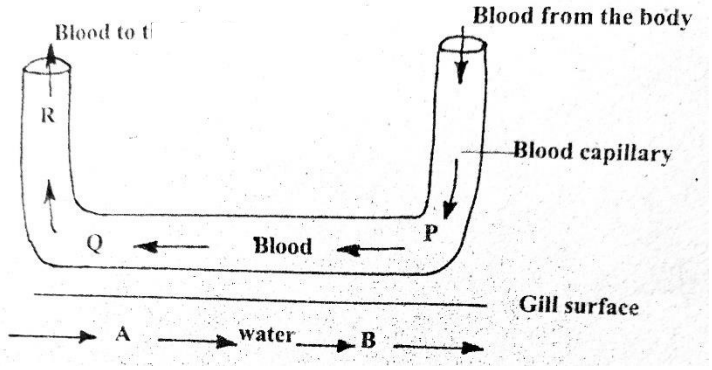
22.a) State two structural differences between skeletal muscles and smooth muscles. (4mks)

Skeletal muscle	Smooth muscle
(i)	
(ii)	

b) What are antagonistic muscles? (1mk)

PAPER 2

1.The diagram below represents the direction of flow of blood in a gill capillary. The percentage of oxygen in solution at position A, B, P, Q and R is given in the table below.



Position	Oxygen concentration in solution (%)	Haemoglobin saturation with oxygen (%)
A	10	
B	7	
P	4	55
Q	7	85

a) Why is the oxygen percentage low at P? (1mk)

---

b) Using evidence from the data given, suggest what will happen to oxygen in the water at point B. (3mks)

---

c) Name the organ into which blood coming from the capillary at Q flows. (1mk)

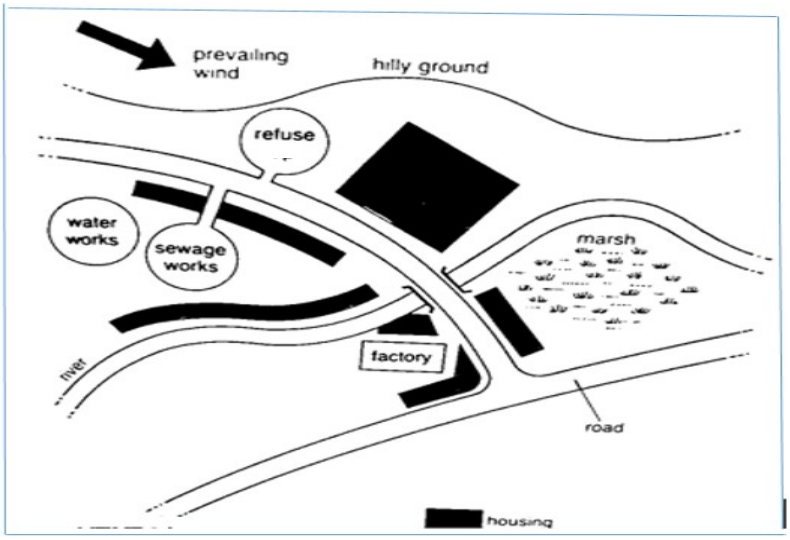
---

d) Suppose the flow of blood in the capillary illustrated above was in the opposite direction, explain the disadvantage it would have to the fish. (2mks)

---

e) Name the principle where the blood flows in the opposite direction to another fluid. (1mk)

2.Below is a diagram of a poorly planned town showing some building and facilities.



a) Giving evidence from the diagram, state two likely sources of water pollution. (2mks)

---

b) State three ways that the positioning of the refuse pit and sewage works pose danger to the residence of the town. (3mks)

i) ---

---

ii) ---

---

iii) ---

---

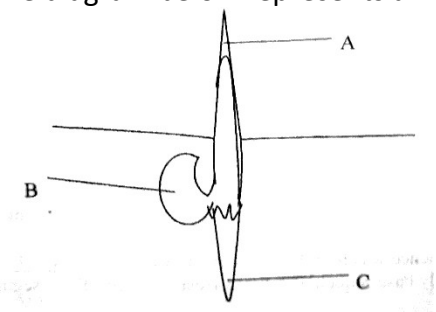
c) Residents living close to the marsh are likely to suffer from malaria. Explain. (1mk)

---

d) Suggest two control measures to overcome water pollution in the area. (2mks)

---

3. The diagram below represents a maize seedling.



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

A ---

C ---

b) State the functions of parts labeled A, B and C. (3mks)

A ----------

B ----------

C----------
---

c) Name the type of germination exhibited by maize (1mk)

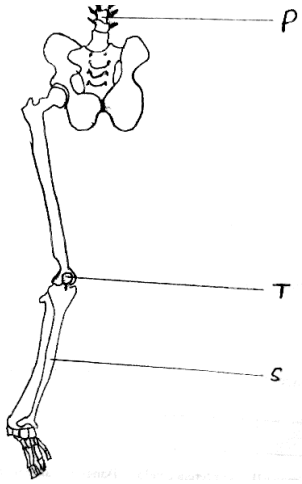
---

d) Name two conditions necessary for seed germination other than water and oxygen. (1mk)

---

e) What is the role of oxygen in seed germination? (1mk)

4.The figure below shows part of a human skeleton.



a) Which part of the human skeleton is it? (1mk)

---

b) On the diagram label by name three types of joints. (3mks)

c) Label the S, T and P. (3mks)

S ----------

T ----------

P ----------

d) Which two bones on the diagram manufactures red blood cells? (1mk)

---

5. In maize the gene for purple colour is dominant to the gene for white colour.
A pure breeding maize plant with purple grains was crossed with a heterozygous plant.
a) Using letter G to represent the gene for purple colour, work out the genotypes of the offspring.
(4mks)

b) State the phenotype of the offspring. (1mk)

---

c) What is genetic engineering? (1mk)

---d) Gene for smooth seed coat is dominant over gene for wrinkled seed coat.
Two heterozygous pea plants with smooth seed coats were crossed and produced a total of 14640 seeds. How many seeds had wrinkled seed coat? Show your calculations. (2mks)

---

6. The diagram below is obtained from measurements of growth in the leaf petiole of a certain plant. The relative growth rate is calculated and the data is obtained as shown below.

Time in days	0	1	2	3	4	5	6	7	8	9
Relative growth rate(cm/day)	0	0.1	0.3	0.8	2.0	4.0	4.5	3.5	0.2	0

a) Plot a graph of relative growth rate against time. (5mks)

b) State two functions of a leaf petiole. (2mks)

---

c) State two characteristics of cells found in the region of cell division. (2mks)

---

d) Account for the shape of the curve between the following days (3mks)

i) 2 – 5.

---

ii) 6 – 8 (3mks)

---

iii)6 – 8 (3mks)

---

d) Distinguish between primary growth and secondary growth in a flowering plant. (2mks)

---

7. How are flowers adapted to wind and insect pollination? (20mks)

8a) Name factors that affects the enzyme controlled reactions. (6mks)

b) Explain the factors that affect the rate of enzyme activity. (14mks)

PAPER 3

1. You are provided with specimen P and Q. Examine them carefully and answer the questions that follow.

(a). State three observable differences between P and Q. (3mks)

Specimen P	Specimen Q

(b) Identify the parts of the flower from which specimen **P** and **Q** developed. (2mks)

P ----------

Q ----------

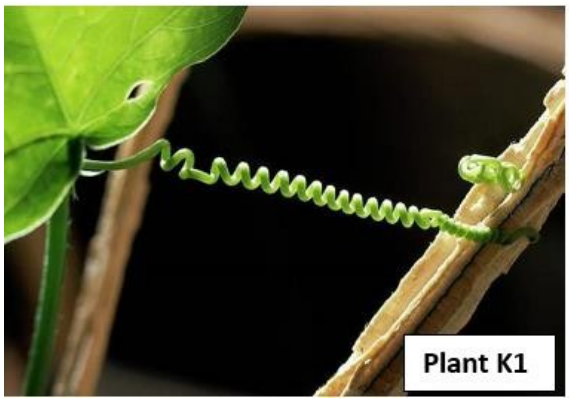
(c i). Make a longitudinal section of specimen P. Draw a well-labelled diagram of one half with all its Contents intact. (4mks)

(ii). State the functions of any two structures in (c) (i) above. (2mks)

(d). Using a mortar and pestle crush specimen Q, add 5ml distilled water to make a **solution Q** and carry out appropriate tests using the reagents provided. (6mks)

Test	Procedure	Observation	Conclusion

2. Study the photos below.



a) Name:-

i) The stimulus operating in **Plant K1.** (1mk)

---

ii) The type of response being investigated in **Plant K2.** (1mk)

---

iii) Suggest a control set up for **Plant K2** investigation. (1mk)

---

b) Describe the role of auxins in the response exhibited by **Plant K1.** (4mks)

---

c) What is the biological value of the tropisms evident in: -

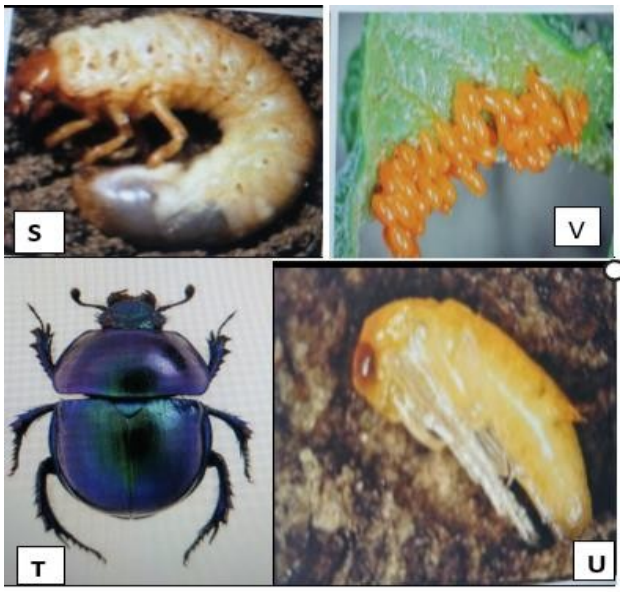
i) **Plant K1** (1mk)

---

ii) **Plant K2** (1mk)

---

3. Below are photos of of a certain arthropod at different stages of its life cycle.



a) Identify the stage of the life cycle represented by organism **S**. (1mk)

---

b i) Name the stage that immediately preceed and succeed organism S in the life cycle. (2mks)
Preceeding stage

Succeeding stage.

---

ii) What name is given to the complete life cycle of the arthropod? (1mk)

---

c) Name the gaseous exchange system of orgaism **S**. Give a visible featuret that supports your answer. (2mks)

---

d i) What type of food does organisms **S** feed on? Give a reason to support your answer. (2mks)

---

ii) State the significance of stage **U** in the life cycle of the beetle. (2mks)

---

iii)How is specimen T adapted to locomotion in its habitat ? (2mks)

---

e) State the role of the following in the life cycle of the arthropods. (2mks)
i) Juvinile hormone.

---

ii) Moulting stimulating hormone.

KCSE REPLICA 9
PAPER 1

1. (a) Define the following terms as used in Biology.
   (i) Chemosynthesis (1 mark)
   ……
   ……
   ……..
   (ii) Mutualism (1 mark)
   ……
   ……
   ……..
   (b) State the importance of photosynthesis in nature. (2 marks)
   ……..
   ……
   ……..
2. What is the importance of the stroma in the chloroplast? (2 marks)
   ……..
   ……
   ……
3. Name **two** cell structures that synthesize the following cell organelles.
   (a) Ribosomes (1 mark)
   ……..
   (b) Lysosomes (1 mark)
   ……..
4. Name **three** plant leaf excretory products. (3 marks)

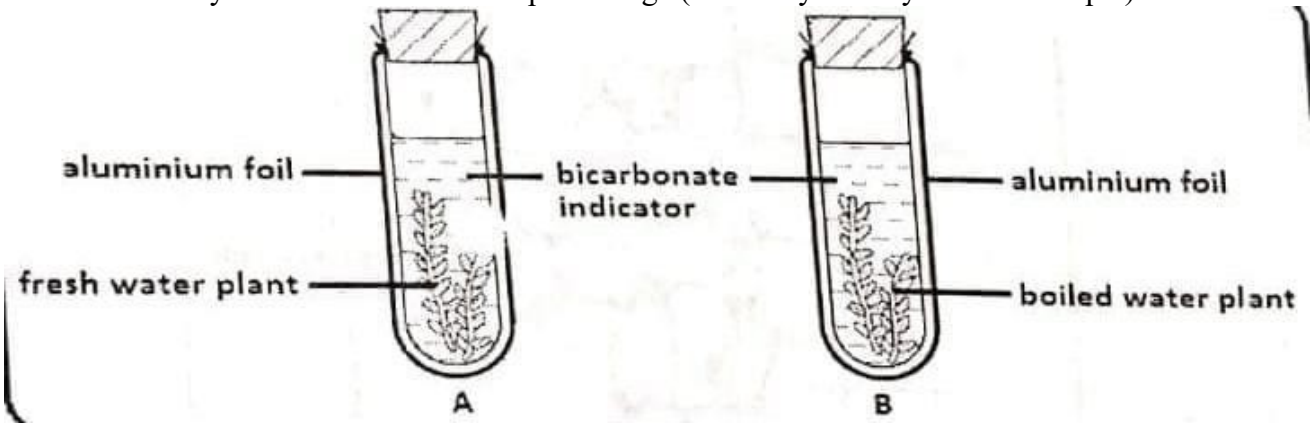
   ……..
   ……
   ……
5. A student mixed a sample of urine from a patient with Benedict's solution and boiled the mixture. The colour changed to orange.
   (a) What was present in the urine sample? (1 mark)
   ……..

   (b) What did the student conclude about the health status of the patient? (2 marks)
   ……..
   ……
   ……..
   (c) Which organ in the patient may not be functioning properly? (1 mark)
   ……..
6. Name **two** types of values in the heart. (2 marks)
   ……..
   ……
   ……
7. Sometimes when one stands up very quickly after a long period of sitting, she may feel faint or dizzy. Explain. (2 marks)
   ……..
   ……
   ……
8. The cardiac muscles are said to be myogenic. What is the meaning of the term myogenic.

(1 mark)

……..
……
……

9. A Form 3 student carried out an experimental set up as shown below.
Bromothymol blue is sensitive to pH change (bromothymol is yellow in low pH)



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

(b) Why was set up B included in this experiment? (1 mark)
……..
……

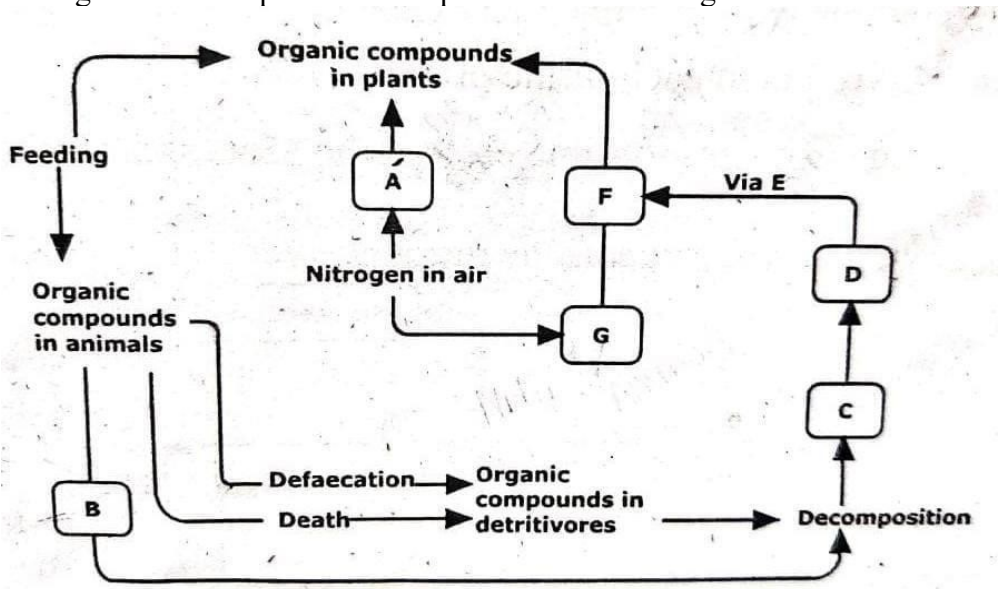
(c) Why was aluminium foil used in this experiment? (1 mark)
……..
……

(d) Explain why bromothymol changed its colour from blue to yellow in tube A after 30 minutes. (1 mark)
……..
……

10. Differentiate between the cell wall found in fungi and the one in plants. (2 marks)
……..
……
……

11. State **three** adaptations that enable prey to evade predators. (3 marks)
……..
……
……
……

12. The diagram below represents a simplified trend of nitrogen circulation in an ecosystem.



(a) What is the descriptive term applied to each of the organisms **A** and **D**.

A ……..

D ……..

(b) Name each of the processes. (3 marks)

(i) Marked **B** ……

(ii) Facilitated by organisms **D** ……..

(iii) One group of organisms that can act as saprophytes

……

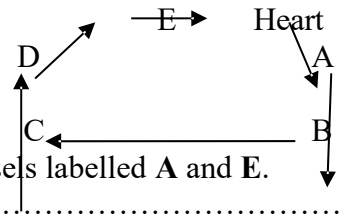
(c) Name the chemicals **C, F** and **E**.

C ……

F ……..

E ……

13. The diagram below is a summary of the sequence of blood flow through the heart and associated blood vessels.



(a) Name the blood vessels labelled **A** and **E**. (2 marks)

A ……

E ……

(b) State **two** differences between blood vessel **B** and **D**. (2 marks)

……..

……

……..

……

(c) State **two** adaptations of the blood vessel labeled **C** to its functions. (2 marks)

……..

……
……..

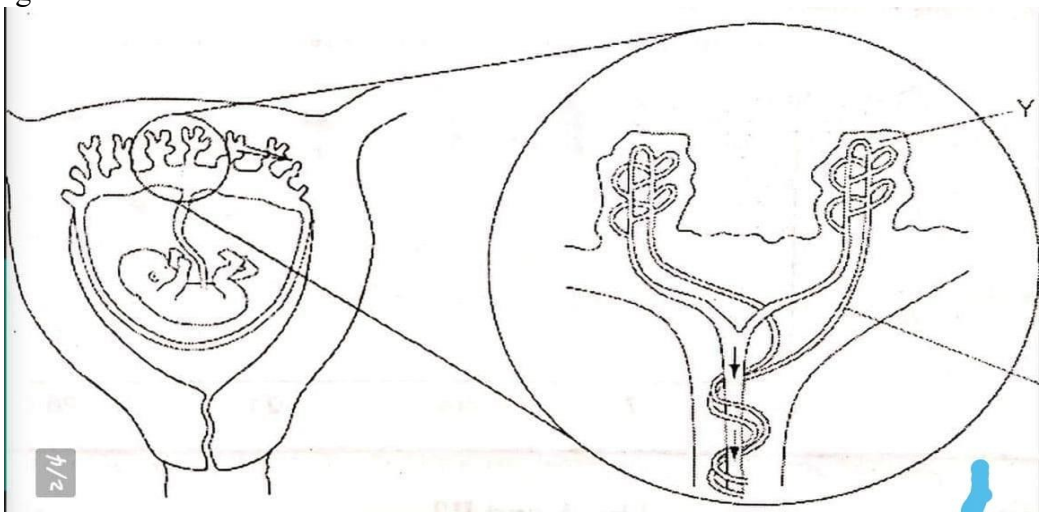
14. How does light as a biotic factor influence the distribution of plants in an ecosystem? (3 marks)

……...
……
……

15. Seed germination is affected by certain plant growth regulators.
Describe **two** actions of gibberellins during seed germination. (2 marks)

……..
……..
……..

16. The diagram below shows a foetus in the uterus.



(a) Name **two** substances that will be at a higher concentration at Y that at X. (2 marks)

……..
……
……..

(b) State **two** observable adaptations of the placenta to its functions. (2 marks)

……..
……
……..

17. (a) Name the genetic disorder in humans that is characterized by inability of blood to clot. (1 mark)

……..
……

(b) A female human was found to have an extra sex chromosome in her cells.

(i) Give the total number of chromosomes in the male individual's cells. (1 mark)

……..
……...

(ii) Explain the possible causes of this condition. (2 marks)

……..
……
……..

(iii) State **two** physical characteristics observed in the female individual with such a condition. (2 marks)

……..
……
……..

18. (a) Explain why fossil records as evidence of organic evolution are usually incomplete. (3 marks)

……..
……
……..
……..

(b) Name the evidence of organic evolution exhibited by occurrence of similar amino acid molecules in a range of organisms. (1 mark)

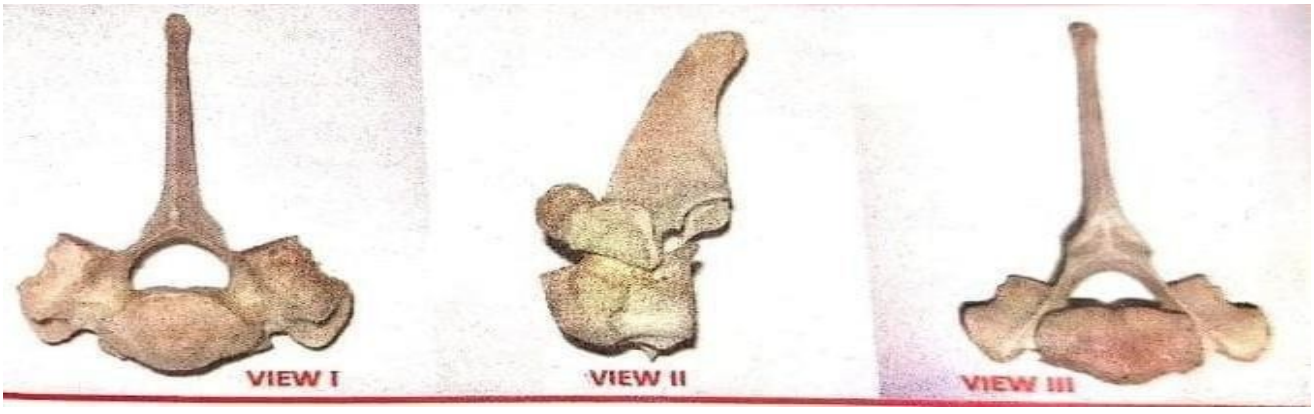
……..
……
……..

19. Bumble bees are insects that live in the arctic tundra. They have adaptations to keep their body temperature above that of the environment. One adaptation is shivering which involves rapid muscle contraction. A second adaptation is a very hairy body.

Explain how those adaptations help to keep the body temperature above that of the environment. (3 marks)

……
……..
……..
……..
……

20. The photograph below shows a bone from an animal.



(a) (i) Identify the bone shown. (1 mark)

……..
……

(ii) Give **one** reason for your answer. (1 mark)

……..
……

(b) Name the body region from which the bone was obtained. (1 mark)

……..

……

……..

(c) State **three** adaptations of the bone in the photograph to its functions. (3 marks)

……..

……

……..

21. The photograph below shows a potted plant in horizontal position.

(a) Name the type of response shown. (1 mark)

……..

……

(b) State the biological significance of the response above to the plant. (1 mark)

……..

……

……..

(c) Explain the mechanisms of the response. (4 marks)

……..

……

……..

……

……..

(d) (i) State the class to which the plant belongs. (1 mark)

……..

……

(ii) Give **one** reason for your answer. (1 mark)

……..

……

PAPER 2

SECTION A

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).

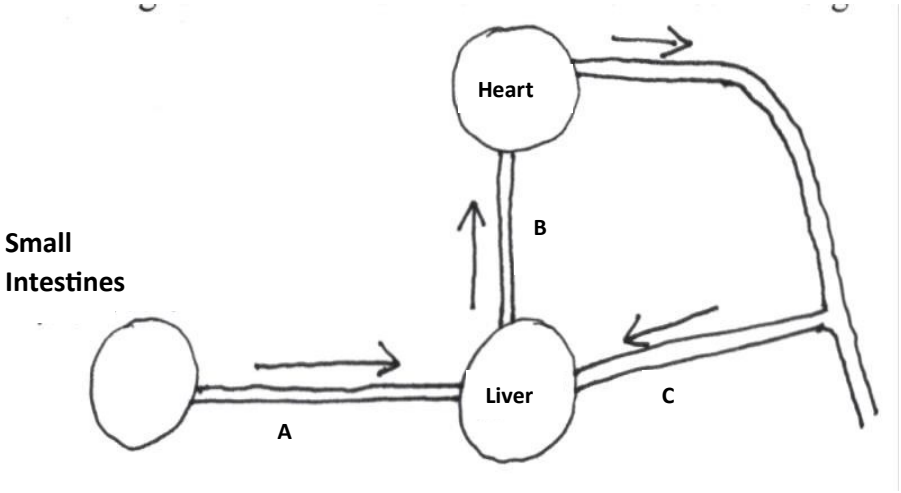
b. Use information from the table to predict the concentration of a sucrose solution isotonic to the cells in the tulip stem. (1mk).

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. The diagram below illustrates circulation in certain organs of the mammalian body.



a) Identify the blood vessels represented by A, B and C. (3mks)

A……

B……

C……

b) Explain why blood from the small intestines goes to the liver before it goes to any other organ of the body. (2mks)

……

……

……

……

c) Compare the blood in vessels B and C. (1mk)

……

……

d) Outline how a glucose molecule in vessel A finally reaches the heart. (2mks)

……

……

……

……

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.

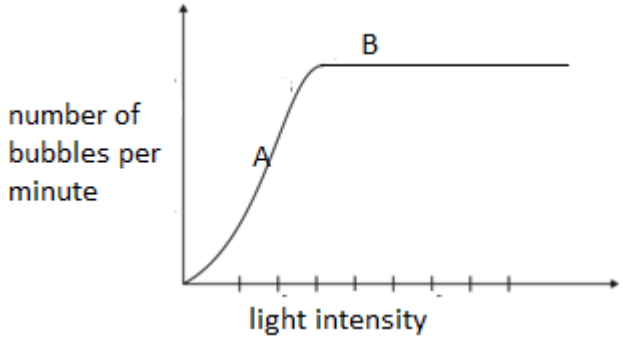
(2mks)

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)

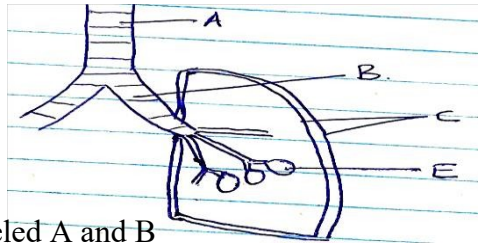
d). Explain the role of the following in photosynthesis.

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 in the spaces provided after questions 8

6. The pressure in the flow of blood in a mammal was determined at two different vessels; A and B. The data was taken within a period of 1 minute and was presented as follows.

Time in seconds	Blood pressure in	
	Vessel A	Vessel B
0	160	320
10	165	360
20	170	320
30	180	400
40	170	360
50	160	320
60	160	360

(a) Plot the graph of blood pressure in both vessels against time on the same axis. (7 marks)

(b) Describe the trend of each curve. (2 marks)

……
……
……
……

(c) (I) From the graph, suggest the possible identity for:

i) Blood vessel A. (1 mark)

……

ii) Blood vessel B. (1 mark)

……..

II) Give reasons for your answer in (c) i) and ii) above. (2 marks)

……
……
……
……..

(d) Explain a factor that would result to an increase in blood pressure in both the blood vessels above. (2 marks)

……
……
……
……

(e) State **two** structural differences between the two vessels mentioned in (c) above. (2 marks)

……
……

(f) i) Name **two** diseases of circulatory system in humans. (2 marks)

ii) Other than transport of substances give one other function of blood. (1 mark)

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)

PAPER 3

1. You are provided with an unknown mixture labelled J
   You are also provided with Benedict's solution, dilute hydrochloric acid solution, iodine solution, Dichlorophenol-Indophenol (DCPIP) solution. Sodium hydrogen-carbonate solution, means of heating, test tubes, test tube holder and a test tube rack.
   a) Using the reagent provided only, test for the food substances in mixture J. Record in the table below the chemical test, the procedure of the test, your observations and conclusions.
   8mks

Chemical test	Procedure	Observations	Conclusions

   b) Which of the components of mixture J does not undergo digestion in the mammalian digestive system? 1mk

……

   c) i)Name a deficiency disease that may result from a deficiency of the component identified in (b) above. 1mk

……

   d) Name a common carbohydrate that could be present in mixture J. 1mk

……

   e) State the role of hydrochloric acid and sodium hydrogen carbonate in the experiment.
   2mks

   Hydrochloric Acid

……
……
……..

   Sodium Hydrogen Carbonate

……
……
……

2. The photographs below show a flower specimen. Study it carefully and use to answer the questions that follow.

a) On the photograph, label the following parts 3mks
   i. Stigma
   ii. Style
   iii. Staminal tube

b) i) Classify the plant from which the flower was picked into the taxonomic groups listed below. 4mks

Kingdom
……

Division
……

Sub division
……

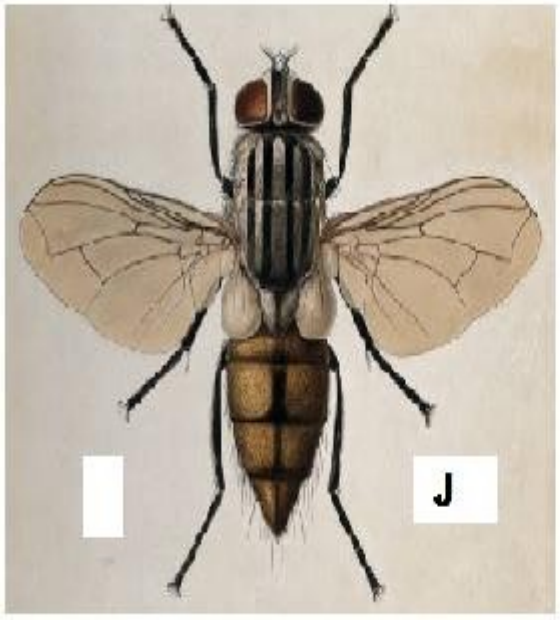
Class
……

ii) Name three observable features from the photograph of the class you named in (a) (i) above. 3mks
……
……
……
……

c) Suggest the pollination agent of this flower. Give reasons for your answer.
Pollinating agent **1mk**
……

Reasons **2mks**
……
……

3. Below are photographs of two specimens, **J** and **K.** Both of them belong to the same Phylum and Class. Observe them carefully before you answer the questions that follow.



a) Name the class to which **J** and **K** belong and support your answer with two reasons.
Class 1mk

……

Reasons 2mks

……

……

……

……

b. Suggest why the transport fluid in **J** and **K** has no haemoglobin. 2mks

……

……

……..

c. The actual length of specimen K is 8cm, given that both J and K are under the same magnification, determine the actual length of J 3mks

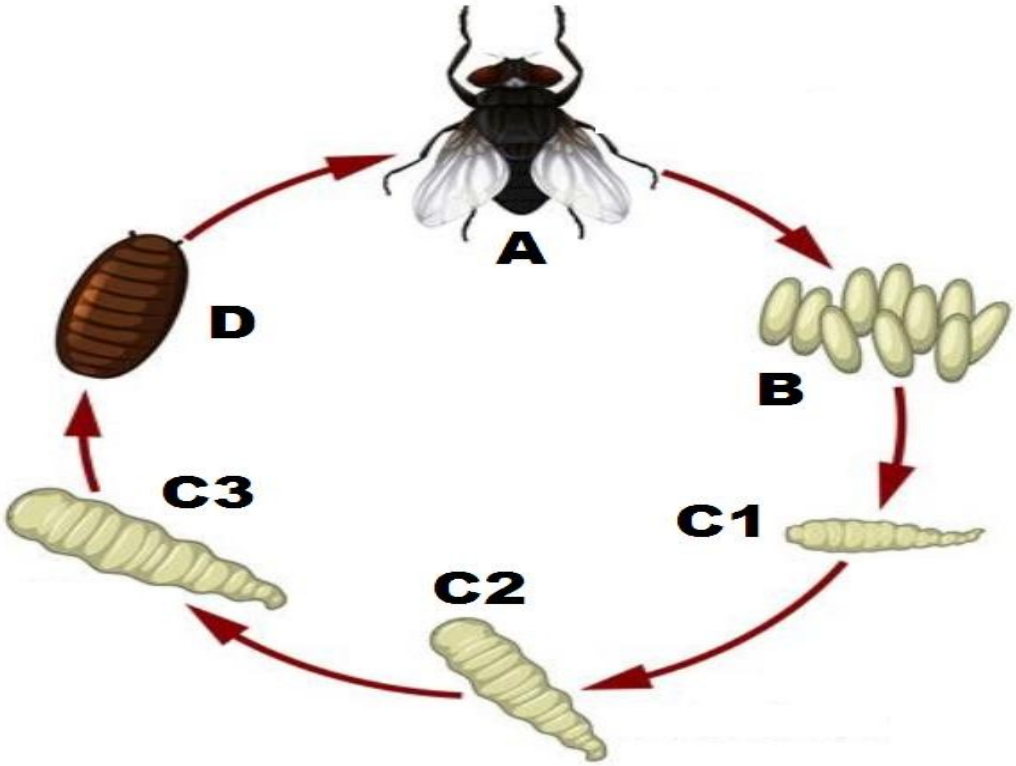
……

……

……

……..

d. Below is a diagram showing the life cycle of specimen J.



i. Identify the stage labeled **D**. 1mk

……

ii. Name the hormone responsible for the change from **D** to **A**. 1mk

……

iii. Explain the differences in the change from **C2** to **C3** and from **C3** to **D**. 2mks

C2 to C3

……

……

C3 to D

……

……

iv. State the importance of the process illustrated above in the life cycle of the organism 2mks

……

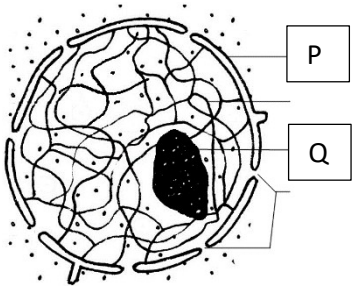
……

……

……

KCSE REPLICA 10
PAPER 1

1. The diagram shown below represents a nuscleus



a) State the role of the organelle labelled **Q** (1mk
……
b) Name a Kingdom whose members lack structure labelled **P** (1mk
……
c) Which is the general term given to organisms whose cells have structure **P**?
……..…(1mk

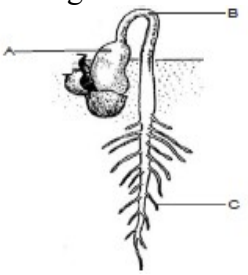
2. a) Name the **TWO** components of a lipid molecule (1mk
……
b) State **TWO** disadvantages of using fats as respiratory substrates (2mks
……
……

3. a) Name the pigment that protects humans from the negative effect of Ultraviolet lights
……..….(1mk
b) Explain how sunlight contributes to stronger bones and teeth in human beings (2mks
……
……

4. Name the main target organ of the following hormones: (2mks
a) Aldosterone ….. …….
b) Insulin …….

5. a) What is asexual reproduction? (1mk
……
……
b) Give **TWO** disadvantages of sexual reproduction (2mks
……
……

6. The diagram shown below represents a seeding. Use it to answer questions that follow



a) Give a reason why the plant above is a member of Class Dicotyledonae (1mk
……

b) Explain why the biomass of part labelled **A** will be lower compared to the one found in the seed stage of the same plant (2mks

……

……

7. a) State **TWO** ways in which blood clotting is important to a human being (2mks

……

……

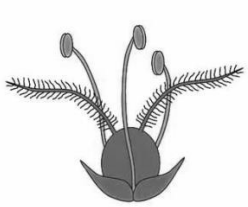
……

b) What are the roles of thrombokinase enzyme during blood clotting? (2mks

……

……

8. The diagram shown below represents a flower



a) Name the agent of pollination for the flower shown above (1mk

……

b) Give **TWO** reasons for your answer in a) above (2mks

……

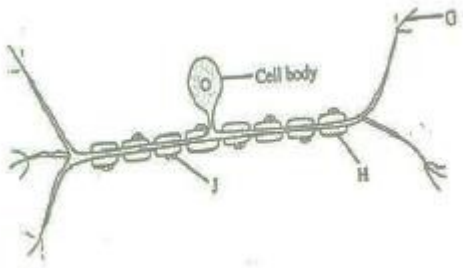
……

……

9. State the differences between cones and rods in terms of the following (2mks

Feature	Cone	Rod
Visual acuity		
Photochemical		

10. Use the diagram of a nerve cell shown below to answer questions that follow



a) With a reason, give the identity of the nerve cell (2mks

Identity ……

Reason ……

b) Explain the significance of absence of part labelled **H** in nerve cells found in the brain.

……

……(2mks

11. Give **THREE** features that make modern man to be more adaptable to the environment

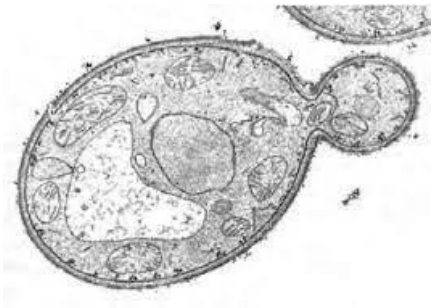
……

……

……

……(3mks

12. The diagram below represents a living organism



a) State **TWO** economic importance of the above organism in the food industry (2mks

……

……

……..…(2mks

b) Why does the rate of respiration reduce under the following conditions? (2mks

i) Low temperature

……..……

……..

ii) Metabolic poison

……..……

……..

13. State **TWO** reasons why Biotechnology is important in modern science (2mks

……

……..……..……

……

14. a) Fill in the table shown below to give differences between continuous and discontinuous variation (2mks

Continuous Variation	Discontinuous Variation

b) Explain how variation is important in the process of evolution? (3mks

……

……..……..……

……

15. a) Define the term species (1mk

……

……..……..

b) State **TWO** contributions of Carolus Linnaeus (1708 – 1778) to taxonomy (2mks

……

……..……..……

……

16. a) In an experiment, Peter counted 9 cells along the diameter of field of view of a light microscope measuring 3.0mm. Determine the diameter of one cell in micrometers (3mks

……

……..……..……

……

……

……..……..

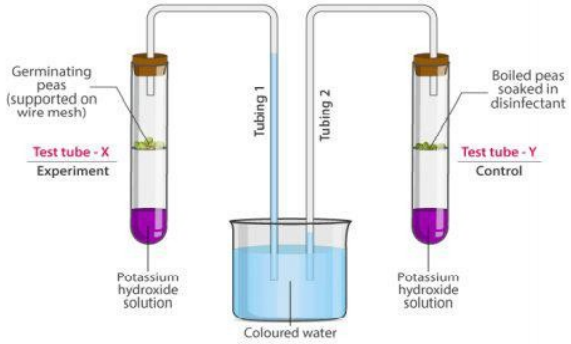
b) Why is electron microscope safer to the eye than light microscope during use? (1mk

……

……

……

17. The following diagram represents results of an experiment carried out on two sets of germinating seeds.



a) Account for the result shown in test tube **X** (2mks

……

……

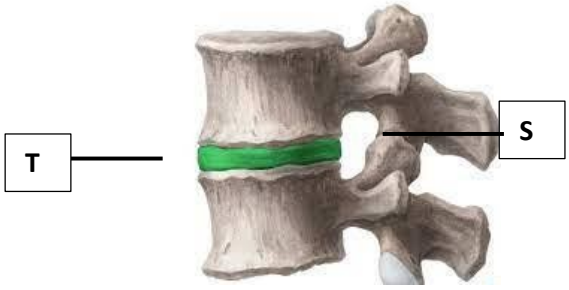
……

b) What is the importance of dipping the boiled seeds in a disinfectant in test tube **Y**?

……

……(1mk

18. The diagram shown below represents a section of the vertebral column



a) Name the part labelled **S** (1mk

……

b) State **TWO** ways in which part **T** is important to movement in human beings (2mks

……

……

19. Describe how the following cells adapt the structures where they are found to their functions

a) Companion cell (2mks

……

……

b) Schwann cell (2mks

……

……

20. A mother had a still birth and the expelled foetus showed clear signs of anaemia and jaundice

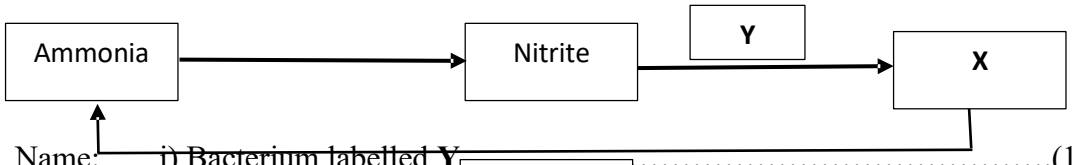
a) Give the name of this disorder (1mk

……

b) Describe how the disorder arose (3mks

……..……..……
……
……..……..

21. The following equation represents a section of the Nitrogen Cycle



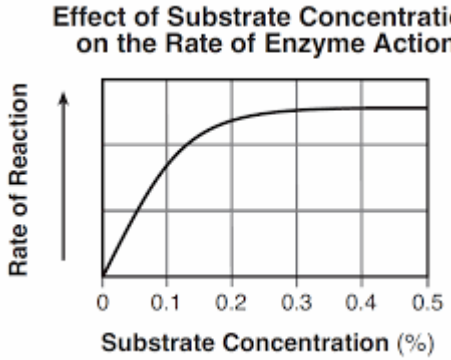
a) Name: i) Bacterium labelled **Y** ……(1mk
ii) Compound **X** ……(1mk

b) Explain how Process **Z** affect plant growth in an area? (2mks

……
……..……..

22. Samson had a road accident resulting in serious head injuries that left him with the following conditions: Loss of balance, low body temperature; poor speech, unregulated breathing and memory loss. Name the part of the brain affected that led to the following:
i) Low body temperature ……..…….…..,,..(1mk
ii) Memory loss ……..…….……..(1mk
iii) Unregulated breathing ……..……(1mk

23. The graph shown below represents effect of substrate concentration on rate of enzymatic reaction



a) Account for the rate of enzymatic reaction when the substrate concentration was between 0.3 to 0.5%. (2mks

……
……..……..

b) Name the substrates for the following enzymes
i) Carbonic anhydrase ……..……(1mk
ii) Thrombin ……....(1mk

24. A tilapia fish has a full length of 300mm but measures 200mm from the mouth tip to its anus. Determine the tail power of the fish (2mks

……
……..……..……
……
……..……..

PAPER 2

SECTION A (40 marks)

1. a) Using the diagrams below, construct a dichotomous key that can be used to identify the leaves. (2mks)

WHITE CLOVER

COTTON WOOD

HONEY LOCUST

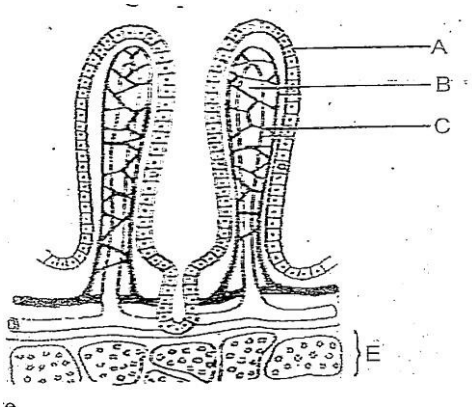
……..

b) State two reasons for classifying living organisms (2mks)

……

……

2. The diagram below is a cross section through a part of human ileum.

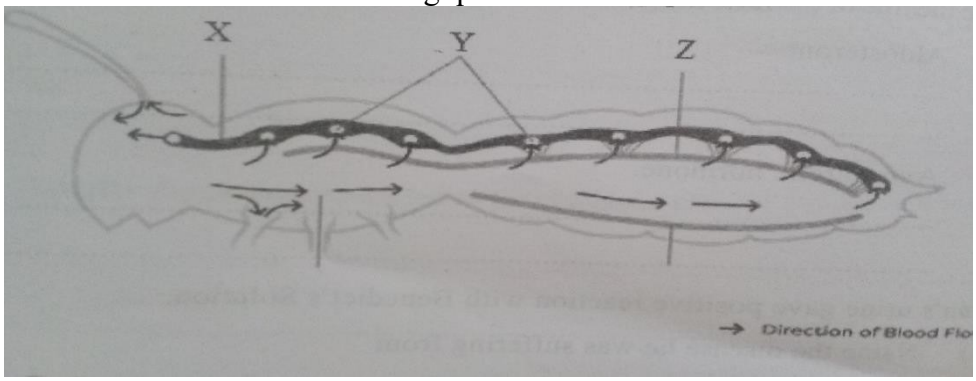


(a)(i) Identify the structure drawn above (1 mark)
……
(ii) Sate the significance of the structure shown above. (1 mark)
……
(b) Name the parts labelled A, B and C (3 marks)
A……
B……
C……
(c)Give the functions of the part labelled B and C (2 marks)
B……
C……..
(d) Name the cell organelle more abundant in goblet cells. (1 mark)
……

3. a) In human, premature baldness is controlled by a gene on the **Y** chromosome. Using **B** to represent the gene for baldness, work out a cross between a bald man and his wife . (4mks)

(b)i) What is the probability of their daughters being bald? (1mk)
……
ii) Give a reason for your answer. (1mk)
……
……
(c) Name one trait in human beings that is determined by multiple allele. (1mk)
……
(d) Name one genetic disorder affecting the red blood cells. (1mk)
……

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



(a) i) Identify the type of circulatory system shown in diagram above. (1mk)
……
ii) Give a reason for your answer in (a)i) above. (1mk)
(b) Name the parts labelled X, Y and Z. (3mks)

X……
Y……
Z……

(c) Explain the disadvantage of having the above circulatory system in the animals. (2mks)

……
……

(d) Explain why amoeba lack a circulatory system. (1mk)

……
……

5. An experiment was carried out to find out the concentration of ions in the cell sap of an aquatic plant and that of the pond water in which they were found.

	Concentration in	
Ions	Cell sap	Pond water
Na^+	50	1.2
K^+	49	0.5
Mg^{2+}	11	3.0
Ca^{2+}	13	1.3
Cl^-	101	1.3
SO_4^{2-}	13	0.67

(a)(i) Name the process by which the aquatic plant absorbs ions from pond water. (1 mk)

……

(ii) State the four roles of the process you have named in (a)(i) above in a mammalian body. (4 mks)

……
……..

(b) Name the cell structure that allows passage of ions in and out of the cell. (1mk)

……..

(c) How can the rate of uptake of ions by the aquatic plant be increased. (2mks)

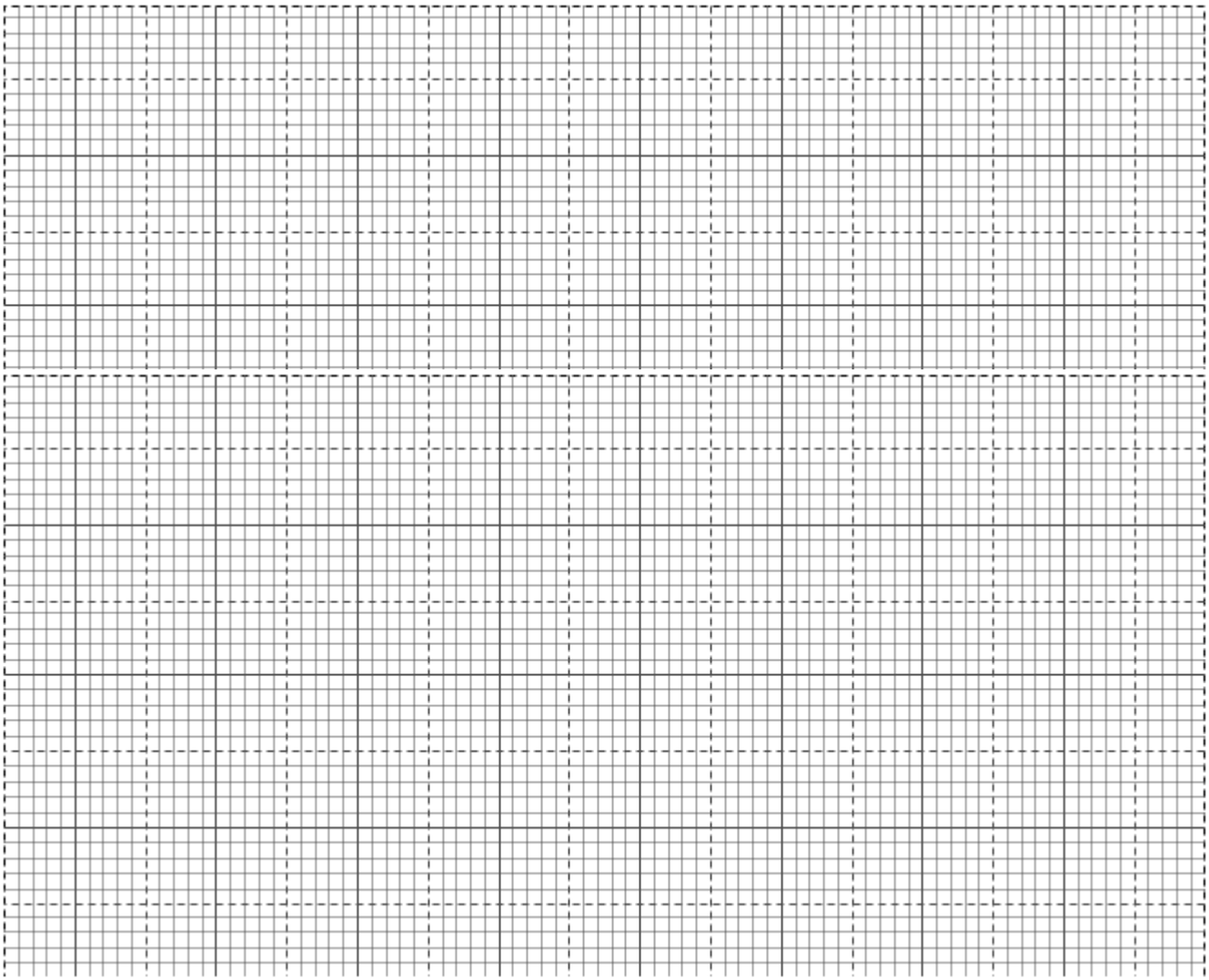
SECTION B (40 marks)

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

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

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

a) On the grid provided, plot graphs of glucose levels in blood against time on the same axes. (7mks)



b) What was the concentration of glucose in the blood of Y and Z at the 50th minute? (2mks)

Y.....

Z.....

c) Account for the level of glucose in present Y

i) During the first 45 minutes. (2mks)

.....

ii) After 45th minute to the end. (4mks)

.....

.....

.....

d) Account for the decrease in glucose level person Z after 60 minutes. (2mk)

.....

e) Low blood sugar level in harmful to the body . Explain. (3mks)

.....

7. (a) (i) Give four modes of expressing food relationship in an ecosystem. (4 marks)

(ii) Explain how food as a factor regulate the population of animals in an ecosystem.(8 marks)

(b)How are desert plants adapted to conserving water? (8 marks)

8. Describe the structure and functions of various organelles in a mature animal cell. (20mks)

PAPER 3

1. You are provided with visking tubing labeled **J**, a piece of thread and a solution labeled **K**.

Dip the visking tubing in distilled water to moisten it, open it, and then tie one end tightly with the thread provided.
Half-fill the visking tubing with solution **K** then tie the open end of the tubing tightly. Ensure solution **K** does not spill out of the tubing.
Immerse the visking tubing into distilled water in a beaker. Ensure that the visking tubing is completely immersed in the distilled water.
Leave the set-up for 20 minutes. Record your observations after 20 minutes.

(a) (i) Observations (1mk)

……...

(ii) Explain you observations in a (i) above. (2mks)

……...

……...

(b) Remove the visking tubing carefully. Ensure the contents of the visking tubing do not mix with that of the beaker.Using the reagents provided, test for the food substance present in the visking tubing and the beaker.

I. Visking tubing (4mks)

FOOD TEST	PROCEDURE	OBSERVATIONS	CONCLUTION
Starch			
Reducing sugars			

II. Beaker (4mks)

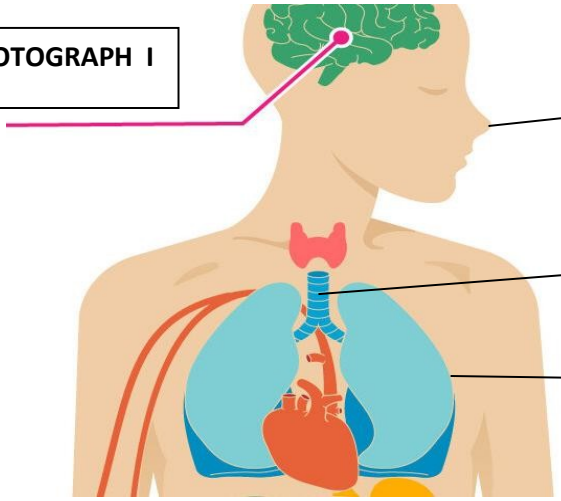
FOOD TEST	PROCEDURE	OBSERVATIONS	CONCLUTION
Starch			

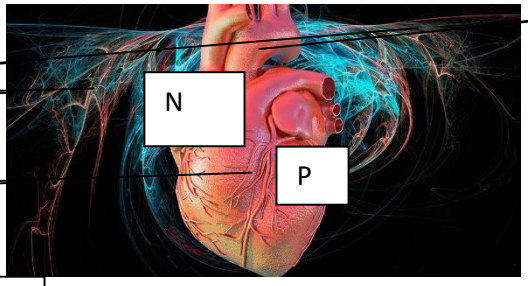
Reducing sugars			

(c) Explain observations in the visking tubing and Beaker in 1(b) above. (3mks)

2. The photographs I and II below illustrate parts of mammalian systems. Study them and answer the questions that follow.

PHOTOGRAPH I





(a) Identify the two mammalian systems shown above. (2mks)

(b) Name the membrane that covers part marked P and Z. (2mks)

P……

Z……
……

(c) Describe two ways by which organ P and Z are protected. (2mks)

(d) How is the part labelled Y adapted to perform its function. (2mks)

(e) Identify the part labelled N. (1mk)

(f) State the difference in the content of blood in L and M. (1mk)

L	M

(g) State the role of the inner part of X in ensuring a healthy system. (2mks)

3. You are provided with specimens labeled S_1, S_2 and S_3

(a) Using a scalpel blade split S_1 longitudinally and draw a well labeled diagram to show the internal structures. (4mks)

(b) With a reason, state the class of the plant from which specimen S_1 was obtained.

(a) Class (1mk)

……

Reason (1mk)

Specimen S_2 is a germinated seedling of S_1.

In the table below, name three structures of S_1 and identify the structures they developed into in specimen S_2 (3mks)

Structure in S_1	**Structure developed into, in S_2**
1_____	_____
2_____	_____
3_____	_____

(c) i) Using specimens S_2 and S_3 ,name the type of germination. (2mks)

S_2

S_3

ii) Give a reason for your answer in S_3 above. (2mks)

iii) Account for the type of germination in S_2 (2mks)