BIOLOGY PAPER 2

EXPECTED QUESTIONS IN KCSE

Comprises 6 KCSE prediction set exams (Class of KCSE March 2022).

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PREDICTION 1

NAME _____SCHOOL _____

INDEX NO_____ CANDIDATE'S SIGNATURE _____

DATE _____

231/2

BIOLOGY
FORM 4 2021

Paper 2
Time: hours.

Instructions to the candidates

- Write your name and index in the spaces provided above.
- Sign and write the date of examination.
- This paper consists of **TWO** sections A and B
- Answer **ALL** questions in section A in the spaces provided.
- In section B answer question **6 (compulsory)** and either question 7 or 8 in the spaces provided after question 8.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

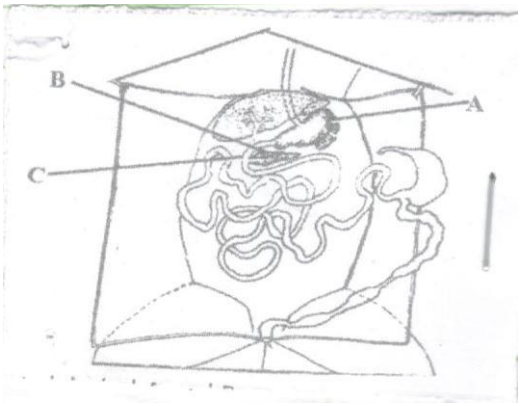
For Examiner's Use Only

Section	Question	Maximum score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	

	TOTAL	**80**	

SECTION A – (40 MARKS)
Answer ALL Questions in This Section In The Spaces Provided.

1. The diagram below shows the mammalian digestive system. Study it carefully and answer the questions that follow.



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

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ii) How is the structure labeled A in the diagram adapted to carry out its function. (2marks)

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b) i) Name the hormone secreted by the walls of the part labeled C (1mark)

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ii) Explain the role of the hormone in b) (i) above in digestion. (3marks)

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2. In human beings a download pointed frontal hairline ("window peak") is a heritable trait from an expression of recessive gene in a somatic cell. Use 'W' for a dominant gene.
   a) Determine the F1 generation if a homozygous peak male is married to a homozygous frontal hairlined female parent. (4marks)

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

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c) Name two sex linked genetic disorders that can affect both human females and males. (2marks)

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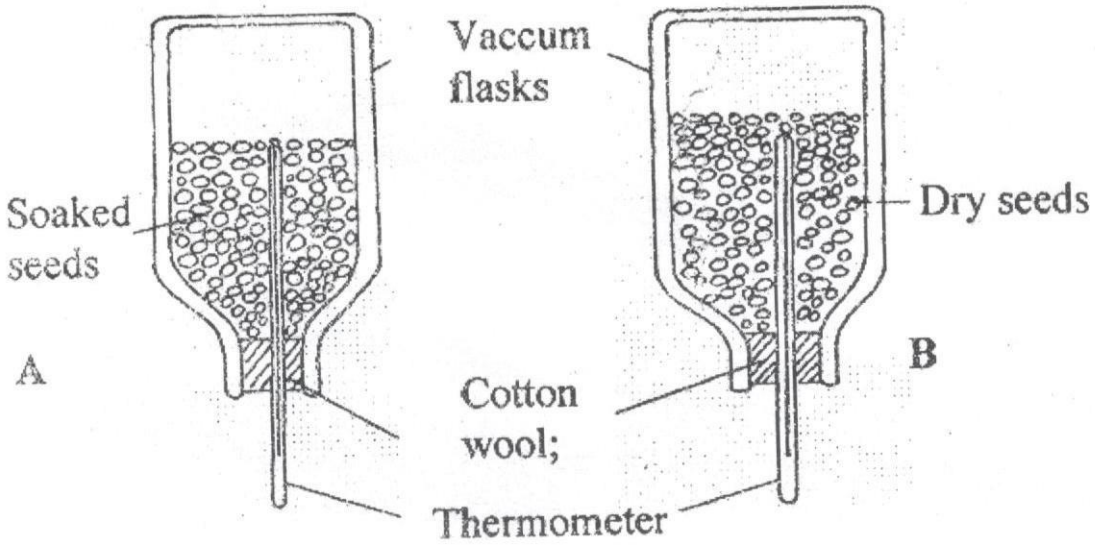
3. A student set up an experiment using soaked and dry seeds as shown below



a) State the objective of this experiment (1mark)

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b) State the observations made in each of the flasks after 24 hours (2marks)

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c) Account for the observation made in (b) above (2marks)

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d) Suggest why vacuum flasks were used in this experiment. (1mark)

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e) What alteration would you make in the set up to make the results more reliable (1mark)

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f) Why should the seeds be washed with antiseptic 10% formalin? (1mark)

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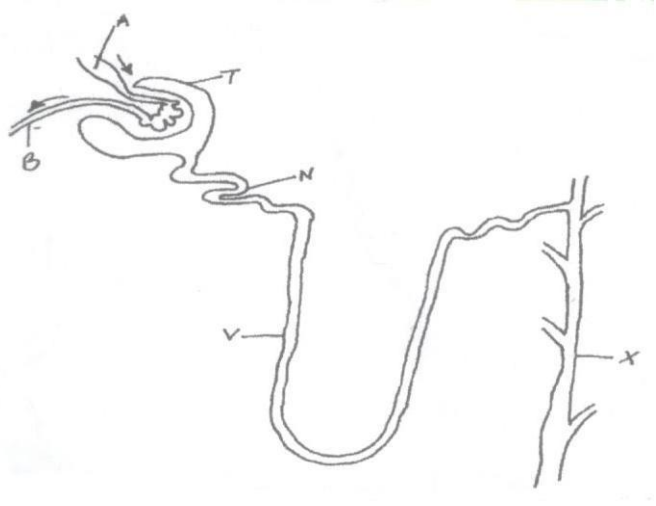
4. Shown below is a section through the mammalian nephron.



a) Name the structures labeled A and N. (2marks)

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b) Name all the structures in a nephron which are normally present in the cortex region of a kidney (1mark)

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c) Which region in a kidney deals with conservation of body water? (1mark)

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d) Name one hormone that has an effect on part labeled X (1mark)

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e) How is part labeled N adapted to its function. (3marks)

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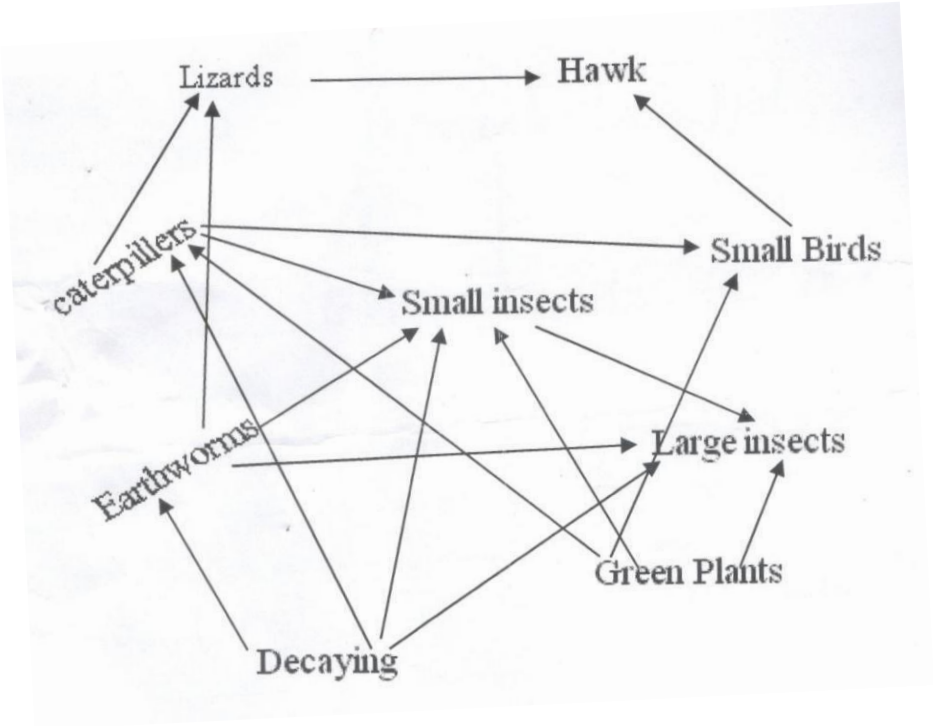
5. The diagram below represents a food web in a certain ecosystem.



a) Name the trophic level occupied by each of the following:
   i) Caterpillars (1mark)

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   ii) Small insects (1mark)

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b) From the food web, construct two food chains which end with lizards as tertiary consumer. (2marks)

c) i) Which organisms have the least biomass in this ecosystem (1mark)

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ii) Explain the answer in (i) above. (3marks)

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SECTION B - (40 MARKS)

Answer Question 6 (Compulsory) and Either Question 7 Or 8 in The Spaces Provided After Question 8

6. The relationship between oxygen concentration, sugar consumption and potassium ion uptake in isolated wheat roots was determined. The results obtained were tabulated as shown below. The loss of sugar and potassium uptake or gain are in arbitrary units.

		Percentage oxygen in aerotun stream						
		0	5	10	15	20	30	100
Sugar loss		15	20	43	45	45	44	43
Potassium ion gain		5	55	70	75	75	72	70

a) Plot graphs of sugar loss and potassium ions gain against oxygen concentration on the same axes.

b) i) Identify the process by which potassium ions is taken by the roots . (1mark)

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ii) Give reasons for your answer in b (i) above (3 marks)

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c) Account for sugar loss and potassium ions gain.

(i) 0% oxygen concentration (2 marks)

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(ii) Between 5% and 20% oxygen concentration (2 marks)

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d) Suggest **two** factors necessary for the above process apart from oxygen (2 marks)

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e) State **two** ways by which the process above can be stopped. (2 marks)

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f) Name **two** main areas in a mammalian body where the above process occurs. (2 marks)

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7. Explain the various ways in which seeds and fruits are adapted to dispersal. (20 marks)

8. (a) Describe how the digestion of a protein is achieved in the following portions of the alimentary canal.

(i) Stomach (4 marks)

(ii) Duodenum (4 marks)

(b) (i) Describe the process of absorption at the root hair to the xylem of the root. (8 marks)

(ii) Describe how temperature and light intensity affect the rate of transpiration. (4 marks)

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PREDICTION 2

NAME …… **INDEX NO** ……..……..

SCHOOL …… **SIGNATURE** ……...……...…….

DATE ……..……..

231/2
BIOLOGY
PAPER 2
(THEORY)
2 HOURS

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- This paper consists of **two** sections. Section **A** and section **B.**
- Answer **ALL** questions in section **A** in the spaces provided. In section **B** answer question **6** (compulsory) and either question **7** or **8** in the spaces provided after question 8

For Examiners use only.

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total score	80	

This paper consists of 10 Printed pages.
Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

1. (a) What is meant by the following terms?

(i) Protandry (1**mark**)

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……

(ii) Self sterility (1**mark**)

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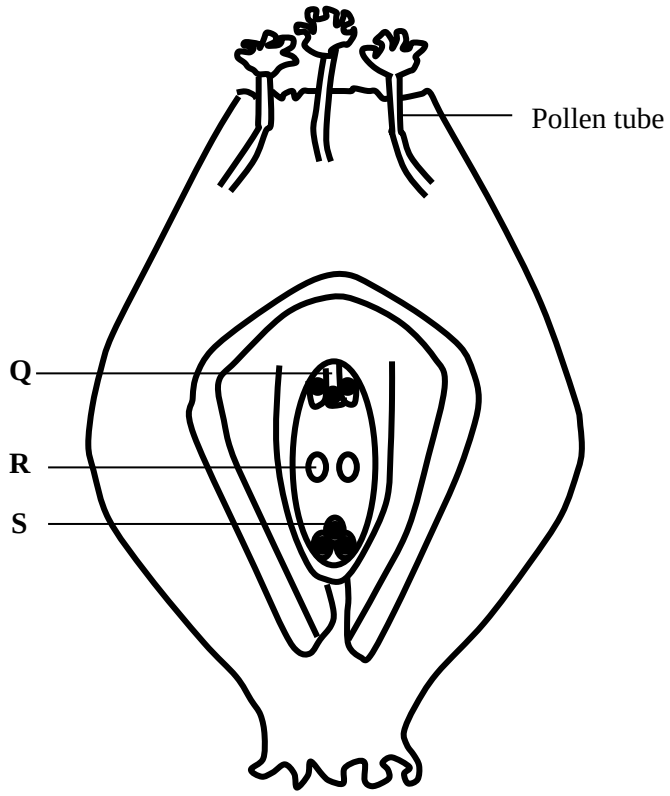
(b) The diagram below shows a stage during fertilization in a plant.



(i) Name the parts labelled Q,R and S (3 **marks**)

Q

……..

R

……..…….

S

……..

(ii) State two functions of the pollen tube (2 **marks**)

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……

(c) On the diagram label the microphyle. (**1mark**)

2. Explain what happens to excess amino acids in the liver of humans. (3**marks**)

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(b) Which portions of the human nephron are only found in the cortex? (3 **marks**)

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(c) (i) What would happen if a person produced less antidiuretic hormone? (1 **mark**)

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(ii) What term is given to the condition described in C (i) above? (1**mark**)

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3. (a) (i) What is meant by the term biological control? (1**mark**)

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(ii) Give an example of biological control. (1**mark**)

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(b) (i) What is eutrophication? (3**marks**)

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(ii) What are the effects of eutrophication? (3 **marks**)

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(c) Name a substance that is responsible for acid rain. (1**mark**)

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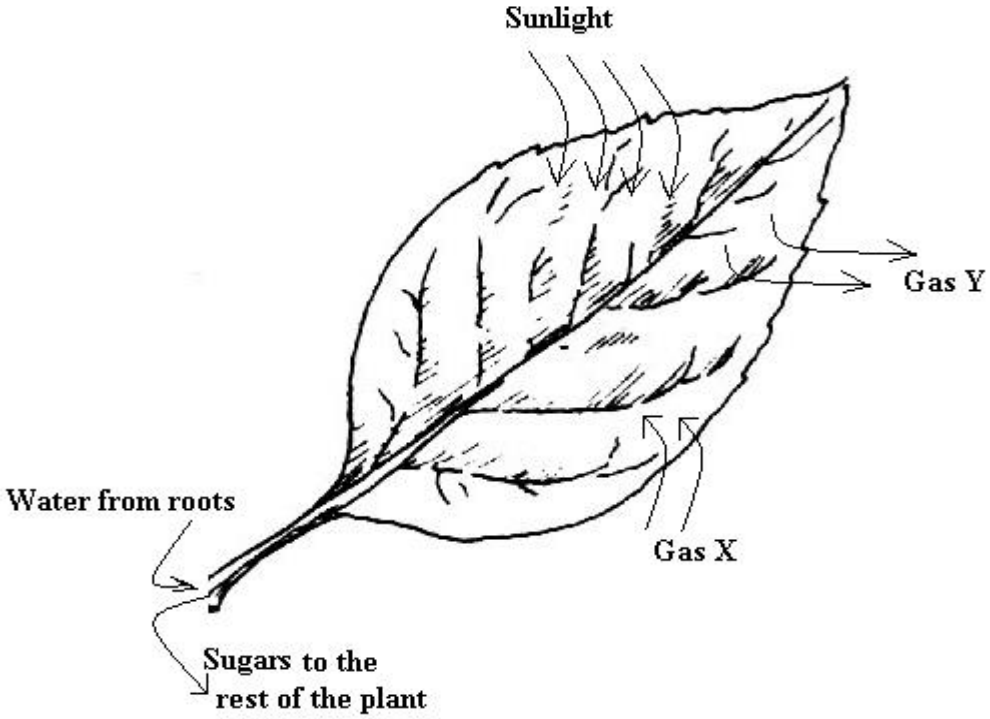
4. Leaves are the organs of photosynthesis. The following diagram shows what happens in a plant leaf during photosynthesis.



(a) Give two ways in which leaves are adapted to absorb light. (2 **marks**)

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(b) Name the gases labelled X and Y. (2**marks**)

X

……

Y

……

(c) Name the tissue which transport:

(i) Water in to the leaf. (1 **mark**)

……..

(ii) Sugars out of the leaf. (1 **mark**)

……..

(d) Explain why it is an advantage for the plant to store carbohydrates as starch rather than as sugars.

(2**marks**)

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5. Some millet seeds were socked in water for two days. They were then broken into small pieces and placed on the surface of agar containing starch. After two days it was found that the agar no longer contained starch.

(a) Suggest how the test for starch in the agar was carried out. (1 **mark**)

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(b) Explain why there was no starch in the agar after two days. (2**marks**)

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(c) Why was it necessary to soak the seeds? (1**mark**)

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(d) Why were the millet seeds broken into small pieces? (1**mark**)

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(e) State the observation that would be made if the seeds had been soaked in boiling water? (1**mark**)

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(f) Suggest a control experiment that would have been suitable. (2**marks**)

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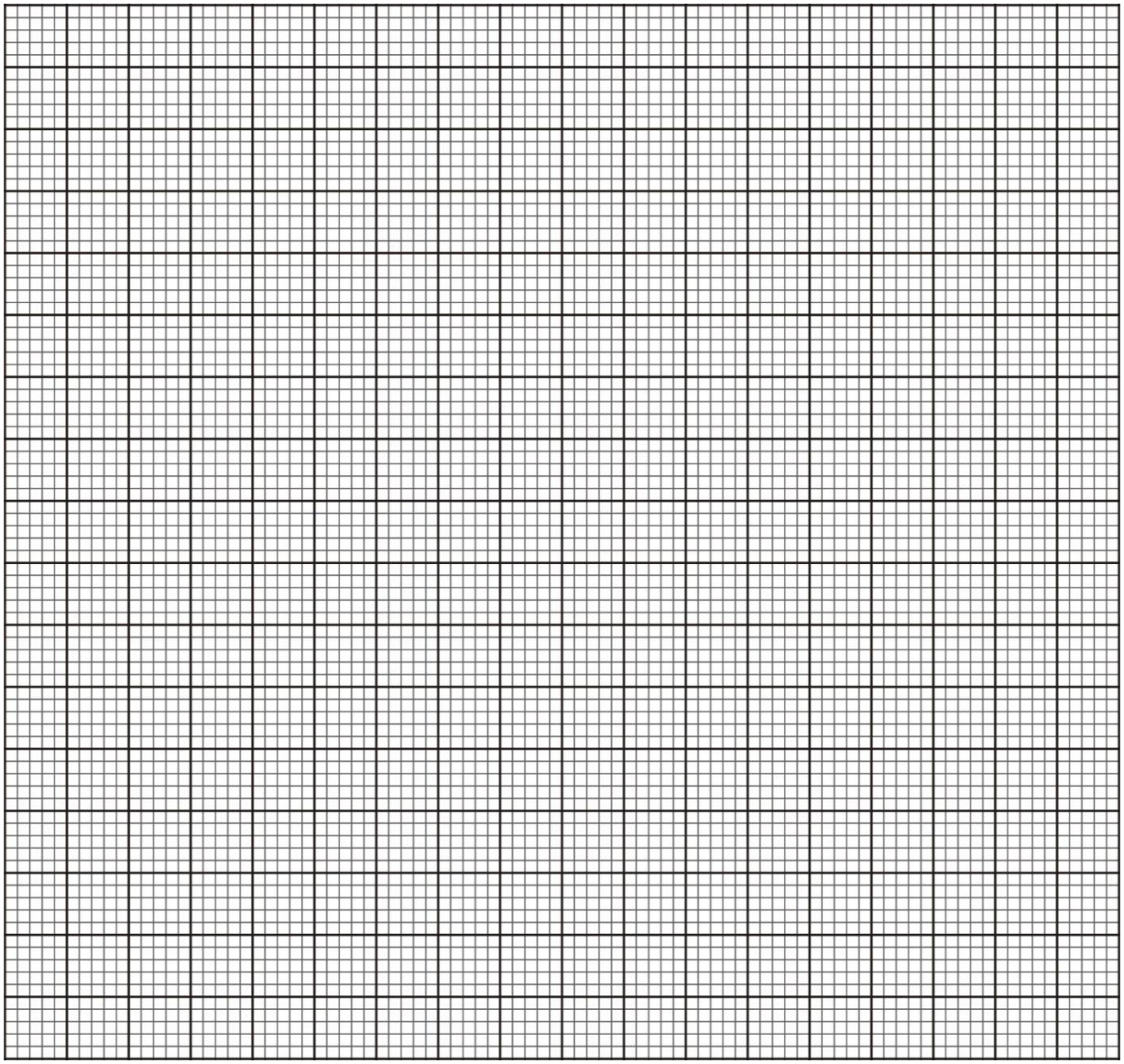
SECTION B:

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

6. A research was carried to determine the trend of growth of some boys and girls.Their average mass in kilograms was taken separately for a period of 20 years and tabulated as shown in the table below.

Age	Average mass of boys (kg)	Average mass of girls (kg)
0	2.5	2.5
2	11.5	11.5
4	15.0	16.0
6	18.5	19.3
8	22.1	27.1
10	25.1	27.1
12	27.5	30.5
14	37.0	35.5
16	44.0	44.0
18	46.9	52.0
20	48.5	55

(a) On the same axis draw a graph of the average mass of the girls and boys against age. (7**marks**)



(b) From the graph , determine the;-

(i) Mass of boys at the age of 11 years. (1 **mark**)

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(ii) Growth rate of girls between ages 13 and 15. (3 **marks**)

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(c) Account for the change in the mass of girls during the age stated in (ii) above. (2 **marks**)

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(d) Explain the trend observed in the curves for both boys and girls. (2 **marks**)

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(e) Why do girls above 10 years require in take of food that is richer in iron than boys of the same age? (2 **marks**)

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(f) Part from using average mass to estimate growth in human beings, name two other parameters that can be used. (2 **marks**)

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7. Describe how the various parts of the human digestive system are adapted to their functions. (20 **marks**)
8. (a) State the causes of air pollution. (5 **marks**)

(b) State how air pollutants affect organisms hence state how air pollution should be controlled. (15 **marks**)

PREDICTION 3

Name……. Index No……/…….

School…… Date ……..…

Candidate's Signature……

231/2
BIOLOGY
(THEORY)
Paper 2
Time: 2 Hours

KCSE PREDICTION 3
Kenya Certificate of Secondary Education (K.C.S.E)

231/2
BIOLOGY
(THEORY)
Paper 2
Time: 2 Hours

INSTRUCTIONS TO CANDIDATES

- This paper consists of two sections **A** and **B**.
- Answer **ALL** questions in section **A**
- Answer question **6** (compulsory) and either question **7** or **8** in section **B**.

For Examiner's Use Only

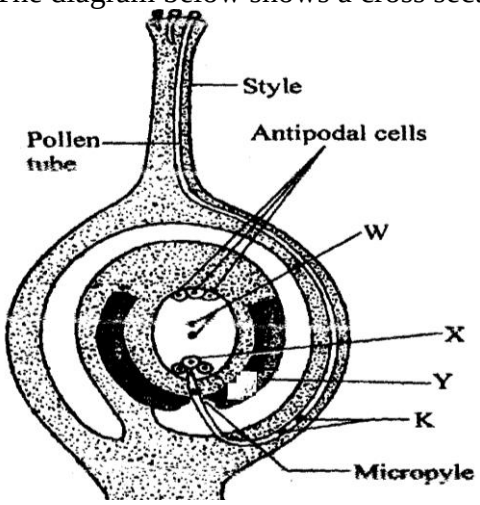
Section	*Question*	*Maximum score*	*Candidate's score*
A	***1***	***8***	
	2	***8***	
	3	***8***	
	4	***8***	
	5	***8***	
B	***6***	***20***	
	7	***20***	
	8	***20***	
Total Marks		***80***	

This paper consists of 13 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

SECTION A (40 MARKS)

Answer all questions in this section.

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



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

W .....

X .....

Y .....

b) State **two** functions of the pollen tube. (2mks)

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c) What happens to antipodal cells after fertilization. (1mk)

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d) Name the structure labeled **K** and state their role. (2mks)

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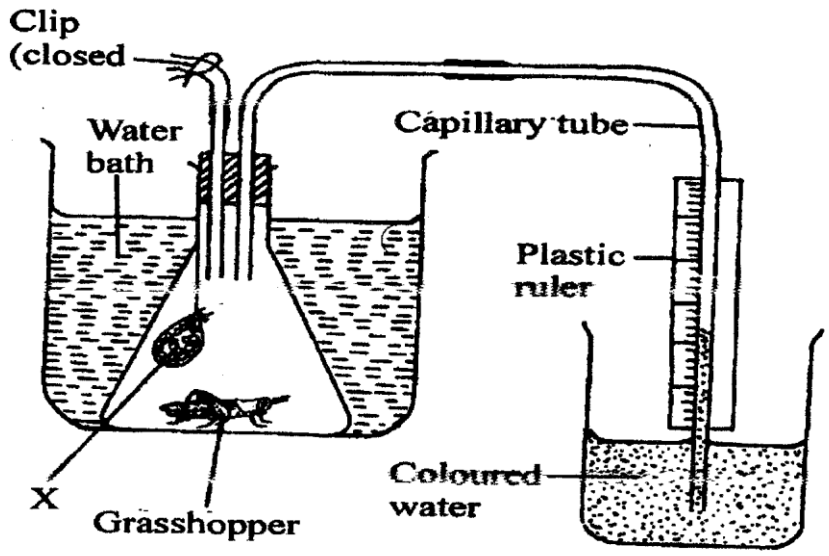
2. The diagram below illustrates and experiment to determine the rate of respiration in a small insect.



a) Name the chemical compound labeled **X** and state its function. 2mks)

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

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

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

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

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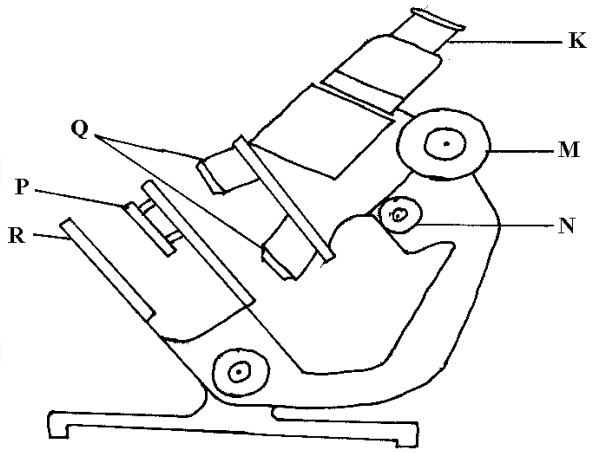
3. The diagram below shows some components of a light microscope.



a) Name the parts labeled

(2mrks)

K

……

M

……

b) State the functions of (2mrks)

P

……

Q

……

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

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

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

……

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

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

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(ii)Staining the section (1mrk)

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(iii)Putting the section in water (1mrk)

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

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

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

i) Genotypic ratio. (2mrks)

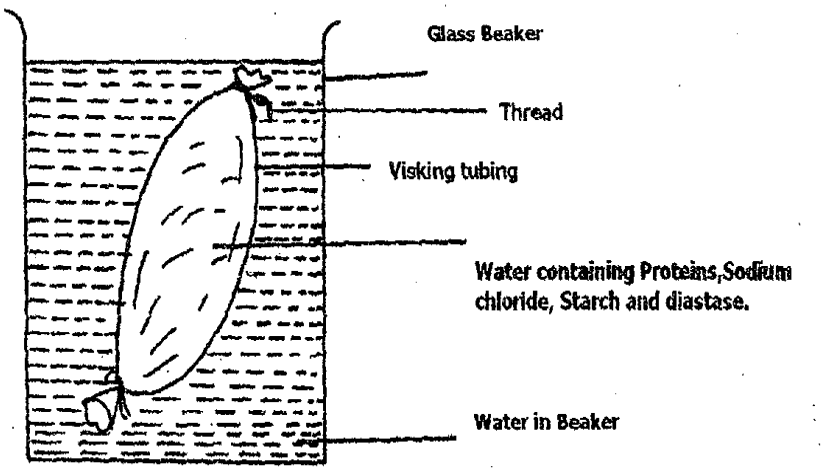
……

ii) Phenotypic ratio. (1mrk)

……

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

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



The following observations were made after the procedures indicated.

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

	followed by copper sulphate solution, colour remains blue	followed by copper sulphate solution, colour remains blue

a) Name the process by which salt moved into the water in the beaker from the visking tubing. (1mark)

……

b) i) Name the food substance responsible for the brown colour observed after 1 hour both in the beaker and visking tubing when solutions are boiled with benedicts solution. (l mark)

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

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

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

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

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SECTION B(40 MARKS)

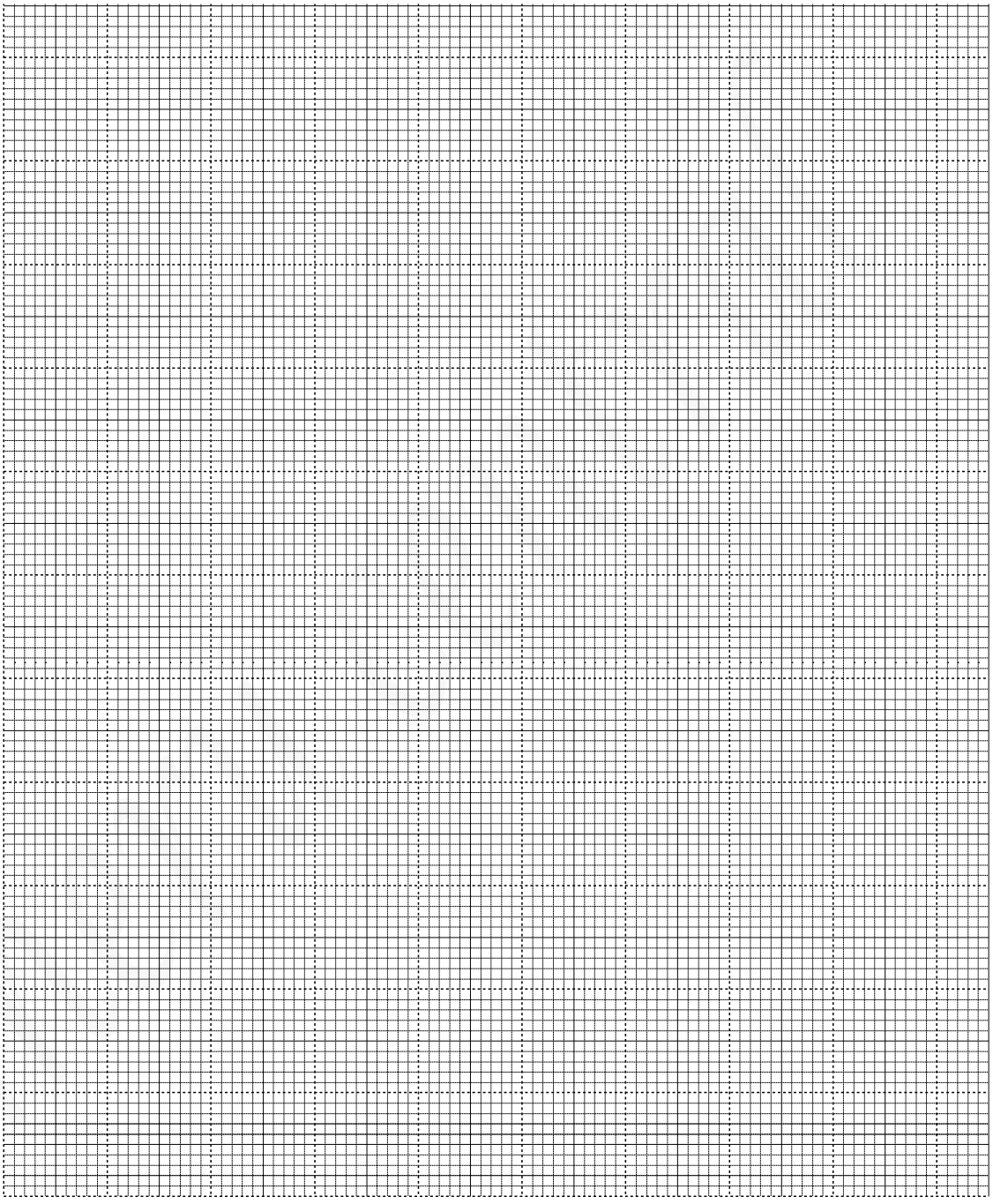
Answer questions 6 (compulsory)and either questions 7 or 8 in the spaces provided questions 8

6. An experiment was carried out whereby three healthy rats were fed on equal amounts of glucose. After half an hour, the glucose concentration per ml. of blood was measured at 15 minutes intervals for three hours. The following results were obtained.

Glucose conc. mg/ml / Rats	**0 min**	**15 min**	**30 min**	**45 min**	**60 min**	**75 min**	**90 min**
A	0.800	0.774	0.715	0.680	0.650	0.595	0.555
B	0.745	0.695	0.695	0.660	0.635	0.600	0.545
C	0.795	0.695	0.665	0.635	0.590	0.550	0.495
Mean	0.780	0.720	0.691	-	0.625	-	0.532

a) i) Calculate the mean concentration of glucose in mg per ml of blood at 45 and 75 minutes. Record your answer on the table. (2mks)

ii) On the graph paper provided, plot a graph of the mean glucose concentration against time.(6mks



iii) What was the mean glucose concentration in the blood after 37.5 minutes? (1mk)

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iv) Give a reason why it was necessary to use three rats in the experiment instead of one. (1mk)

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v) Why was the initial concentration of glucose in the rats not the same? (2mks)

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vi) Account for the difference in mean glucose concentration during the period. (3mks)

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b) Give two reasons why glucose is the main respiratory substrate. (2mks)

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c) Give three ways in which glucose is assimilated in the body. (3mks)

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7. a) What assumption are made when using the captured recapture method in estimating population of animals. (5mks)

b) Describe how you would use the capture – recapture method to estimate the population of fish in the school pond. (15mks)

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

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

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PREDICTION 4

Name……Index no……

Admission No…… Candidate's signature……

School …….....Date….....

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

KCSE PREDICTION 4

Kenya Certificate of Secondary Education (K.C.S.E)

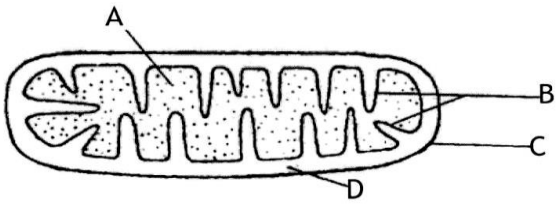
INSTRUCTIONS TO CANDIDATE:

- Write **your name** and **index number** in space provided.
- Answer **all** questions in section **A** in the spaces provided
- In section **B** answer questions **6** (compulsory) and either question **7** or **8** in the spaces provided

For examiners use only:

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	**80**	

1. a) Study the diagram of a cell organelle shown below and answer the questions that follow



i. Identify the organelle (1mark)

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……..

ii. State the function (1mark)

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iii. Name the parts labelled A and B (2marks)

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b) When preparing plant sections to be observed under the microscope:

Water is used to mount the tissue

Very thin sections of plant should be cut

Give a reason why each of the steps are carried out (2marks)

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c) Naomi observed an object using a microscope with eye piece lens of magnification X5 and an objective lens of magnification X20.What was the magnification of the object? (2marks)

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2. During an experiment a group of students took equal volumes of blood from the same person containing 50 red blood cells and were suspended salt solutions A, B and C.

After an hour the cells in each solution were counted and their sizes determined and results tabulated as shown below. Study the table and answer the questions that follow

Solution	A	B	C
SIZE	Large	Normal	Small
NUMBER	20	50	50

a) State the nature of solutions

B (1mark)

……

C (1mark)

…….

b) Account for the number of red blood cells in solution A after one hour (3marks)

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c) Explain how the above physiological process facilitates the following actions in living organisms

i. Gaseous exchange (1mark)

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ii. Osmoregulation (2marks)

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3. A cross between a red flowered and a white flowered Mirabilis plant produced pink flowered F1 plants

a) Suggest a reason to explain why there were no red or white flowered F1 plants (1mark)

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b) The F1 offsprings were selved to get F2 generation. Using appropriate letter symbols work out the following for the generation: (4marks)

i. The genotypic ratio

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ii. The phenotypic ratio

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c) What would be the result of crossing one of the F1 offspring producing pink flowers with a true breeding plant producing white flowers? (3marks)

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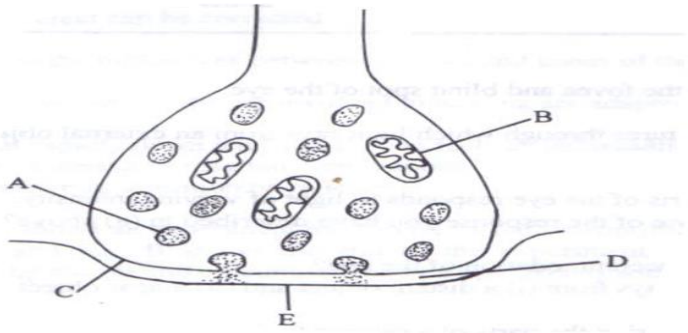
4. Examine the diagram of a synapse below and answer the questions that follow



a) Name the parts labelled A and C (2marks)

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b) Name the enzyme that exerts its effects on the structure above (1mark)

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c) Name the neurotransmitter substance in impulse transmission (1mark)

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d) State the function of B (1mark)

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e) Identify the two synaptic inhibitors that may poison to interfere with a transmission of an impulse across the synapse (2marks)

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f) State the possible causes of hypermetropia (1mark)

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5. a) Define natural selection (2marks)

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b) Explain the following

Survival for the fittest (3marks)

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Struggle for existence (3marks)

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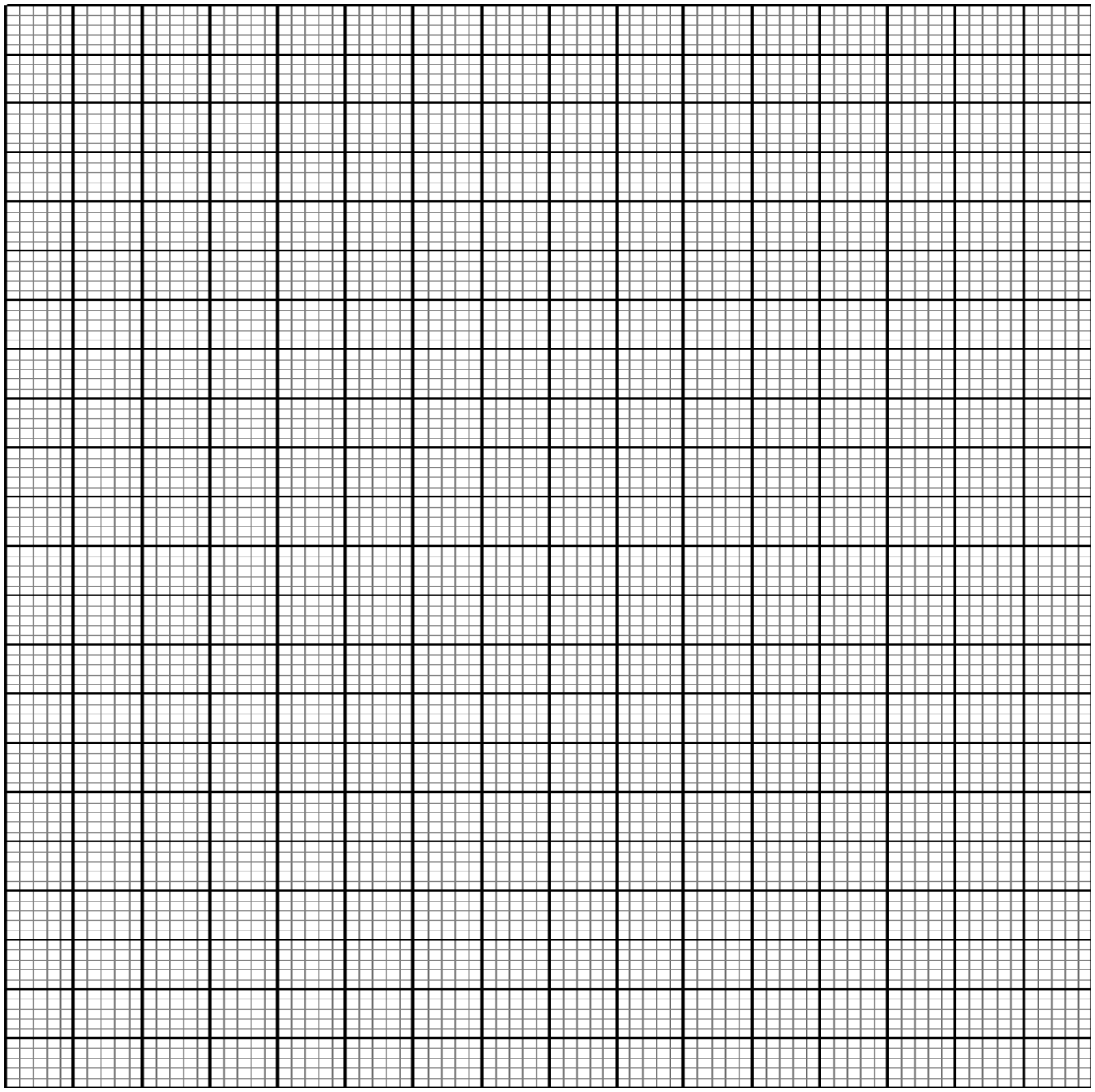
SECTION B

Answer question 6 and either question 7or 8

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

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

a. Using suitable scale draw the graphs of the mean lengths in set A and B against time on the grid provided (8marks)



b. From the graph state the mean shoot length of each of seedling at the 66^{th} hour (2marks)

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

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

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

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7. Describe the role of the following parts in human reproduction

i. Testes (4marks)
ii. Ovary (6marks)
iii. Sperm and ovum (6marks)
iv. Uterus wall/endometrium (4marks)

8.State the adaptations of the following tissues for support in plants

i. Parenchyma tissues (4marks)
ii. Collenchyma tissues (4marks)
iii. Sclerenchyma tissues (2marks)
iv. Tracheids (6marks)
v. Xylem vessels (4marks)

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PREDICTION 5

NAME _____ INDEX NO. _____

SCHOOL _____ SIGNATURE _____

DATE _____

231/2
BIOLOGY
(THEORY)
PAPER 2
TIME: 2 HOURS

KCSE PREDICTION 5

INSTRUCTIONS TO CANDIDATES

- Write your name, school and index number in the spaces provided above.
- Write the date of examination and sign in the spaces provided above.
- Answer **ALL** the questions in **section A** by filling in the spaces provided.
- In **section B**, **answer question 6 (compulsory question)** and **any other one question** from the remaining two questions. (i.e. 7 or 8) in the spaces provided after question 8.
- Candidates may be penalized for false information and even wrong spellings of technical terms.
- This paper consists of 10 printed pages.
- Candidates should check to ensure that all pages are printed as indicated and no questions are missing.

FOR OFFICIAL USE ONLY

Section	Question	Maximum score	Candidate's score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total Score	80	

SECTION A (40 MARKS)

Answer ALL questions

1. A pure breed red flowered plants was crossed with a pure breed white flowered plant. The F1 generate had all pink flowers. When F1 were selfed 1600 plants were obtained in F2 generation

a) Identify the type of dominance (1mark)

_____

b) Give a reason for your answer (1mark)

_____

_____

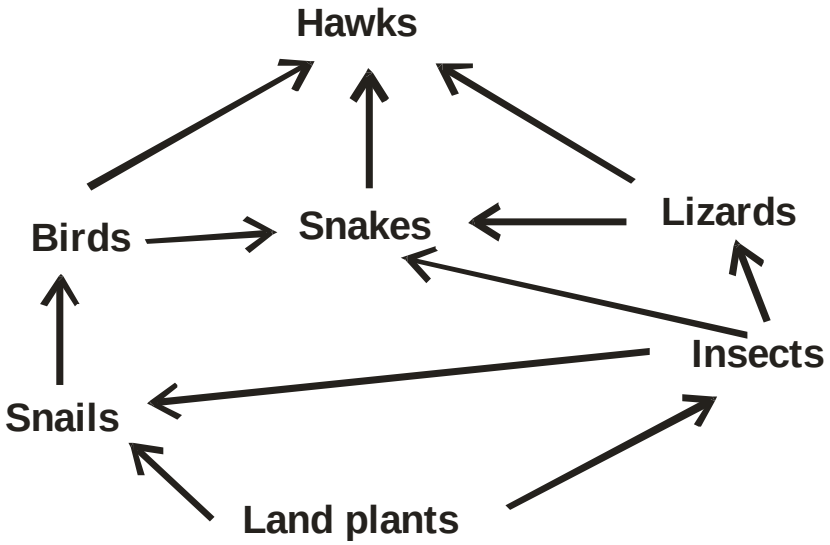
c) i) Using letter R to represent the gene for red color and W for the white colour work out the possible genotypes for F2 generation. (4marks)

ii) Work out the answer of plants in F2 with

Pink flower (1mark)

Red flowers (1mark)

2. Study the food web below and use it to answer the questions that follow



a) Identify the tropical level occupied by the hawks. (1mark)

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b) Write down any two food chains from the food web that ends with:

i) Quaternary consumer (2marks)

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ii) Tertiary consumer (1mark)

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c) Suggest **three** short term effects on the ecosystem if all the snakes died (3marks)

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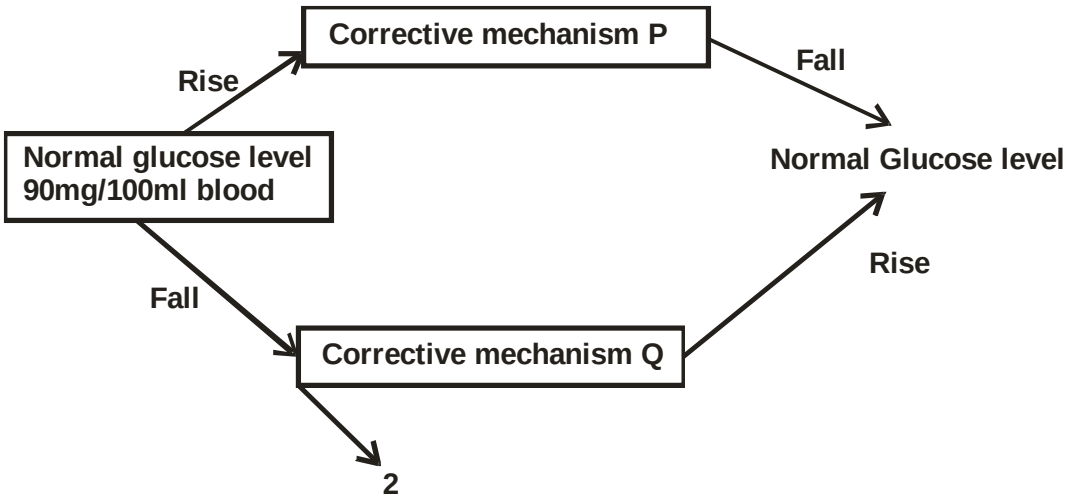
d) Which organism has the highest number of predators (1mark)

_____

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



a) Name the feedback represented by 2 (1marks)

_____

b) Explain what happens during corrective mechanism P (3marks)

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c) i) Name **two** organism involved in corrective mechanism P and Q (2 marks)

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ii) Why would glucose level be maintained constant (1marks)

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d) What is osmoregulation? (1 mark)

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4. In a fish pond the number of fish was estimated by use of the following information.

First captured =50

Second captured =90

Marked recaptured =25

a) Identify the method suggested above (1mark)

_____

b) Name **two** other sampling methods used in estimating populations (2marks)

_____

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c) Calculate the total number of fish in the pond (2marks)

d) Give **three** assumptions of the above method (3marks)

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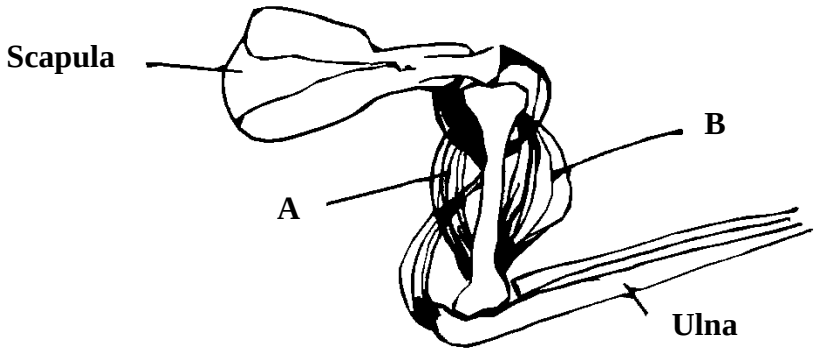
5. a) The diagram below represents bones and muscles in human arm



i) Give **two** differences between the type of muscles labeled A and B above and the type of muscles found in the blood vessel (2mark)

_____

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ii) Explain how the muscles labeled A and B above bring about stretching of the arm (2marks)

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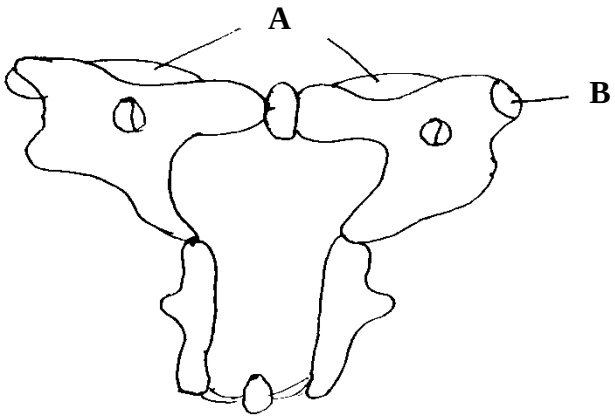
b) Below is diagram of above coiled sacrum



i) State the disgusting feature of sacrum (1mark)

_____

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ii) What is the function of sacrum in the body (1mark)

_____

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iii)How is sacrum adapted to its function (2marks)

_____

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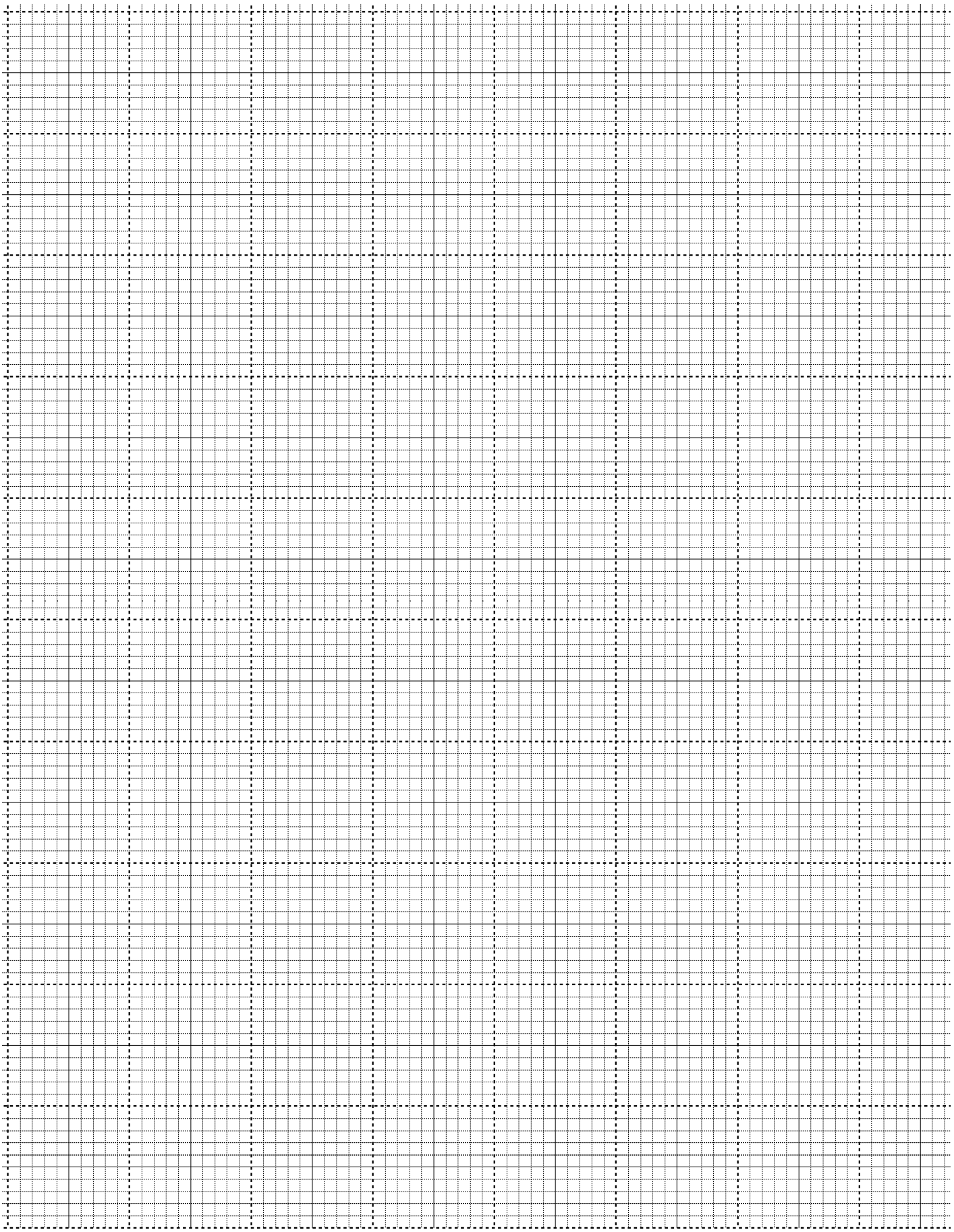
SECTION B (40 MARKS)

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

6. In an experiment to investigate the action of salivary amylase in starch, equal amount of amylase was added to equal amount of starch in in different tubes. The test tubes were placed at different temperatures. The table below shows the time taken for the enzyme to digest starch.

Time (min)	45	27.5	15	05	1.5	1	8	35
Temperature ^{0}c	0	10	20	30	35	38	40	45

a) On the grid provided, plot a graph of time in minutes against temperature. (5marks)



b) What is the optimum temperature of the enzyme (1mark)

_____

c) Account for the time taken to digest starch at

i) 5^0C (2marks)

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ii) 45^0C (2marks)

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d) Other than temperature name **two** other factors that influence the rate of enzyme action. (2marks)

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e) What is the rate of enzyme action at 15^0C? Work out using the graph drawn. (3marks)

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f) Salivary amylase continues to digest starch to maltose in the bolus from the mouth down the esophagus but stops in the stomach. Explain. (2marks)

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g) Name the secretions received in the duodenum from the pan crease to facilitate the process of digestion (1mark)

_____

h) During a scientific research on a rat hydrochloric acid was carefully introduced in the pancreatic duct to mix with the secretion before it was received in the duodenum it was discovered that no digestion took place in the duodenum. Explain . (2marks)

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7. a) Describe the adaptations of the human ear to its function (10marks)

b) Describe the following evidence of organic evolution

i) Comparative anatomy (6marks)

ii) Geographical distribution (4marks)

8. a) Define pollution (2marks)

b) Describe water pollution under the following:

i) Causes (6marks)

ii) Effects of pollutants on plants and animals (6marks)

iii)Methods of controlling pollution (6marks)

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PREDICTION 6

NAME……...……...… ADM NO…….……CLASS……

231/2

BIOLOGY

PAPER 2

(THEORY)

TIME: 2 HOURS

KCSE PREDICTION 6

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- This paper consists of **two** sections. Section **A** and section **B.**
- Answer **ALL** questions in section **A** in the spaces provided. In section **B** answer question **6** (compulsory) and either question **7** or **8** in the spaces provided after question 8
- This paper consists of 8 Printed pages. Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing.

For Examiners use only.

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total score	80	

This paper consists of 8 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

SECTION A

1. In a certain plant species which is normally green, a recessive gene for colour (n) causes the plant to be white when present in a homozygous state. Such plants die at early age. In heterozygous state, the plants are pale green in colour but grow to maturity.

(a) Suggest a reason for the early death of plants with homozygous recessive gene. **(2 marks)**

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(b) If a normal green plant was crossed with a pale green plant, what would be the genotype of the F1 generation? (Show your working) **(3 marks)**

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(c) If seeds from the heterozygous plants were planted and the resulting plants allowed to self pollinate. Workout the phenotypic ratio of the plants that would grow to maturity. **(2 marks)**

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(d) Give an explanation for occurrence of the pale green colour in heterozygous plants. **(1 mark)**

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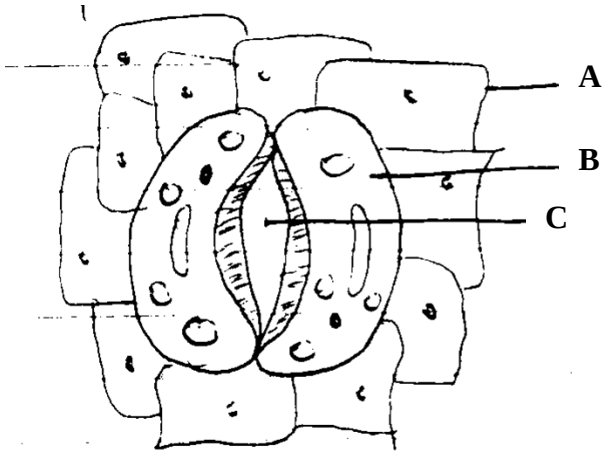
2. Study the diagram below and answer the questions that follow.



a) Name the tissue where the cells drawn above are found. **(1 mark)**

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b) Identify cells A and B. **(2 marks)**

A……..

B……..

c) Give **two** structural differences between cell A and cell B. **(2 marks)**

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d) Describe how structure C opens as explained by the photosynthetic theory. **(3 marks)**

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3. Catalase is an enzyme present in all living tissues in both plants and animals. It breaks down toxic hydrogen peroxide produced during cellular metabolism into less toxic water and oxygen is evidenced by effervescence.

In an experiment 10 ml of hydrogen peroxide was put in different boiling tubes into which different specimens were put. The table below summarizes part of the results. Carefully analyze the table and answer the questions that follow.

	The specimen	**Observation**
A	Fresh liver	A lot of bubbling almost violent
B	Boiled liver	No bubbling
C	Fresh muscle tissue	Vigorous bubbling less than tube A
D	Dry bean seed	Very slow bubbling
E	Soaked bean seed	Vigorous bubbling done intensity of tube C
F	1 cm3 potato cube	Moderate bubbling
G	1 cm3 mashed potato	Vigorous bubbling since intensity as in tube E

(a) Compare & account for the rate of bubbling between

(i) Tube A and tube B. **(2 marks)**

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(ii) Tube A and C **(2 marks)**

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(iii) Tube D and tube E **(2 marks)**

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(iv) Tube F and G **(1 mark)**

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(b) Write the equation for the reaction that produces the bubbling. **(1 mark)**

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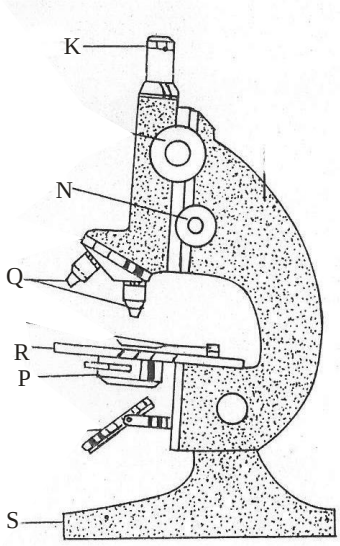
4. The diagram below shows an instrument used in the laboratory.



(a) Name the apparatus shown above

…… **(1 mark)**

(b) Name the parts labeled Q , K and R **(3 marks)**

Q……

K……

R ……..

(c) What are the functions of parts **P, N** and **S.** **(3 marks)**

P……

N……..

S…….

(d) What is the formula of calculating linear magnification **(1 mark)**

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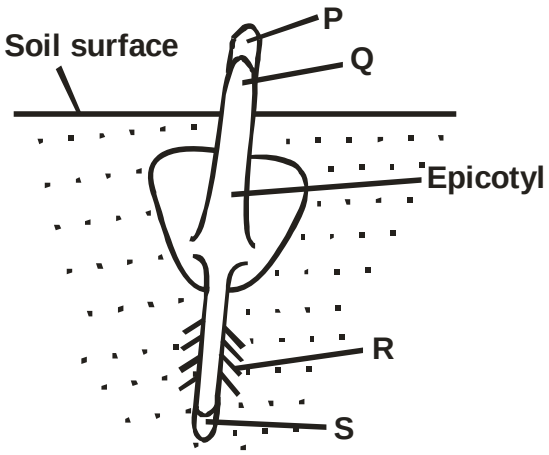
5. Diagram below represents a germinating seedling.



a) What is germination? **(1 mark)**

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b) Name the part labelled P, Q and R. **(3 marks)**

P…….

Q…….

R…….

c) Identify the type of germination shown in the diagram. **(1 mark)**

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d) What is the role of the following in germination of the above seedling?

1. Oxygen **(1 mark)**

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2. Enzymes **(1 mark)**

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3. Water **(1 mark)**

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SECTION B

Answer question 6 and either 7 or 8

6. Some students used a model to demonstrate the effect of sweating on human body temperature. Two boiling tubes A and B were filled with hot water. The surface of tube A was continually wiped with a piece of cotton wool soaked in methylated spirit. The temperature of water in the tubes was taken at the start of the experiment and then at 5 minutes interval. The results obtained are as shown in the table below.

Time (in minutes)	Temperature (°C) in tubes	
	A	B
0	80	80
5	54	67
10	40	59
15	29	52
20	21	47
25	18	46

(a) On the same axis plot graphs of temperature of water in the tubes against time. **(7 marks)**

(b) At what rate was the water cooling in tube A? **(2 marks)**

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(c) Why was tube B included in the set up? **(1 mark)**

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(d) Account for the rate of cooling in tube A **(3 marks)**

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(e) State **two** processes of heat loss in tube B. **(2 marks)**

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(f) What would be the expected results if tube B was insulated? **(1 mark)**

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(g) What would the insulation be compare to in

(i) Birds ? **(1 mark)**

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(ii) Mammals? **(1 mark)**

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(h) Name the structures in the human body that detect

(i) External temperature changes **(1 mark)**

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(ii) Internal temperature changes **(1 mark)**

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7. (a) Differentiate between nervous system and endocrine system. **(5 marks)**

(b) Describe how hormones regulate the menstrual cycle in human being. **(15 marks)**

8. How is the mammalian intestine adapted to its functions? **(20 marks)**