KCSE 2025 PREDICTIONS

2025-TOP SCHOOLS' SERIES

BIOLOGY

(EXPECTED EXAMS 1-10)

A premium collection of expertly curated KCSE 2025 prediction questions Obtained from Kenya's top 10 national schools. This comprehensive, well-organized compilation reflects national standards, offering high-quality practice to boost student readiness, confidence, and performance in upcoming final KCSE exams.

CONFIDENTIAL!

For Marking Schemes
Mr Isaboke 0746-222-000 / 0742-999-000

ALL THE BEST! SUCCESS!

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 1

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

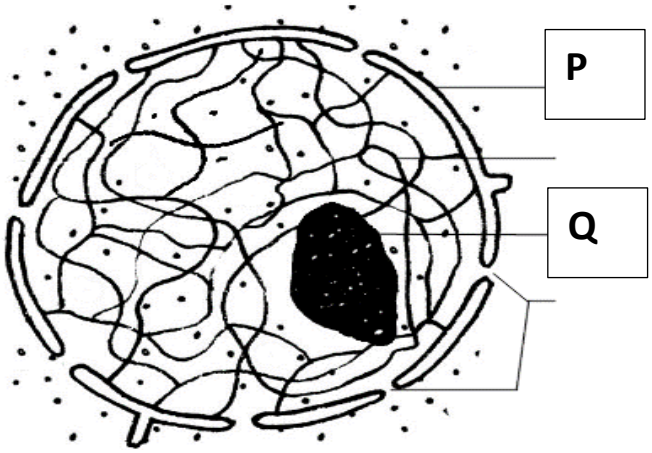
1. *Write your **Name**, **Index Number** and **School** in the spaces provided above.*
2. ***Sign** and write the **DATE** of examination in the spaces provided above.*
3. *Answer **all** the questions in the spaces provided.*
4. *Answers must be written in the spaces provided in the question paper.*
5. *Additional pages must not be inserted.*

FOR EXAMINER'S USE ONLY:

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1 – 24	80	

Answer all the questions in the spaces provided.

1. The diagram shown below represents a nucleus



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**

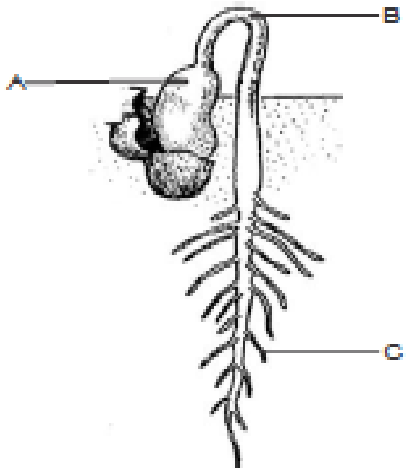
a) Aldosterone **….. ……**

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



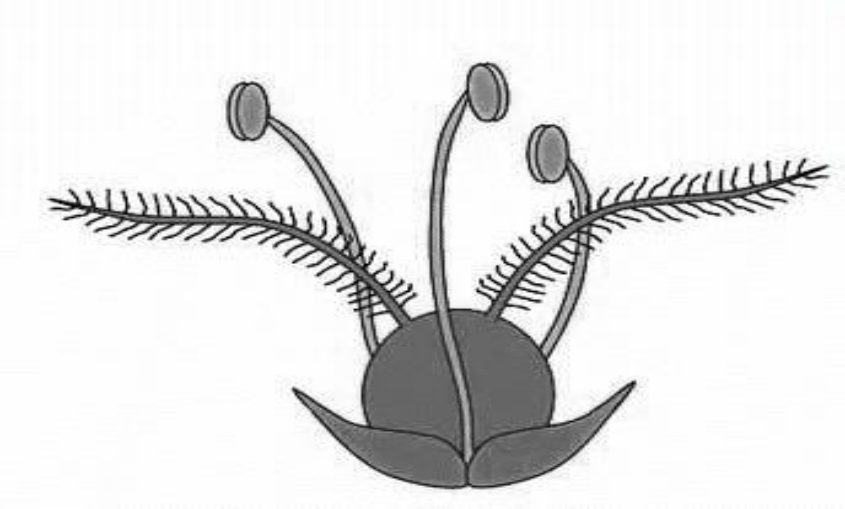
a) Give a reason why the plant above is a member of Class Dicotyledonae **(1mk**

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



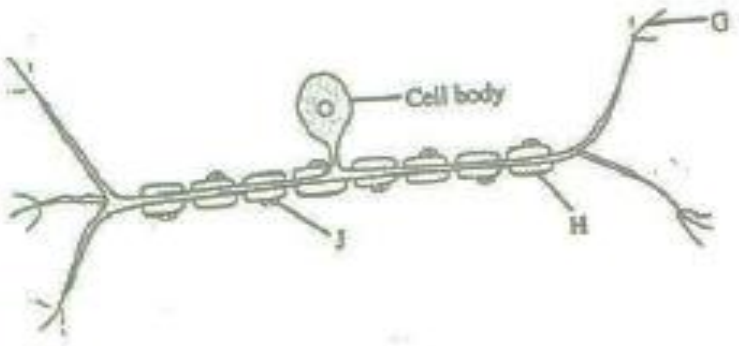
a) Name the agent of pollination for the flower shown above **(1mk**

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**

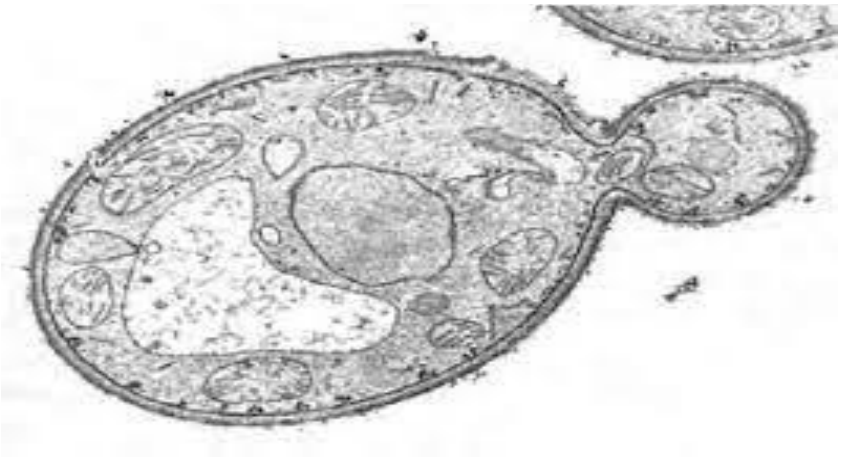
Identity **……**

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**

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**

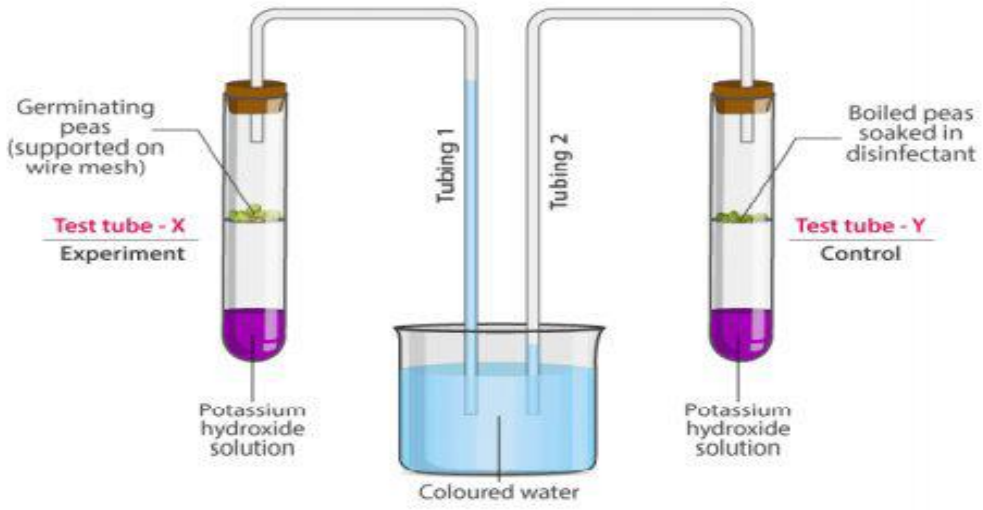
15. a) Define the term species **(1mk**

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**

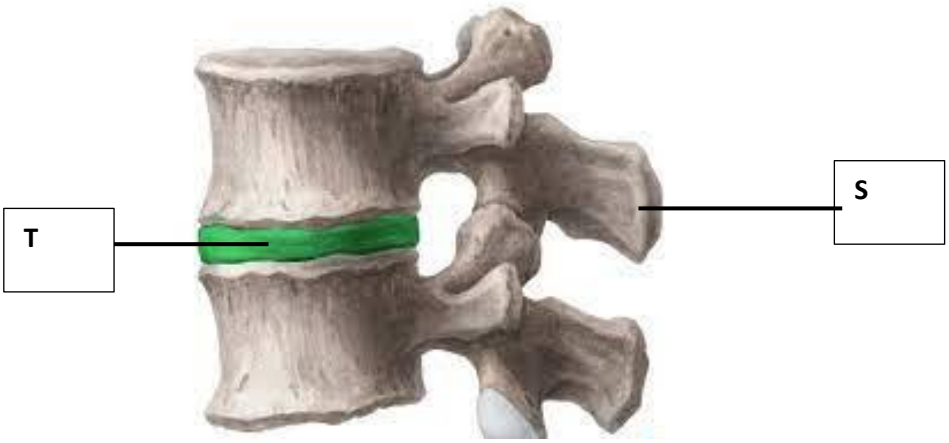
17. The following diagram represents results of an experiment carried out on two sets of germinating seeds.



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**

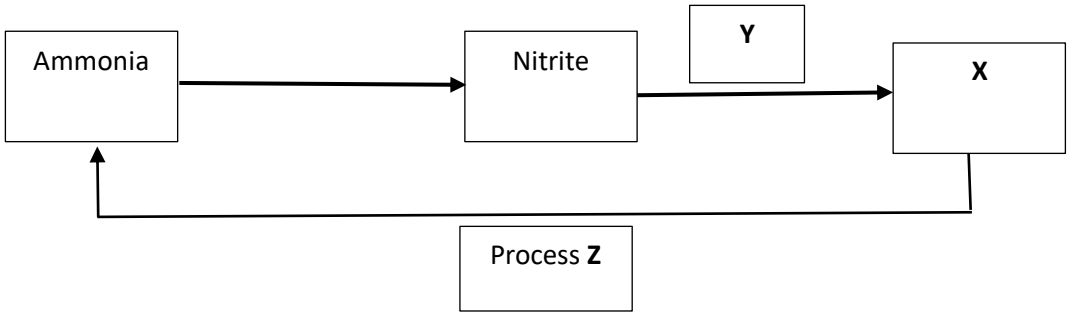
b) Schwann cell **(2mks**

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**

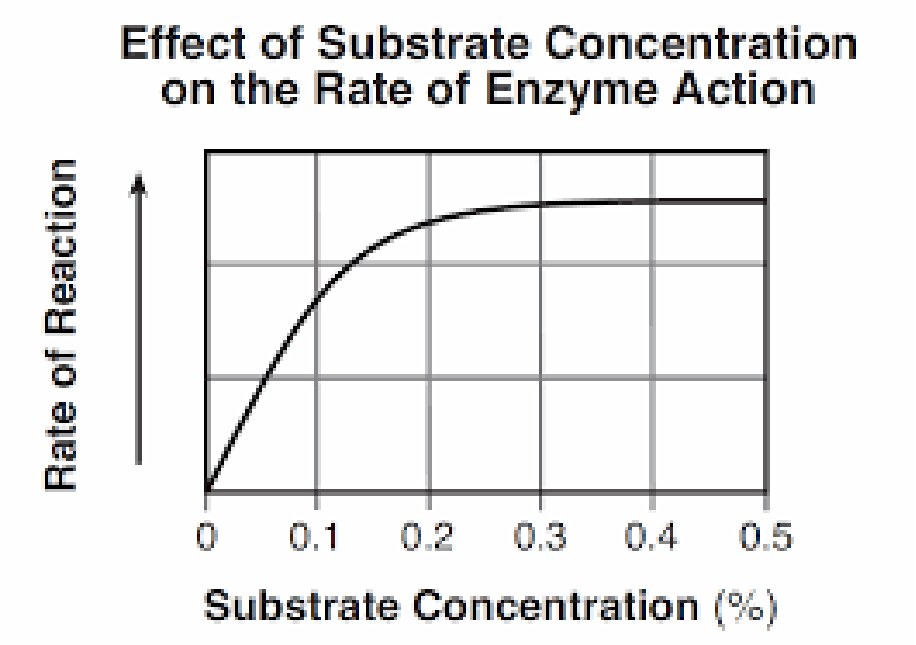
22. Samson had a road accident resulting in serious head injuries that left him with the following conditions: Loss of balance, low body temperature; poor speech, unregulated breathing and memory loss. Name the part of the brain affected that led to the following:

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**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 1

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

INSTRUCTIONS TO CANDIDATES;

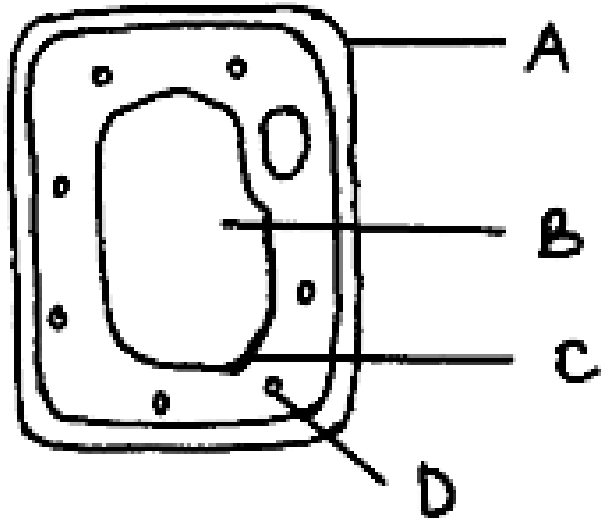
(a) *Write your name, school and index number in the spaces provided above.*
(b) *This paper consist of **TWO** sections; **A** and **B**.*
(c) *Answer **all** the questions in the section **A** in the spaces provided.*
(d) *In section **B** answer Question **6 (compulsory)** and either question **7** or **8** in the space provided after question **8**.*

FOR EXAMINER'S 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	

SECTION A: (40 MARKS)

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



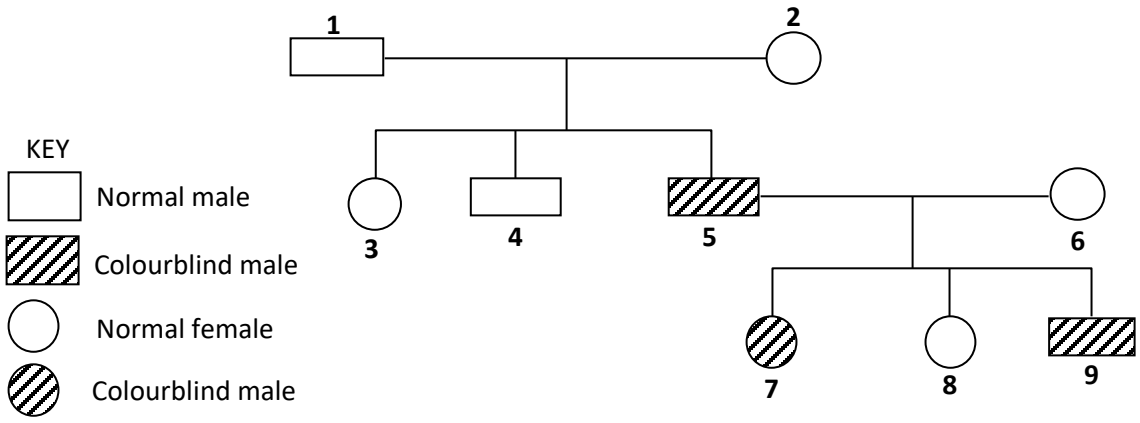
(a) Name the parts labeled **B,C** and **D** **(3mks)**

(b) What is substance which makes up part labeled **A**? **(1mk)**

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

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

2. The figure **below** is a pedigree showing the inheritance of colourblindness, a disease transmitted through a recessive gene located on the X-chromosome.

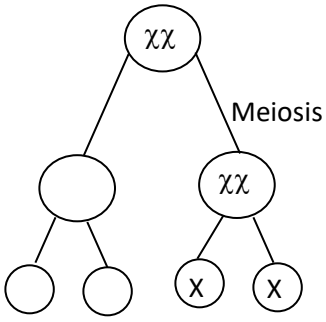


(a) Using the symbol N for normal gene and n for colourblind gene, write down the genotypes of parents **1** and **2**. **(2mks)**

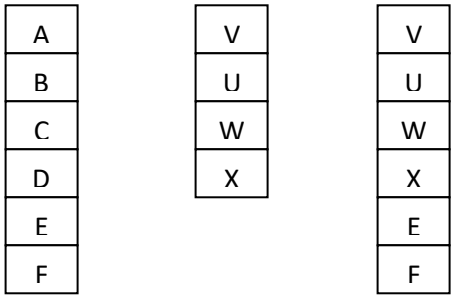
(b) Work out the possible genotypes of the children **3**, **4** and **5**. **(4mks)**

(c) The diagrams **below** illustrate some chromosome mutations.

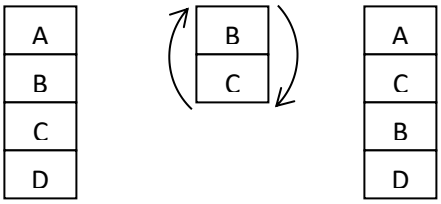
A



B

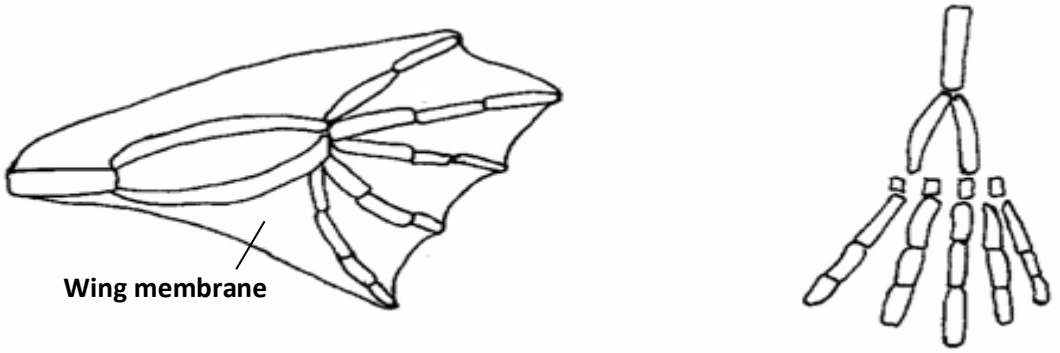


C



Identify the mutations **A,B** and **C** **(3mks)**

3. The diagram **below** shows structures of the bat wing and human arm.



(a) These structures are thought to have same ancestral origin. State **one** structural similarity and **one** adaptational difference between the two.

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

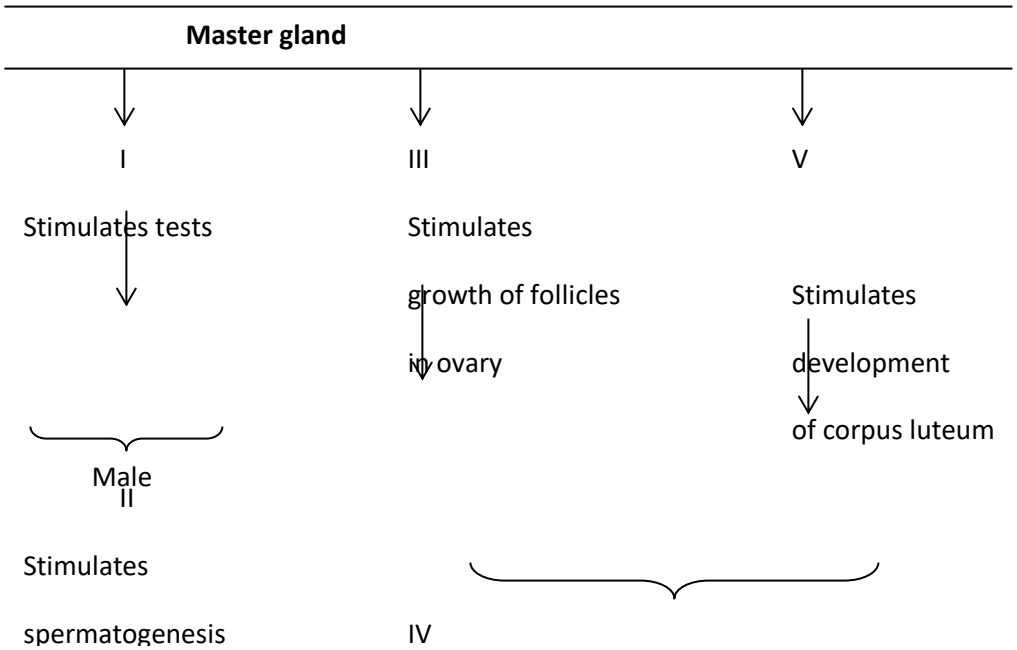
(ii) Adaptational difference. **(2mks)**

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

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

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

4. The diagram **below** represents some hormones, their sources and functions in a mammal.



(a) Identify the gland described as master gland. **(1mk)**

(b) Name the hormones:- **(4mks)**

II ……

III……

V……

VI……

(c) Describe the consequences of deficiency of hormone **II** in man. **(2mks)**

(d) Other than stimulate development of uterine wall, suggest two other functions of hormone **VI**. **(2mks)**

5. Ascaris lumbricoides is an endoparasite.

(a) Name the genus to which it belongs. **(1mk)**

(b) State the habitat of the organism. **(1mk)**

(c) State **three** ways in which the organism is adapted to living in its habitat. **(3mks)**

(d) Mention **three** ways of preventing spread of the parasite. **(3mks)**

SECTION B:(40 MARKS)

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

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

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

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

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

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

(d) Explain the observation made on the amount of urine produced as the temperature increases. **(3mks)**

(e) How is the skin adapted for temperature regulation? **(6mks)**

7. Describe the structural adaptations of the mammalian heart to its function. **(20mks)**

8. Describe how water moves from the soil to the leaves in a tree. **(20mks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 2

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

1. *Write your **Name**, **Index Number, Admission Number** and **School** in the spaces provided above.*
2. ***Sign** and write the **date** of examination in the spaces provided above.*
3. *Answer **all** the questions in the spaces provided.*
4. *Answers must be written in the spaces provided in the question paper.*
5. *Additional pages **must not** be inserted.*

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1 – 30	80	

*Answer **all** the questions*

1. State the functions of each of the following organelles: **(2mks)**

a) Plasma membrane

b) Ribosome

2. (a) State **two** ways by which leaves of plants are adapted to gaseous exchange. **(2mks)**

b) Name the structure from which the above process occurs. **(1mk)**

3. How do identical and fraternal twins arise?

i) Identical **(2mks)**

ii) Fraternal **(1mk)**

4. State three reasons why it is important for plants to lose water to the atmosphere. **(3mks)**

5. What is meant by destarching a leaf? **(1mk)**

6. State **two** ways in which sunlight increases the rate of transpiration. **(2mks)**

7. List **two** features of flowers that attract insect pollinators. **(2mks)**

8. State three activities in human digestive system that depend on respiration. **(3 mks)**

9. In the table below, indicate the deficiency diseases caused by lack of given nutrients in man. **(2mks)**

Nutrient	Deficiency disease
Iron	
Vitamin A	

10(a) Give **two** ways in which red blood cells are adapted to carry out their functions**.** **(2mks)**

(b) Name chemical forms in which carbon IV oxide is transported in the human body**.** **(2mks)**

11. Name any **two** divisions of the kingdom plantae. **(2mks)**

12. (a) Name the hormone produced in human body when one takes in a large amount of water. **(1mk)**

(b) What disease results from the inadequate production of the hormone in 12(a) above? **(1mk)**

13. A cow in a paddock was found to be infected with ticks. State the trophic level occupied by the **(2mks)**

a) i) Cow**.....**

ii) Tick**.....**

b) Give **one** disadvantage of using pesticide to eliminate the ticks. **(1mk)**

c) Write a food chain arising from the above feeding **relationship** **(1 mk)**

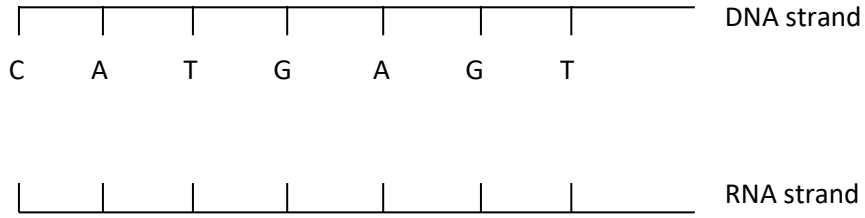
14. State two roles of water in germinating seeds? **(2mks)**

15(a) State **two** limitations of fossil records as an evidence for organic evolution theory. **(2mks)**

(b) State an idea that led to the formulation of Lamarck's theory of evolution. **(1mk)**

16. Explain what happens to red blood cells placed in distilled water for 20 minutes. **(3 mks)**

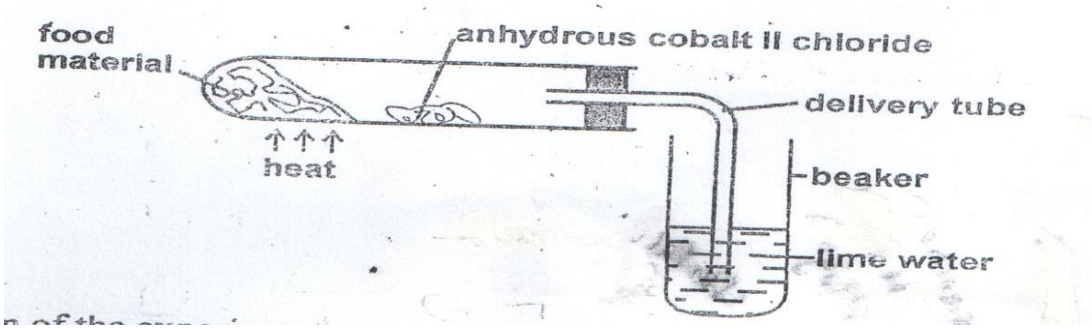
17(a) Write the base sequence of M RNA that would be coded from the DNA strand shown below. **(2mks)**



(b) How many nitrogenous bases code for a single amino acid? **(1mk)**

18. Why are animal cells put in isotonic solution when performing an experiment? **(2mks)**

19. Study the diagram below



a) Suggest the aim of the experiment. **(1mk)**

b) Account for the results observed at the end of the experiment**.** **(2mks)**

20. Explain why a camel has a longer nephron than a whale. **(3 mks)**

21. State role of the following bacteria in the nitrogen cycle. **(3mks)**

a) Nitrosomonas**.....**

b) Nitrobacter**.....**

c) Azotobacter**.....**

22. Explain the importance of each of the following during digestion in man.

a) Teeth**..... (1mk)**

b) Saliva **.....(1mk)**

23(a) Distinguish between prokayotic and eukaryotic cells. **(2mks)**

b) Name one kingdom with:

i) Prokaryotic cells **..... (1mk)**

ii) Eukaryotic cells..... **(1mk)**

24. What would blood gain on passing through each of the following organs:

i) The lungs..... **(1mk)**

ii) Active muscles..... **(1mk)**

25. How do sunken stomata lower the rate of transpiration? **(2 mks)**

26. State **two** adaptations of fruits dispersed by wind. **(2mks)**

27(a) Describe two ways how white blood cells fight against infection. **(2mks)**

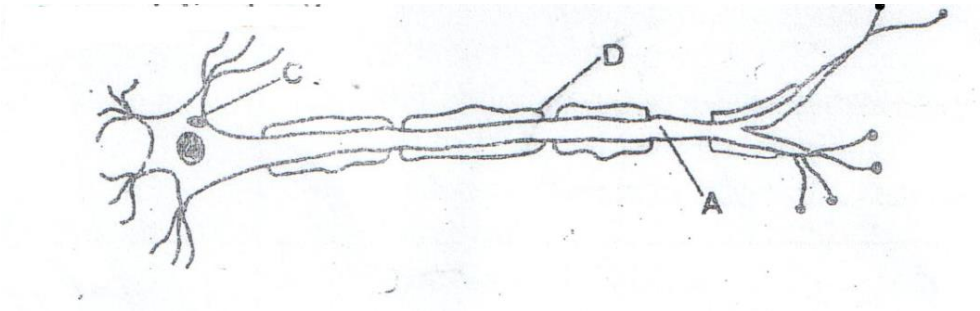
(b) State the function of blood platelets **(1mk)**

28. Calculate the diameter of the cells in micro-metre(µm) given that the diameter of the field of view is 3mm and that they are 10 cells across the field of view, the total magnification was x100. **(3mks)**

29. (a) Apart from AIDs, name **one** diseases of the reproductive system in man that is caused by viruses. **(1mk)**

(b) State **one** way by which HIV/AIDs is transmitted from mother to child. **(1mk)**

30 (a). Below is a diagram of a specialized cell:



i) Name parts **(2mks)**

A .....

D.....

ii) What is the role of part D? **(1mk)**

b. State three roles of progesterone. **(3mks)**

End

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 2

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **admission number** in the spaces provided.*
- *Answer **all** the questions in this paper in the spaces provided.*
- ***Answer questions 1-6 (compulsory) and either question 7 or 8.***

FOR EXAMINER'S USE ONLY

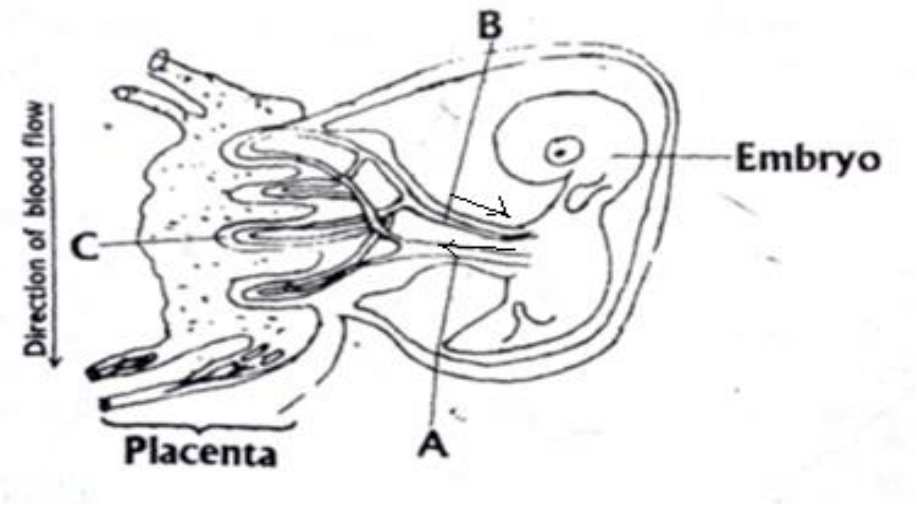
SECTION	QUESTION	MAX.SCORE	CANDIDATES SCORE
A			
B	6	20	
	7	20	
	8	20	
TOTAL		80	

1.A specimen of Drosophila has red eye and when crossed with a purple mutant all the F1 had red eyes.The offspring's were mated among themselves and the following proportions of flies were produced; 201 gad red eyes and 67 had purple eyes.Using R to represent the dominant gene and r to represents the recessive gene,answer the following questions.

i)By the help of diagrams shows how the ratio of 201:67 was arrived at ,in the F2generation. **(5mks)**

ii) Draw diagrams to show the genetic details of a cross between the heterozygous red eyed and a purple eyed individual form F2. **(3mks)**

2. The diagram below shows the relationship between blood supplies of the embryo, placenta and the uterus. Use it to answer the question that follow.



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

b) State any two functions of placenta in mammals. **(2mks)**

c) .(i)What kind of flow does maternal and foetal capillaries exhibit at the placenta. **(1mk)**

(ii) Why is this kind of flow(c) (i) have an advantage. **(1mk)**

d) If the maternal and foetal blood circulatory system were to be directly connected at the placenta suggest what may happen. **(1mk)**

e) In lactating mammals if the pituitary gland is removed, explain what happens. **(1mk)**

3. A student was given four test tubes A, B, C and D, each containing a different mixture among the following:

i) Starch +amylase + maltase+water
ii) Starch +Pepsin +Water
iii) Starch +Glucose +Water
iv) Cellulose +amylase+trypsin+Water

She placed the test tubes in an incubator at 30^0C until all possible reactions had taken place.She then took samples from each test tube and tested them separately for starch,reducing sugar and protein. The results obtained are given in the following table.

Tube	Starch	Reducing	Protein
A	Present	Present	Absent
B	Absent	Absent	Present
C	Present	Absent	Present
D	Absent	Present	Present

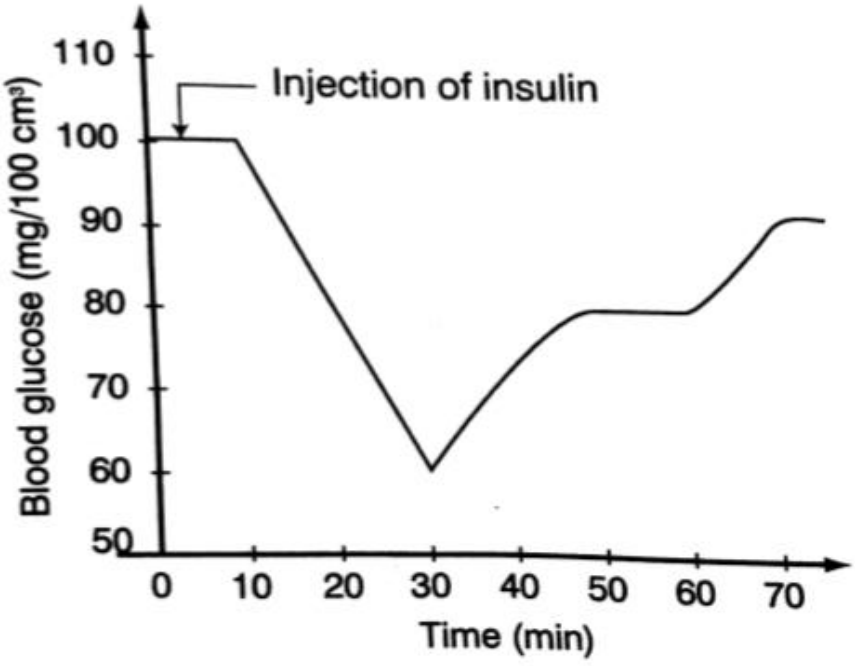
a) Name a reagent used to test for reducing sugar and state the appearance of a positive result.

(2mks)

b) Identify the contents of each of the test tube A,B,C and D according to the results obtained.**(4mk**

c) State the role of enzyme in respiration. **(2mks)**

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



a) Why is insulin injected into blood stream directly instead of being taken orally. **(2mks)**

b) Explain the fall in blood glucose level. **(2mks)**

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

(1mk)

d) Name the hormone responsible for the conversion of glycogen to glucose. **(1mk)**

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

i)Too much glucose in the blood. **(1mk)**

ii) Very little glucose in the blood. **(1mk)**

5. The diagram below shows a stem of a passion fruit twining around a post.

a)What is the name given to the type of growth movement shown above? **(1mk)**

b) What is the biological importance of this growth? **(1mk)**

c .i) Account for the twining growth pattern. **(3mks)**

ii) Name three other types of growth responses exhibited by plants. **(3mks)**

SECTION B(40 MARKS)

Answer question 6 and either question 7 or 8

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

a)Name two other acids (other than sulphuric acid)that can be found in acid rain. **(2mks)**

b)An experiment was carried out to investigate the effects of dilute sulphuric acid on the growth of plant seedlings.Batches of seedlings were grown in glass dishes on filter paper to which dilute sulphuric acid was added.The dishes were then incubated.The root and shoot lengths were measured after 65 hours.The results obtained are as shown in the table below.

Sulphuric acid Concentration (mol/dm^{-3})	Mean root Length(mm)	Mean shoot Length(mm)

0	55.5	25.2
$1x10^{-3}$	63.4	18.4
$3x10^{-3}$	6.5	9.5
$4x10^{-3}$	2.0	4.6
$6x10^{-3}$	1.8	0.8
$7x10^{-3}$	1.5	0.5
$8x10^{-3}$	1.3	0.3
$9x10^{-3}$	1.3	0.0
$10x10^{-3}$	1.0	0.0

Plot a graph of the mean root length and the mean shoot length against the sulphuric acid concentration on the same grid. **(7mks)**

c) Describe the relationship between the concentration of sulphuric acid and the:

i)Growth of the shoots. **(2mks)**

ii) Growth of the roots. **(2mks)**

d)Estimate the mean root and mean shoot lengths when the concentration of sulphuric acid is $5x10^{-3}$. **(2mks)**

e)State two other effects of acid rain. **(2mks)**

f) State three ways of preventing acid rain. **(3mks)**

7.(a) Describe the following terms:

(i) Secretion

(ii) Excretion

(iii) Egestion **(3 mks)**

b)Explain how the mammalian kidney is adapted to its functions. **(17 mks)**

8. Explain the role of hormones in the growth and development of plants. **(20mks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 3

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

231/1

Biology

Paper 1

(Theory).

INSTRUCTIONS TO CANDIDATES:

- *Write your name and index number in the spaces provided.*
- *Sign and write date of examination in the spaces provided above*
- *Answer all the questions in this paper in the spaces provided.*

FOR EXAMINER'S USE ONLY:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE %
1- 21	80	

Answer all the questions

1. (a) What is carbonic anhydrase? **(2 marks)**

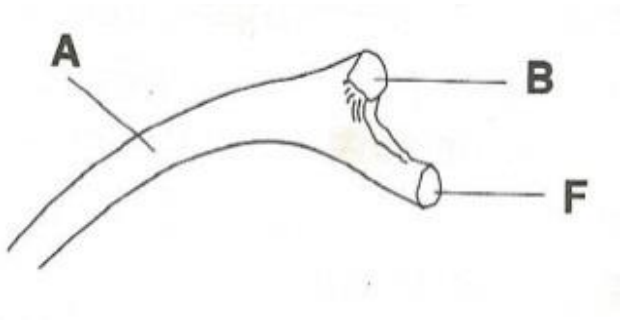
(b) State the role of haemoglobin in the transport of carbon (IV) oxide. **(2 marks)**

2. What is the role of light to a lion in the ecosystem? **(4 marks)**

3. (a) State the contents of lysosomes. **(1 mark)**

(b) State the functions of the contents named in (a) above. **(2 marks)**

4. (a) The diagram below represents part of a rib.



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

(b) State the function of the broad facets on the anteriour part of the atlas. **(1 mark)**

5. Describe the role played by water in the support of herbaceous plants. **(3 marks)**

6. State the role played by the following structures during inhalation:

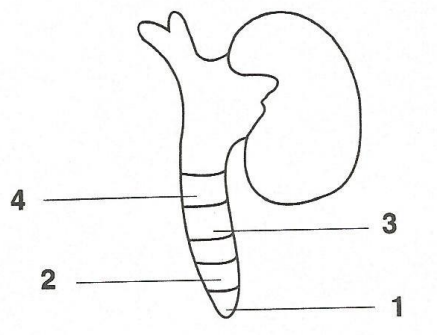
(a) Diaphragm, **(2 marks)**

(b) Intercostal muscles. **(3 marks)**

7. (a) Name **two** genetic disorders of blood. **(2 marks)**

(b) Define the term backcross. **(1 mark)**

8. The diagram below shows a newly germinated seedling with ink marks 2 mm apart. Study it and answer the questions that follow.



(a)(i) Which region would you expect to be longest after 5 days further growth? **(1 mark)**

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

(b) In which regions would you expect root hairs to appear? **(1 mark)**

(c) Name the structure that protects the region labelled **I**. **(1 mark)**

9.(a) How is high pressure build up in the glomerulus? **(1 mark)**

(b) Why is this pressure necessary? **(1 mark)**

10. (a) Describe the concentration and volume of urine produced by a person who has been playing soccer on a hot day. **(2 marks)**

(b) Explain your answer in (a) above. **(3 marks)**

11. (a)(i) Name the process that results in the formation of pyruvic acid in a cell. **(1 mark)**

(ii) Name the part of a cell where the process named in (a) above occurs. **(1 mark)**

(b) Name the process that utilizes the pyruvic acid from the process named in (a) above. **(1 mark)**

12. Name the organelle that performs the following functions in a cell.

(a) Transports cell secretions, **(1 mark)**

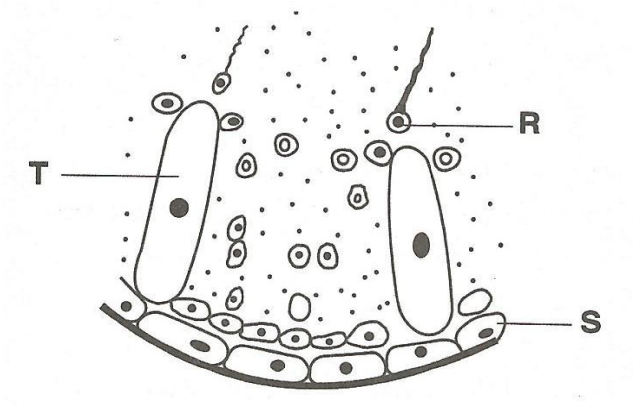
(b) Controls materials entering and leaving the nucleus. **(1 mrk)**

(**c) Forms** cilia and flagella. **(1 mark)**

13.(a)Name the structure responsible for intermittent growth in an insect, giving a reason.**(2 mks)**

(b) Name a hormone produced by the corpus allatum in insects. **(1 mark)**

14. The diagram below shows part of a seminiferous tubule.



(a) Name the parts labelled **R**, **S** and **T**. **(3 marks)**

(b) Name the tube into which the seminiferous tubules open. **(1 mark)**

15. State **two** main events that occur at interphase I. **(2 marks)**

16. Describe how oxygen from the environment reaches a respiring cell of a terrestrial leaf.**(3 mks)**

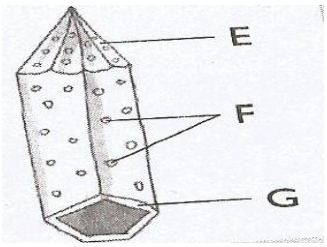
17. Give **two** reasons why gametes are haploid. **(2 marks)**

18. A plastic bottle full of water was stoppered with a piece of stem from a young herbaceous plant, whose epidermis had been peeled off. After 24 hours, it was noted that the stopper closed the bottle tightly. Explain the observation made. **(3 marks)**

19. (a) Name the products of the light dependent stage of photosynthesis**.** **(1 mark)**

(b) Explain why some plants such as *Drosera* species trap and digest insects. **(3 marks)**

20. The diagram below represents a certain plant structure.



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

(b) Name the parts labelled **E**, **F** and **G**. **(3 marks)**

(c) State **two** functions of the structure. **(2 marks)**

21.(a) What are fossils? **(1 mark)**

(b) State **two** limitations of the use of fossils as evidence for evolution. **(2 marks)**

(c) What is meant by the following terms?

(i) Struggle for existence**,** **(1 mark)**

(ii) Survival of the fittest. **(1 mark)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 3

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **admission number** in the spaces provided.*
- *Answer **all** the questions in this paper in the spaces provided.*
- ***Answer questions 1-6 (compulsory) and either question 7 or 8.***

FOR EXAMINER'S USE ONLY:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1	8	
2	8	
3	8	
4	8	
5	8	
6	20	
7 or 8	20	

SECTION A

Answer all questions in this section

1. **A** student carried out an investigation on the methods of reproduction and feeding in Amoeba species. He observed that amoeba doubled in water after 20 minutes.

(a) Name the type of reproduction shown by amoeba species. **(1 mark)**

(b) Illustrate the process of reproduction named in (a) above. **(2 marks)**

(c) If at the start of the investigation, there were 20 amoeba cells in a given quantity of pond water. Calculate the total number of amoeba cells which would be present in the sample of pond water after three (3) hours. **(2 marks)**

(d) State the functions of pseudopodia in amoeba species. **(2 marks)**

(e)(i) Name **one** type of specialized cells in human body which shows a similar mode of feeding as amoeba species. **(1 mark)**

(ii) Name the process of feeding shown by the cell named in (e) (i) above. **(1 mark)**

2. During an ecological study of a lake, a group of students recorded the following observations;

(i) Planktonic crustaceans feed a planktonic algae.

(ii) Small fish feed on planktonic crustaceans, worms and insect larvae.

(iii) Worms feed on insect larvae.

(iv) A bird species feeds on small fish, planktonic crustaceans and worms.

(v) Insect larvae feed on planktonic algae.

(vi) Large fish feed on small fish.

(a) Construct a food web to represent the record of observation provided above. **(3 marks)**

(b) From the food web you have constructed in (a) above isolate and write down a food chain that ends with;

(i) Birds species as secondary consumer. **(1 mark)**

(ii) Large fish as tertiary consumer. **(1 mark)**

(c) The biomass of the producers in the lake was found to be greater than that of the primary consumers. Give an explanation for this observation. **(1 mark)**

(d) State **two** ways by which man may interfere with this ecosystem**.** **(2 marks)**

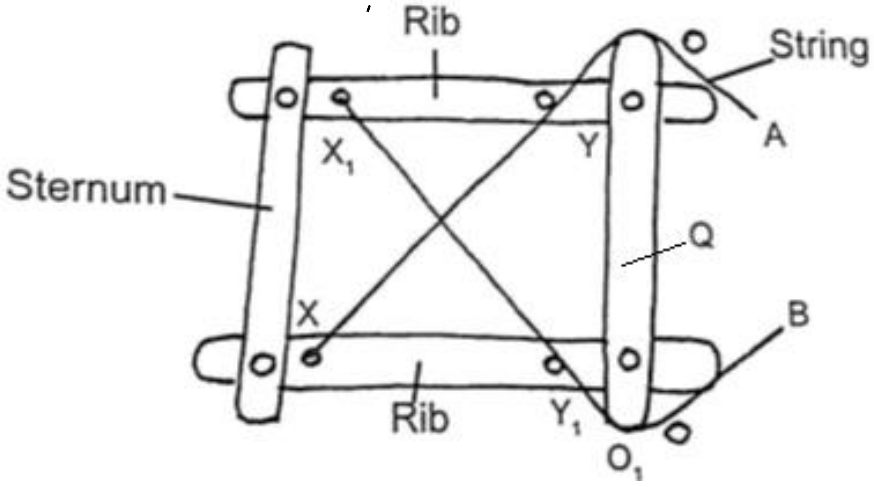
3. Broad and thin lips are inheritable characteristics in humans. When a homozygote broad lipped man is married to a homozygote thin lipped woman, all the children in the family are broad lipped. In a particular family, a woman that is heterozygote for broad lips is married to a man whose parents were both thin lipped. Let B represent gene for broad lips.

(a) Work out the genotypes of the children in that family. (Use a punnet square). **(4 marks)**

(b) Work out the phenotypic ratio and genotypic ratio of the resulting children from the crossing in (a) above. **(2 marks)**

(c) Give two sex- linked traits in man **(2 marks)**

4. The figure below shows a model which was used by a group of Form 2 students to show the effect of or action of intercostal muscles on the movement of ribs.



(a) How does the sternum move when; **(2 marks)**

(i) String A is pulled tight.

(ii) String B is pulled tight.

(b) Between string A and B, which one represents; **(2 marks)**

(i) External intercostal muscles?

(ii) Internal intercostal muscles?

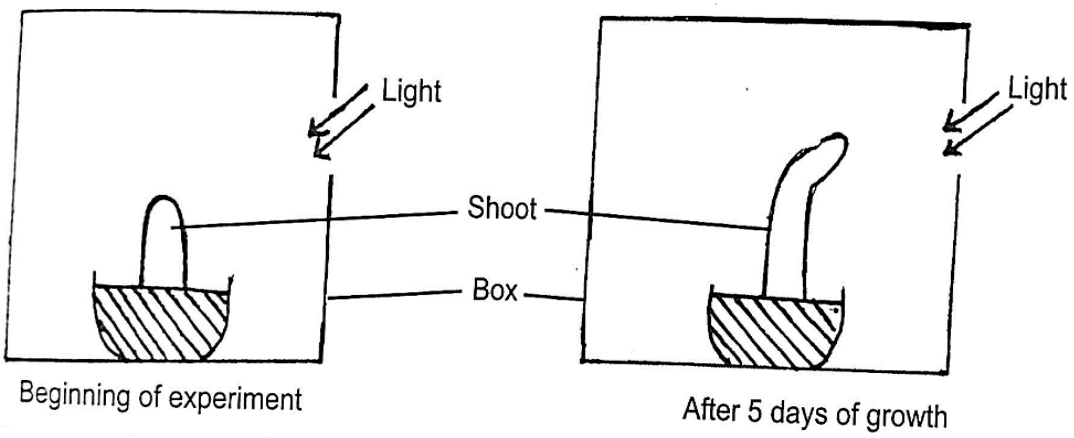
(c) What does structure Q represent in an animal? **(1 mark)**

(c) The rates of gaseous exchange by different respiratory surfaces of plants were determined and recorded in the table below.

Structure	Gaseous exchange in %
A	89
B	3
C	0.3

Suggest the possible plant structure represented by A, B, C. **(3 marks)**

5. The diagram below shows an experiment set up using a seedling enclosed in a desk box with a hole on one side at the beginning of the experiment and after five days of growth.



(a) What type of response is shown by the above shoot? **(1 mark)**

(b) State **two** observable changes which took place in the seedling after five days of growth. **(2 marks)**

(c) **Account** for the observable changes in (b) above. **(2 marks)**

(d) What observations would be made after five days of growth if the shoot was placed in a box without a hole on one side? **(3 marks)**

SECTION B

6. The table below shows how variation in environmental temperature relate to the body temperatures of two different types of animals A and B.

	Body temperature (^{0}C)	
Environmental temp (^{0}C)	Animal A	Animal B
5	5	36
10	10	37
15	15	37
20	20	37
25	25	37
30	29	37
35	36	37
40	41	37
45	44	37

(a) Using the information in the table above, plot a graph on same axes of body temperatures animals against environmental temperature. **(7 marks)**

(b) With reference to thermoregulation, state the general name given to animals of the A and B types. **(2 marks)**

A - type animals

B - type animals

(c) What **three** advantages do B-type animals have over A-type animals? **(3 marks)**

(d) Briefly describe how B-type

i) Physiologically respond to heat **(4 marks)**

ii) Physiologically respond to cold **(4 marks)**

7. Describe experiments you would conduct to show that;

(a) Carbon (IV) oxide, (b) Chlorophyll and (c) Sunlight are necessary for the process of photosynthesis under the following subheadings:- **(20 marks)**

(i) Aim
(ii) Materials and apparatus
(iii) Procedure
(iv) Expected observation
(v) Conclusion

8. Describe **five** evidences, which support the theory of organic evolution. **(20 marks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 4

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your name, class and admission number in the space provided above.*

b) *Write the date of the examination and sign in the space provided above.*

c) *Answer* ***all*** *the questions in the spaces provided.*

d) *You may be penalized for wrong spelling especially technical terms.*

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-33	80	

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

1. Below is an image of a biological vector. Use it to answer questions that follow.

(a) Identify the parasite transmitted into human blood by the organism. **(1 mark)**

(b) Name the blood cells that are destroyed by the parasite in (a) above. **(1 mark)**

(c) State one biological method used to eradicate the larvae of this organism**.** **(1 mark)**

2. Give the structural adaptations of the following in an insect pollinated plant.

(a) Pollen grain. **(1 mark)**

(b) Stigma. **(1 mark)**

3. State the causative agents of the following diseases

(i) Tuberculosis. **(1 mark)**

(ii) syphilis **(1 mark)**

4 a) What do you understand by the term ecologically balanced ecosystem? **(1mk)**

b) Give two reasons for loss of energy from one trophic level to another in a food web **(2mks)**

5. Identify the following types of responses:

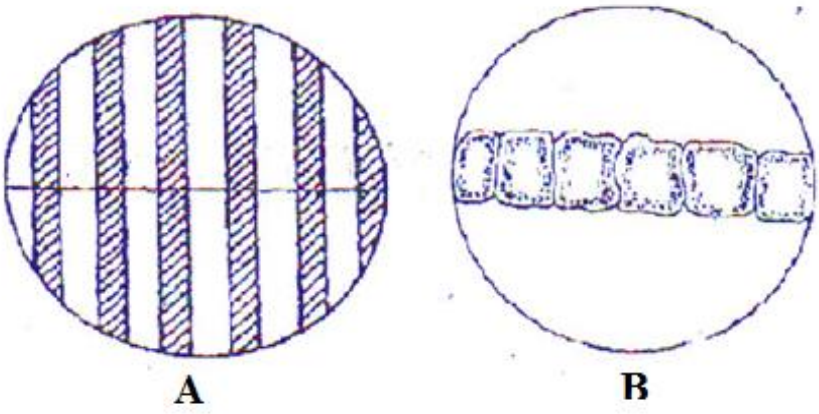
(a) Pollen tube growing towards the ovary **(1 mark)**

(b) Maggots moving away from light. **(1 mark)**

6. State two activities of the cell that are controlled by the nucleus. **(2 marks)**

7. Distinguish between botany and zoology. **(1 mark)**

8. The field of view of a light microscope appeared as shown below in diagram A and the diameter in **A** was occupied by cells as shown in **B.**



Calculate the length of one cell. **(2 marks)**

9. State two importance of water in germination of seeds. **(2 marks)**

10. Why is sexual reproduction advantageous in flowering in plants? **(2 marks)**

11. Below is an illustration of an organism captured by students during a practical lesson.

(a) Identify two features that enable the organism to be placed in the phylum Arthropoda. **(2 marks)**

(b) Explain why the organism will die when Vaseline is applied on its thorax. **(1 mark)**

12. Name two properties of enzyme amylase. **(2 marks)**

13. State the significance of natural selection. **(2 marks)**

14. Explain why a plant shoot develops lateral branches when its tip is removed. **(2 marks)**

15. Why is eating a lot of biscuits harmful to the teeth. **(2 marks)**

16. a) Name the part of the chloroplast where each of the following activities take place.

i) Light stage……..**(1mk)**

ii) Dark stage…….**(1mk)**

b) Name two types of cells in a leaf that carry out photosynthesis **(2mks)**

17. State any three disorders due to Gene mutation in human beings **(3 marks)**

18. Why is it important that the radicle develops first during germination? **(2 marks)**

19. (a) Explain one event of mitosis that restores the genetic constitution of an organism. **(1 mark)**

(b) Identify the following types of cell division:

(i) Division of generative nucleus into male nuclei. **(1 mark)**

(ii) Division of cells lining the seminiferous tubules. **(1 mark)**

20. State two observable characteristics that show discontinuous variations in *Drosophila melanogaster* **(2 marks)**

21. Explain why athletes breathe quickly and deeply after a 100 meters sprint. **(2 marks)**

22.(a) State two proteins that determine human blood groups. **(1 mark)**

(b)(i) What is the role of blood capillary? **(1 mark)**

(ii) Explain why blood does not clot in undamaged blood vessels. **(1 mark)**

23.(a) List one type of chromosomal aberrations. **(1 mark)**

(a) State one advantage of polyploidy in modern farming. **(1mark)**

24. Explain:

(a) Why insulin is not administered orally. **(1 mark)**

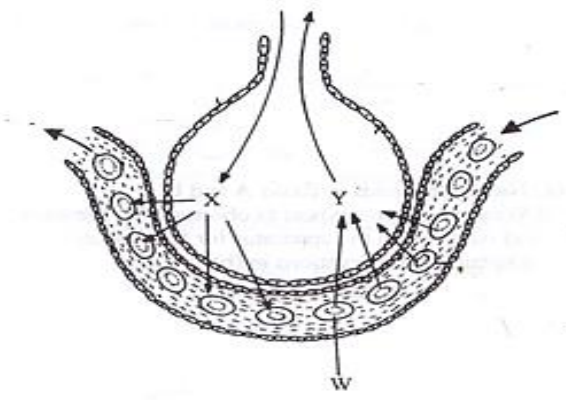
(b) Why stomach wall is lined with mucus **(1 mark)**

25.(a) What is homeostasis? **(1 mark)**

(b) State two behavioral mechanisms used by snakes to increase their body temperature. **(2 marks)**

26. Explain why only a small amount of food materials taken up by herbivores is passed on to secondary consumers. **(2 marks)**

27. Below is a diagram of a respiratory surface. Use it to answer questions that follow.



(a) Name the physiological process involved in the exchange of gases in the structure above. **(1 mark)**

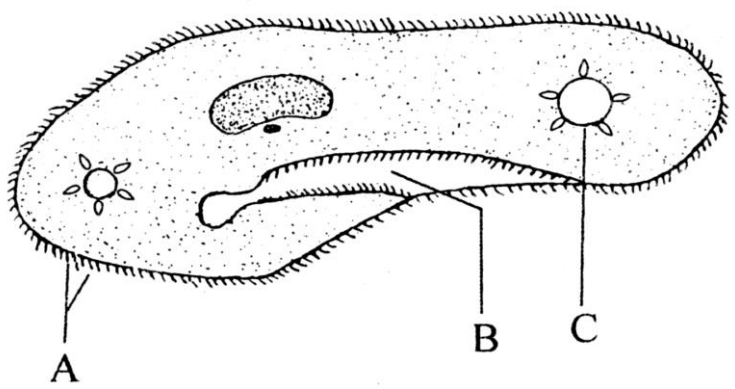
(b) Identify the substance in cell labeled w that has high affinity for gas X. **(1 mark)**

(c) State the advantage of gas **Y** being transported in cells labeled **W** **(1 mark)**

28. (a) Explain why when transplanting a young plant, it is advisable to remove some leaves. **(2 marks)**

(b) Give one role of xylem vessels other than transport **(1 mark)**

29. Study the diagram below and answer the question that follows:



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

(b) State the function of the structure labelled **C**. **(1 mark)**

30. State two characteristics of a bony fish which enable it to reduce friction in water. **(2 marks)**

31. (a) Identify the structural difference between the wing of a bird and the wing of an insect **(1 mk)**

(b) Identify the type of evolution exhibited by the wings of birds and insects and state the name given to such structures. **(2 marks)**

32. Name two characteristics that are controlled by the gene located on:

i) Y chromosomes **(2mks)**

ii) X chromosomes **(2mks)**

33. (a) What is the role of a pollen tube. **(1 mark)**

(b) Identify the role of the following hormones in males:

(i) Follicle stimulating hormone. **(1 mark)**

(ii) Testosterone. **(1 mark)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 4

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

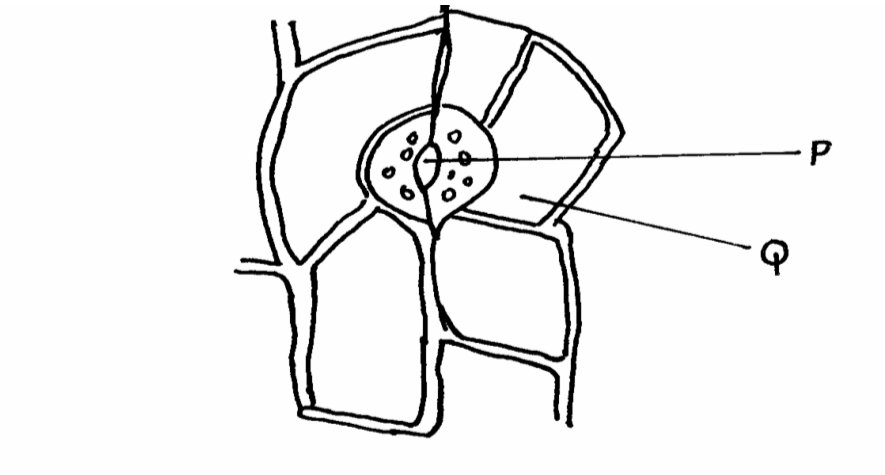
a) *Write your name and Admission number in the space provided above.*
b) *This paper has **two** sections **A** and **B**.*
c) *Answer **ALL** the questions in section **A** in the spaces provided on the question paper.*
d) *In section **B** answer question **6(compulsory)** and either question **7** or **8***

For Examiner's Use Only.

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

QUESTIONS

1. The diagram below shows a portion of a lower epidermis of a sukuma wiki leaf.

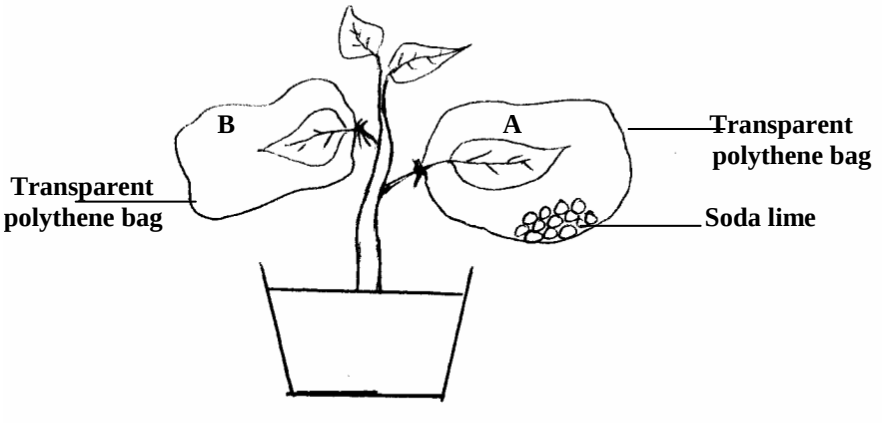


a) Name the parts labeled P and Q. **(2mks)**

b) Briefly describe the photosynthetic theory of stomata opening. **(5mks)**

c) State one modification in the stomata of xerophyte plant other than being sunken and hairy. **(1mk)**

2. The diagram below represents an experimental set-up to investigate an aspect of photosynthesis.



The set up was placed in darkness for 24 hrs and then exposed to light for 5 hrs.

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

(b) Leaves **A** and **B** were tested for starch.

(i) What would be the expected results? **(2marks)**

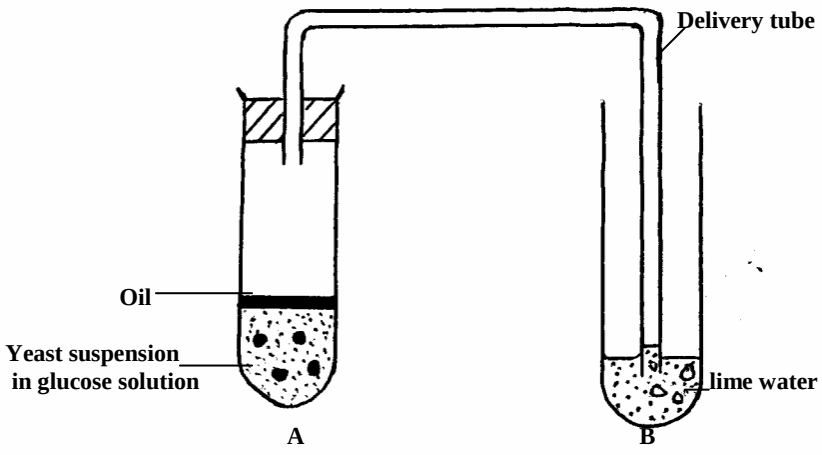
(ii) Give reasons for your answer in **(b) (i)** above. **(2marks)**

(c) What was the role of leaf **B** in the experiment **(1mark)**

(d) Why was the set – up placed in darkness for 24 hours? **(1mark)**

(e) Name the organelle in a plant where photosynthesis takes place **(1mark)**

3. The diagram below illustrates an experiment to demonstrate a certain biological process.



Before adding yeast suspension in tube **A**, the glucose solution was first boiled and cooled.

a. What biological process was being demonstrated? **(1mark)**

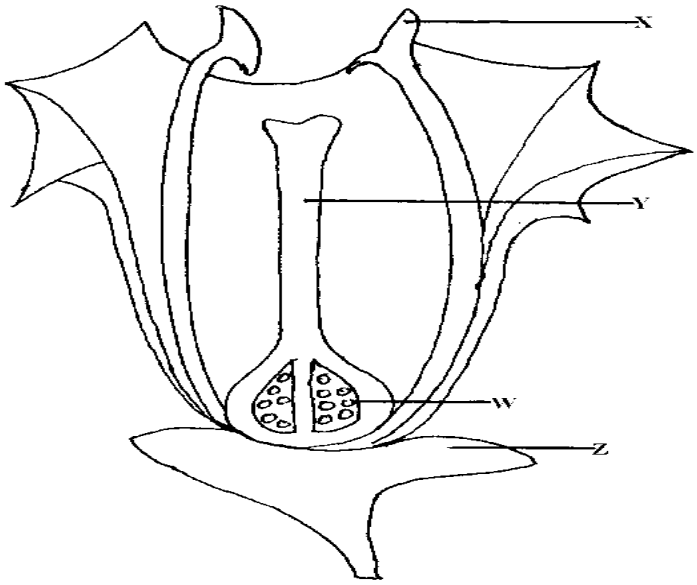
(b) (i) What observation would be made in tube **B** after 20 minutes of the experiment?**(2marks)**

(ii) Account for the observations made in **(b) (i)** above **(2marks)**

(c) Write down an equation to summarize the reaction taking place in tube **A**. **(1mark)**

(d) State two industrial applications of the chemical reaction taking place in tube **A**. **(2marks)**

4. The diagram below represents a flower.



(a) Name the parts labeled X and Y. **(2mks)**

(b) Describe the ovary position. **(1mk)**

(c) (i) **Suggest** an agent of pollination of the flower above **(1mk)**

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

(d) On the diagram above, which part do you expect to find haploid nucleus after meiosis? **(1mk)**

(e) In the flower above its sepals cell was found to have 20 chromosomes. **What** would be the number of chromosomes found in the endosperm cell of the flower embryo sac after fertilization? **(1mk)**

(f) State one way in which flowers prevent self – pollination. **(1mk)**

5. When the offspring of purple and white flowered pea plants were crossed, they produced purple and white flowered plants in the ratio of 3: 1

Using letter H to represent the gene for purple colour

(a) State the genotype of:

(i) Parents **(2 mks)**

(ii) F_1 Generation **(1 mk)**

(b) Work out the cross between plants in the F_1 generation **(4 mks)**

(c) Account for the colour the flowers in plants of the F_1 generation **(1 mk)**

SECTION B (40 marks)

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

6. In an experiment to investigate the effect of temperature on the activity of salivary amylase enzyme, test tubes containing 5 cm^3 of starch solution were placed in water baths maintained at different temperatures. After 30 minutes, 0.1cm^3 amylase solution was added into each of the tubes.

At one minute intervals, a drop of the mixture in each tube was tested for presence of starch. The time taken for all the starch to be digested was taken and recorded. The results were as shown in the table below.

Temperature (^{0}c)	5	10	15	20	25	30	35	40	45
Time taken to digest all starch (mins)	80	60	48	26	18	9	3	14	75

(a) On the grid provided **plot** a graph of time taken to digest all the starch against temperature. **(6 marks**

(b) What was the optimum temperature range for this enzyme? **(1mark)**

(c) Account for the results obtained at

(i) 5^0C **(2marks)**

(ii) 45^0C **(2marks)**

(d) Apart from temperature **name three** other factors that would affect the above reaction. **(3marks)**

(e) Name two regions in a human body where digestion of starch occurs. **(2marks)**

(f) (i) Give three metallic ions that act as enzyme co- factors in a human body. **(2marks)**

(ii) What is the role played by enzyme co- factors in the physiology of human body? **(1mark)**

(g) Name the major respiratory substrate in a mammalian body during severe starvation. **(1mark)**

7. How are leaves of mesophytes suited to their function? **(20mks)**

8. Describe the adaptations of the mammalian skin to its functions. **(20mks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 5

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

1) *Write your name and Index Number in the spaces provided above.*

2) *Sign and write date of examination in the spaces provided above.*

3) *Answer **ALL** questions in the spaces provided.*

4) *All workings **MUST** be clearly shown where necessary.*

FOR EXAMINERS USE ONLY.

Question	Maximum Score	Candidates Score
1 – 25	80	

*Answer **ALL** questions in the spaces provided.*

*Answer **ALL** questions*

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

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

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

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

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

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

Strip **A:**

Strip **B:**

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

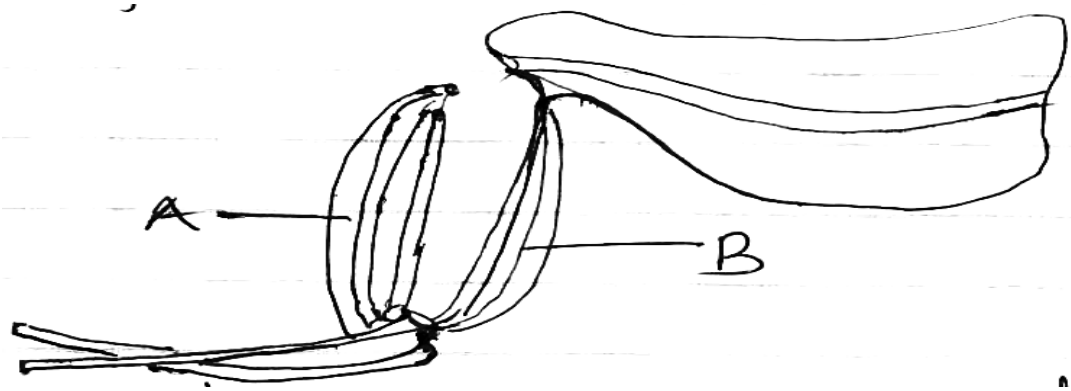
5. State the biological significance of each of the following:

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

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

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

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



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

A:……

B:……

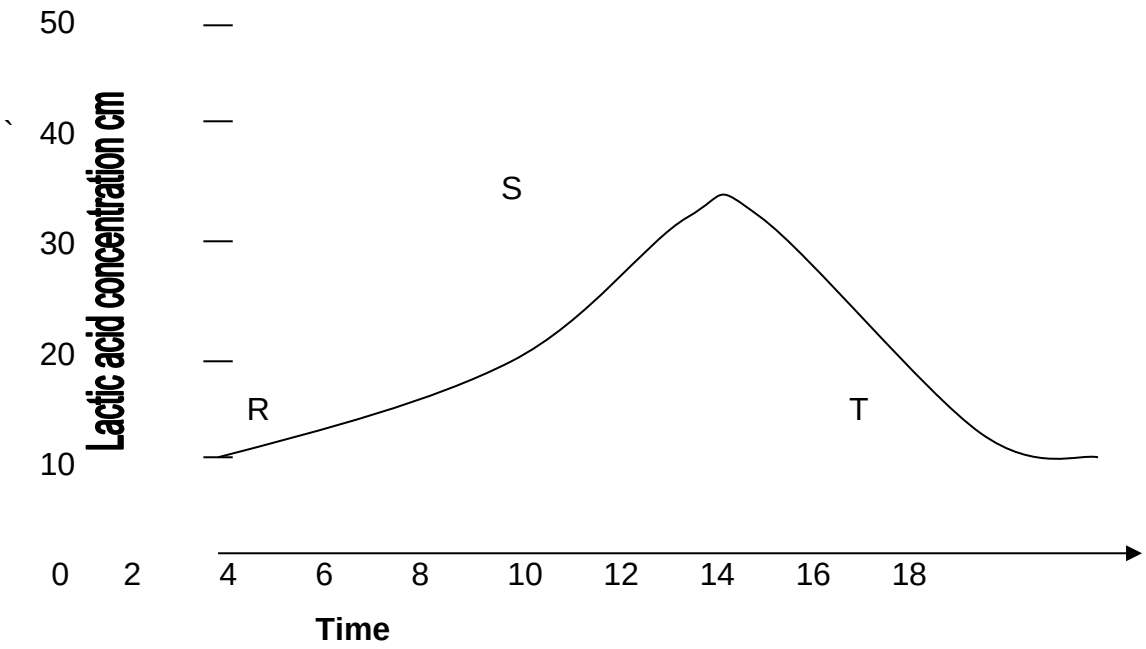
(ii) What happens to each muscle as the arm is straightened? **(2mks)**

8. The binomial name of housefly is MUSCA DOMESTICA.

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

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

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



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

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

(i) **R** and **S** **(1mk)**

(ii) **S** and **T** **(1mk)**

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

(i) Bait trap **(1mk)**

(ii) Specimen bottle **(1mk)**

(iii) Pitfall trap **(1mk)**

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

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

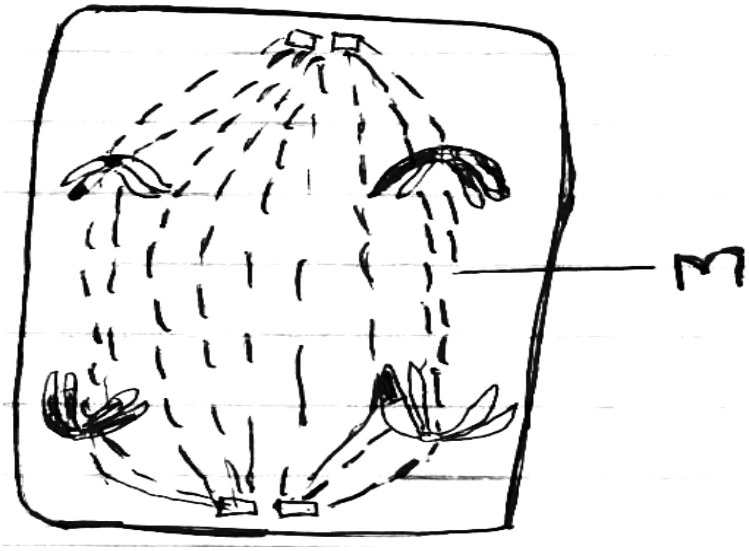
12. (a) Distinguish between epigeal and hypogeal germination. **(1mk)**

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

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

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

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



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

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

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

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

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

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

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

(a) Lens **(1mk)**

(b) Ciliary body. **(1mk)**

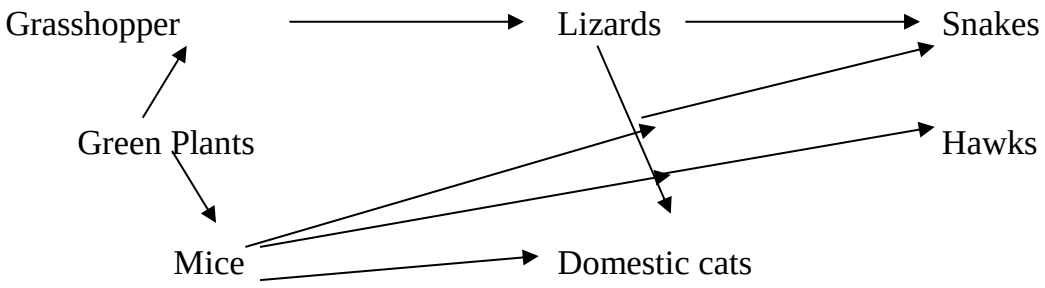
(c) Cornea **(1mk)**

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

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

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

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



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

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

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

(i) Loop of henle **(1mk)**

(ii) Distal convoluted tubule **(1mk)**

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

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

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

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

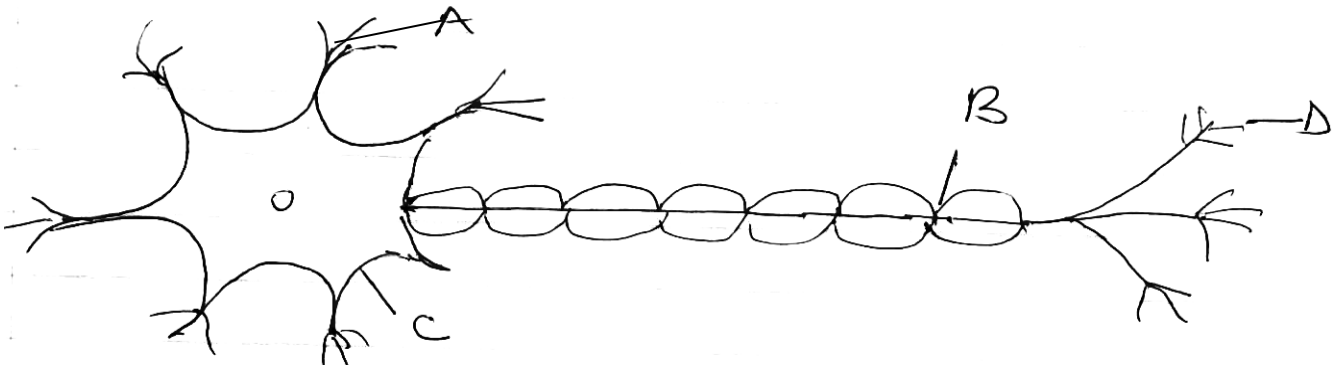
21. Explain how the following factors determine the daily energy requirement in humans.

(a) Age **(1mk)**

(b) Occupation **(1mk)**

(c) Sex **(1mk)**

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



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

A: ……

C: ……

D: ……

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

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

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

(i) Yeast **(1mk)**

(ii) Mushroom **(1mk)**

25. Give reasons for each of the following:

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

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

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

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

(Show your working).

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

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 5

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

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**.*

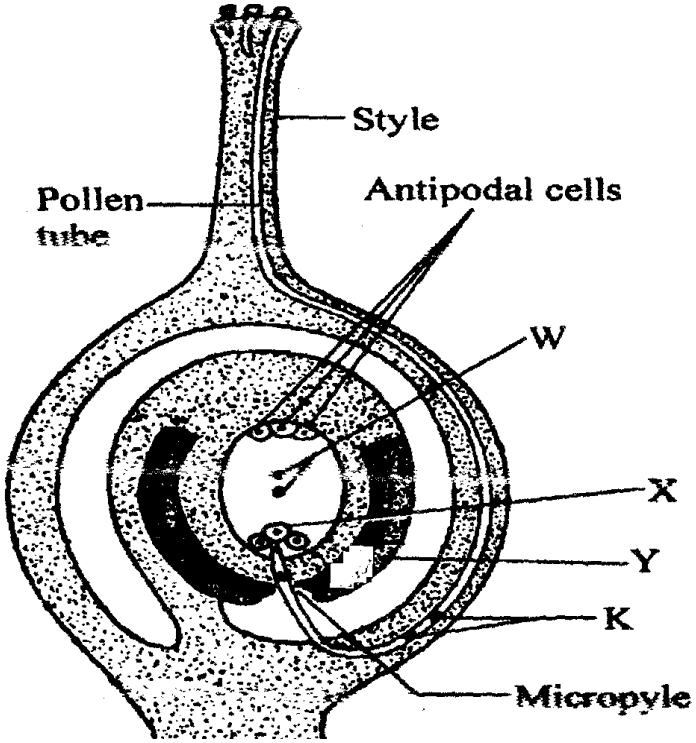
FOR EXAMINER'S USE ONLY

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*	

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.



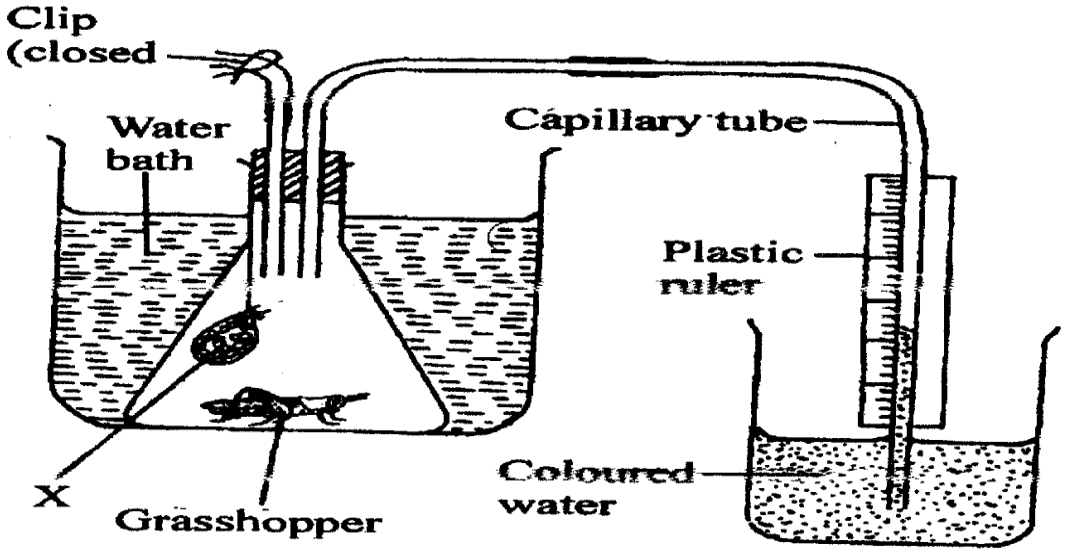
a) Name the structures labeled **W**,**X**, and **Y**. **(3mks)**

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

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

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

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)**

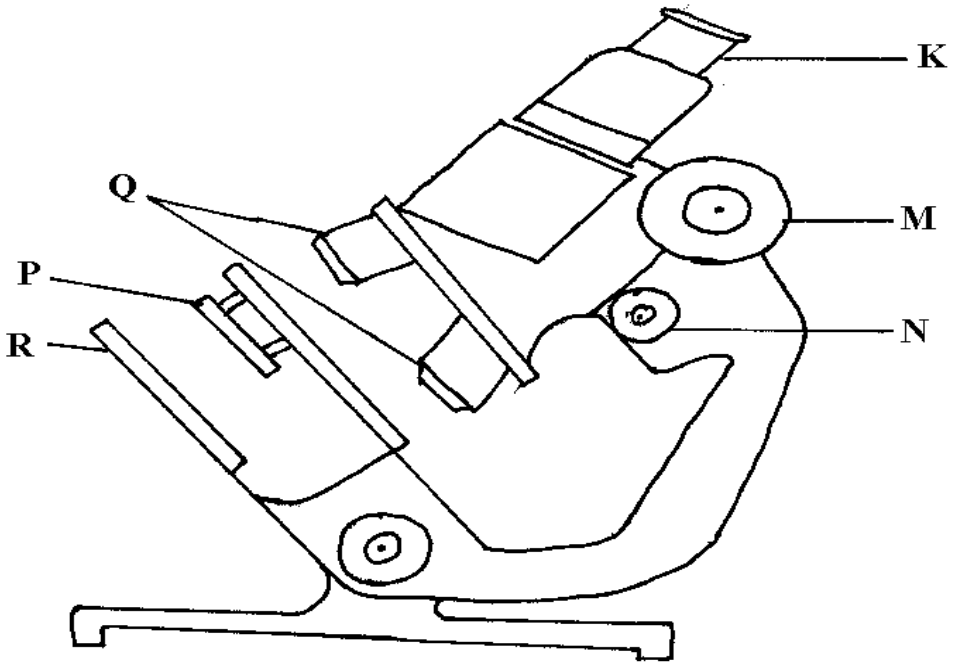
b) Why is it necessary to place the flask in a water bath. **(3mks)**

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)**

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

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

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)**

(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)**

(ii) Staining the section **(1mrk)**

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

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)**

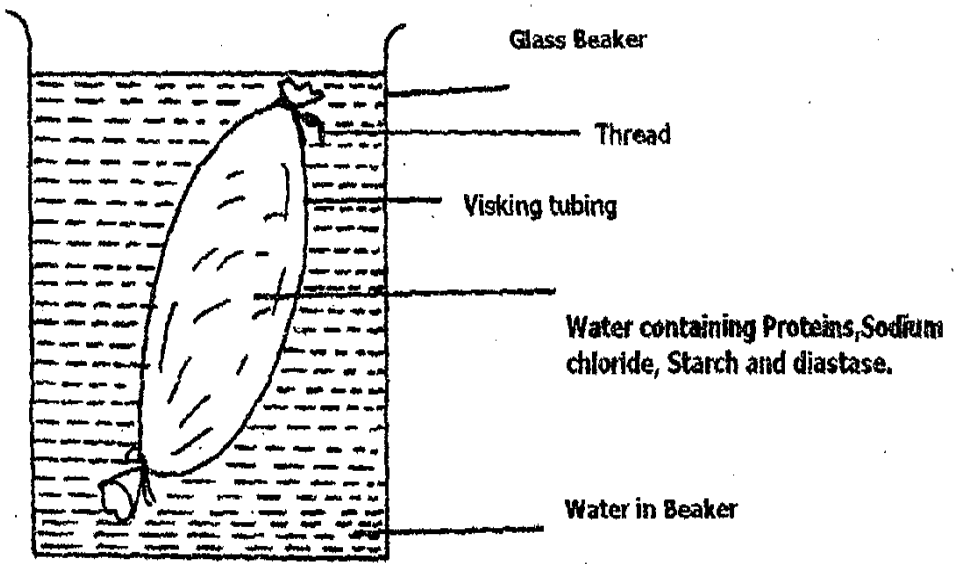
b) From the information above, work out the following for the F2 generation.

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 followed by copper sulphate solution, colour remains blue	On addition of sodium hydroxide followed by copper sulphate solution, colour remains blue

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

(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 mk)**

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

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

(1 mark)

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

(l mark)

e) After one hour the visking tubing was firm. State the term used to describe this state.

(1 mark)

SECTION B(40 MARKS)

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

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

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

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

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

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

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

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

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

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

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 6

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

Instructions to Candidates:

(a) Write your name and Index Number in the spaces provided above.

(b) Sign and write the date of examination in the spaces provided above.

*(c) Answer **all** questions*

*(d) **Candidates should answer the questions in English.***

For Examiner's Use Only

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

17	18	19	20	21	22	23	24	25	26	27	28	Grand Total	

*Answer **all** questions*

1. State **FOUR** environmental problems that can be solved by studying biology. **(4 marks)**

2. Aerobic break down of glucose yields 2880 kJ of energy whereas anaerobic breakdown yields 150 kJ. Give an explanation to account for this difference**.** **(4 marks)**

3. How many of 20 micrometres animal cells would fit in a 1cm long line**?** **(2marks)**

4. State the function of the following apparatus;

(i) Specimen bottle . **(1 mark)**

(ii) Bait trap. **(1 mark)**

5. Name the causative agents of the following diseases:

(a) Cholera**……** **(1 mark)**

(b) Malaria **……..…….** **(1 mark)**

6. Explain why young onion root tip is ideal for examining the stages of mitosis**.** **(2 marks)**

7. The table below shows the concentration of some ions in pond water and in the cell sap of some aquatic plant growing in the pond

Ions	Concentration in pond water(parts per million)	Concentration in cell sap(parts per million)
Sodium	50	30
Potassium	2	150
Calcium	1.5	1
Chloride	180	200

a) With a reason name the process by which each of the following ions could have been taken up by this plant

i) Sodium **…….……** **(2marks)**

Reason**.....**

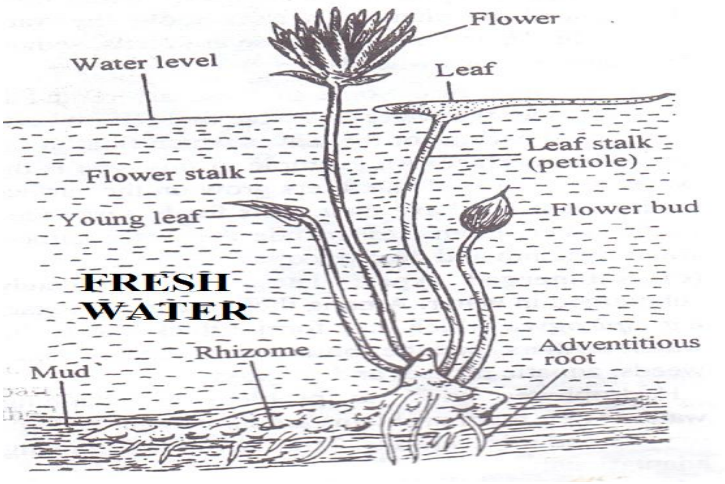
ii) Potassium **……..…. .....(2marks)**

Reason**.....**

b) i) Which ion would cease to be absorbed if the plant was treated with a metabolic poison? **1mark)**

ii) Give a reason for your answer **(1mark)**

8. The photograph illustrates an organism found in aquatic habitat.



(a) Give the type of the plant. **(1 mark)**

(b) Describe **three** adaptation of the organism to its habitat. **(3 marks)**

9. A student smeared the abdomen of a locust with Vaseline.

(a) What were the likely results after ten minutes? **(1 mark)**

(b) Account for the results obtained above. **(2marks)**

10. What is the significance of photolysis? **(2 marks)**

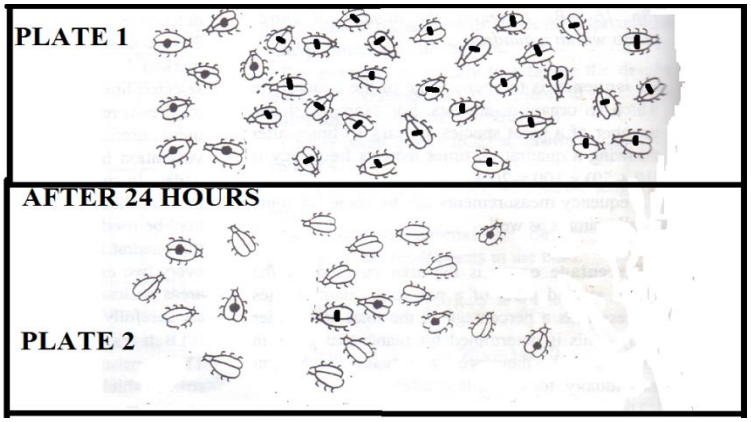
11. The following table shows the volume of gases carried by 100cm^3 of blood.

Gas	**Blood entering lungs**	**Blood leaving lungs**
Nitrogen	0.9 cm^3	0.9 cm^3
Oxygen	10.6 cm^3	19.0 cm^3
Carbon (iv) oxide	58.0 cm^3	50.0 cm^3

(a) Which blood has a higher content of carbon (IV) oxide? **(1 mark)**

(b) Explain the difference in the content of oxygen and carbon (IV) oxide in blood entering the lungs and that leaving the lungs. **(2 marks)**

12. Use the illustration below to answer questions.



(a) Identify the method of population estimation shown above. **(1 mark)**

(b) Estimate the population of the beetles. **(3 marks)**

(c) State **one** limitation of this method. **(1 mark)**

13. An investigation was carried between 1994 and 2003 to study the changes of fish population in a certain small lake. Four species of fish A,B, C and D were found to live in this lake.In 1995,A factory was built near the lake raising temperatures from 25^0C to 30^0C.In 1997,Sewage and industrial waste was diverted into the lake. The population of fish during the period of investigation is shown in the table below.

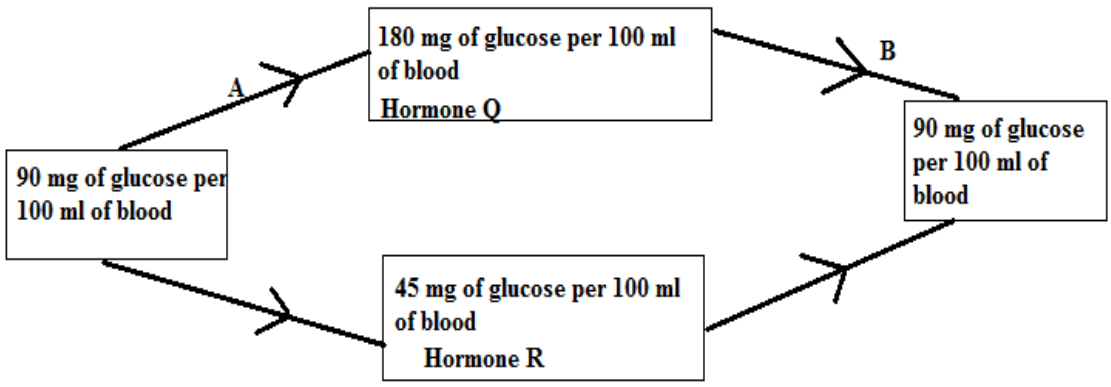
Fish species	1994	1996	1998	2000	2001	2002	2003
A	6102	223	20	106	660	4071	7512
B	208	30	11	22	63	311	405
C	36	100	0	0	0	0	0
D	4521	272	23	23	29	400	617

a) Explain **two** factors that could have brought the changes in the fish populations**.** **(2 marks)**

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

(i) Coarse adjustment knob. **(1 mark)**

15. Use the diagram below to answer questions that follow.



(a) Name the feedback mechanism labeled B. **(1 mark)**

(b) Identify Hormone R**……..…. (1 mark)**

16. Name **three** food substances acquired by herbivores feeding on green sprouting grass exposed to maximum sunlight during the day**.** **(3 marks)**

17. A certain animal has no incisors, no canines,6 premolars and 6 molars in its upper jaw. In the lower jaw there are 6 incisors,2 canines,6 premolars and 6 molars.

(**a)** Write its dental formula. **(2mark)**

(b) Identify the mode of nutrition of the organism. **(1 mark)**

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

18. a). Identify the following:

i) The structure that prevents backflow of blood when pressure in the ventricles fall**. (1mark)**

ii) The vessel from which coronary artery branches **(1mark)**

b) The size of the heart is closely related to the size of the body of the organism. Generally the heart weighs 0.59 percent of the total body weight. Calculate the weight of a healthy adult if his heart weighs 0.4838Kg **(2marks)**

19. A small mammal has ears that are usually pink, but on a day when the environmental temperature is low the ears appear pale pink. Explain this observation **(3marks)**

20 a) State the function of the following during cell division

i) Spindle fibres **(1mark)**

ii) Centrioles **(1mark)**

b). What is the significance of protandry and protogyny structural features in flowering plants **(2marks)**

21. Distinguish between the Cytology and entomology**.** **(2 mark)**

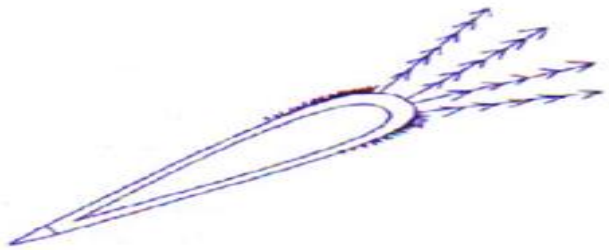
22. Give the roles of the following hormones in males

(i) Follicle stimulating hormone. **(1 mark)**

(ii) Luteinizing hormone**.** **(1 mark)**

23. Describe how the granum is adapted to its photosynthetic function**.** **(2 marks)**

24. Below is a photograph of a fruit.



(a) State the agent of dispersal of the fruit. **(1 mark)**

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

25 a). State **two** advantages of metamorphosis to the life of **insects** **(2marks)**

b). Name **two** harmful effects of **insects** **(2marks)**

26 What is the function of coleoptile in germinating maize grain? **(1mark)**

27 a) Define the term monohybrid inheritance **(1mark)**

b). Differentiate between genotype and phenotype **(2marks)**

28. In some fruit flies there exist two varieties; one with red eyes and another with white eyes. In a population of these organisms, the red eyed greatly outnumber the white eyed.

A white eyed female was crossed with a red eyed male. All the females from the cross were red eyed while all the males were white eyed. Using the given information, answer the following questions;

Which gene is

i) Dominant **.....(1mark**

ii) Recessive**.....(1mark)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 6

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

INSTRUCTIONS TO CANDIDATES

0) *Write your name, Admission Number and Class in the spaces provided above.*

1) *This paper consists of **two** sections. Section **A** and section **B.***

2) *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.

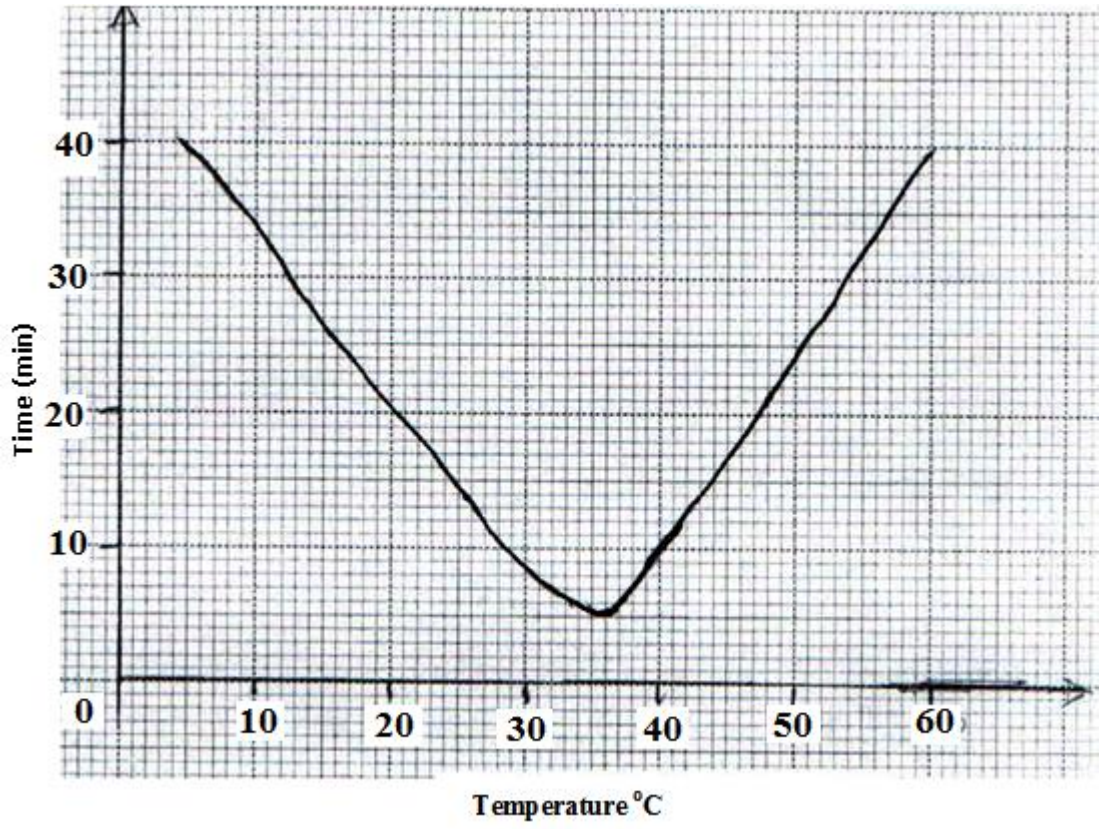
SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total score	80	

SECTION A (40 MARKS)

Answer all questions in this section

1. (a) Define the term denature **(1 Mark)**

(b) In an experiment to investigate the action of pepsin on egg albumen, equal amounts of pepsin were added to equal amounts of egg albumen in different test-tubes. The test tubes were placed in water baths at different temperatures. The graph below shows time taken for the enzyme to digest protein in each.



(i) What is the optimum temperature for the enzyme? **(1 Mark)**

(ii) Account for the time taken to digest egg albumen at 45^0C. **(1 Mark)**

(c) (i) In which form is the enzyme pepsin secreted. **(1 Mark)**

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

(d) Name four plant tissues which lack chloroplast. **(2 Marks)**

(e) State the function of the pad of gum in herbivorous feeding. **(1 Mark)**

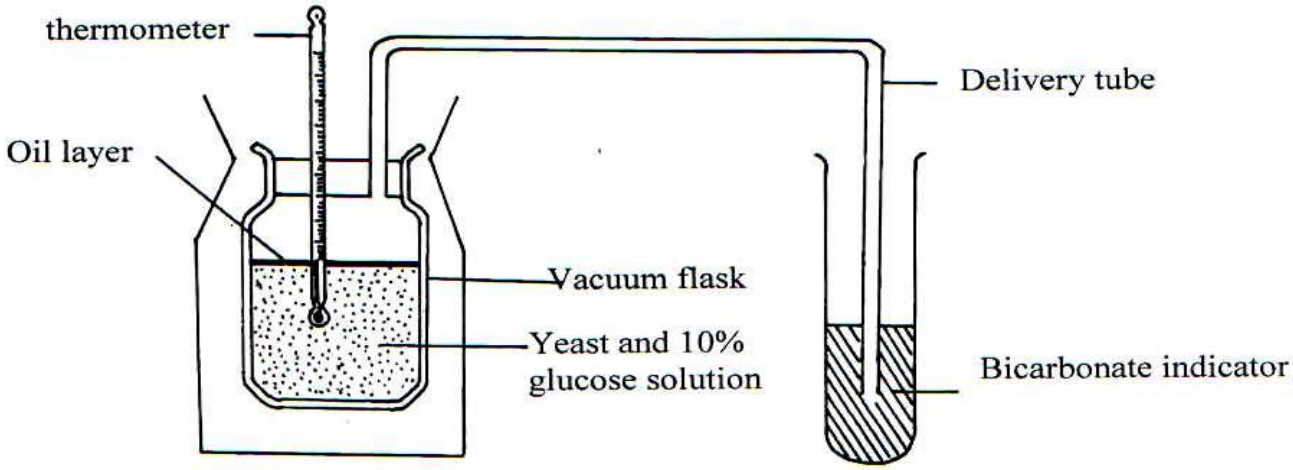
2. During ecological study, students collected and marked 120 ants and released them. After 48 hours, the students captured another 90 ants, 20 of which had been marked previously.

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

(b) What are the limitations of this method in sampling animal populations? **(3 Marks)**

(c) State two other methods which could be used to determine the population? **(2 Marks)**

3. The experiment below was set-up to investigate some physiological processes. The glucose solution was first boiled then cooled. The set-up was left for 24 hrs.



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

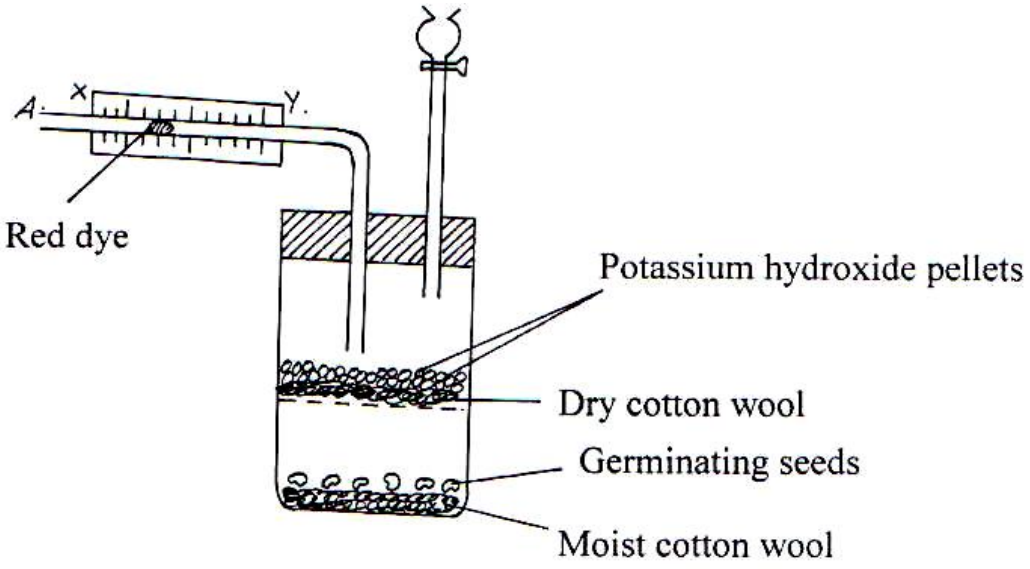
(b) (i) State the expected observations after 24 hours. **(2 Marks)**

(ii) Explain your observations in b (i) above. **(1 Mark)**

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

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

4. The diagram below shows an experimental set up to investigate an aspect of germination.



(a) Why are the following used in this experiment?

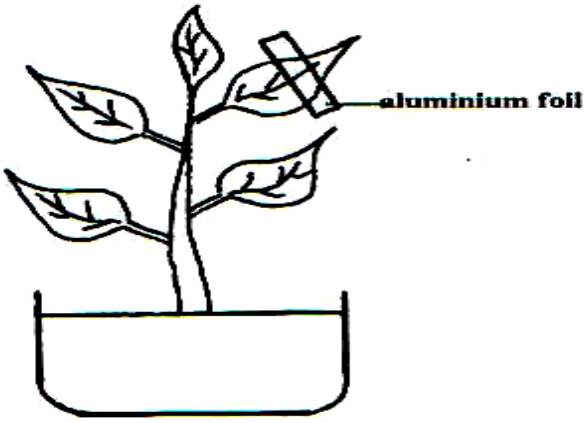
(i) Potassium hydroxide pellets? **(1mark)**

(ii) Moist cotton wool? **(1 mark)**

(b) (i) With reference to points x and y state the direction the dye would move towards during the experiment. **(1 mark)**

(ii) Give reasons for your answer in (b) (i) **(2 Marks)**

5. In an experiment to investigate a factor affecting photosynthesis, a leaf of a potted plant which had been kept in the dark overnight was covered with alluminium foil as shown in the diagram below.



The set up was kept in sunlight for three hours after which a food test was carried out on the leaf.

(a) Which food test was carried out? **(1 Mark)**

(b) (i) State the results of the food test. **(2 Marks)**

(ii) Account for the result of the food test. **(2 Marks)**

(c) (i) Why was the set up kept in sunlight for three hours. **(1 Mark)**

(ii) Why was it necessary to keep the plant in the darkness before the experiment**?** **(1 mark)**

(d) Other than light state one other factor that affects the rate of photosynthesis. **(1 Mark)**

SECTION B – 40 MARKS

Answer question 6 (compulsory) and either 7 or 8

6. In an experiment to investigate a certain process in a given plant species, the rate of carbon (IV) oxide consumption and the rate of Carbon (IV) oxide release were measured over a period of time for the day. The results of the investigation are as shown in the table below.

Time of days (hrs)	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00
CO_2 consumption mm^3/min	0	43	69	91	91	50	13	0	0	0
CO_2 release mm^3/min	38	22	10	3	3	6	31	48	48	48

(a) On the same axes, draw the graphs of volume of Carbon (IV) oxide consumed and Carbon (IV) oxide released against time. **(7 Marks)**

(b) Name biochemical processes represented by;

(i) Carbon (IV) oxide consumption **(1 Mark)**

(ii) Carbon (IV) oxide release **(1 Mark)**

(c) Account for the shape of the curve for

(i) Carbon (IV) oxide consumption. **(3 Marks)**

(ii) Carbon (IV) oxide release **(3 Marks)**

(d) (i) From the graph, state the time of the day when the plant attains compensation point**.(1 Mark)**

(ii) What is meant by compensation point. **(1 Mark)**

(e) Explain how temperature affects the rate of Carbon (IV) Oxide consumption in a plant**.(3 Marks)**

7. (a) Name five methods of excretion in plants. **(5 Marks)**

(b) Give three reasons why plants lack complex excretory system. **(3 Marks)**

(c) State six excretory products in plants and give their economic uses. **(12 Marks)**

8. (a) What is pollination? **(2 Marks)**

(b) Discuss the sequence of events that take place from the time a pollen grain falls on the stigma until a seed is formed. **(18 marks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 7

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

Instructions to candidates

a) *Write your name and class in the space provided above*

b) *Sign and write the date of the examination in the spaces provided above*

c) *Answer all the questions in the spaces provided*

d) *Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.*

e) *Candidate should answer all the questions in English*

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1- 32	80	

Answer all the questions in the spaces provided.

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

(a) Type of movement in cells.

(b) Arrangement of leaves on a plant.

2.

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

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

3.

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

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

4. State the role of the diaphragm.

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

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

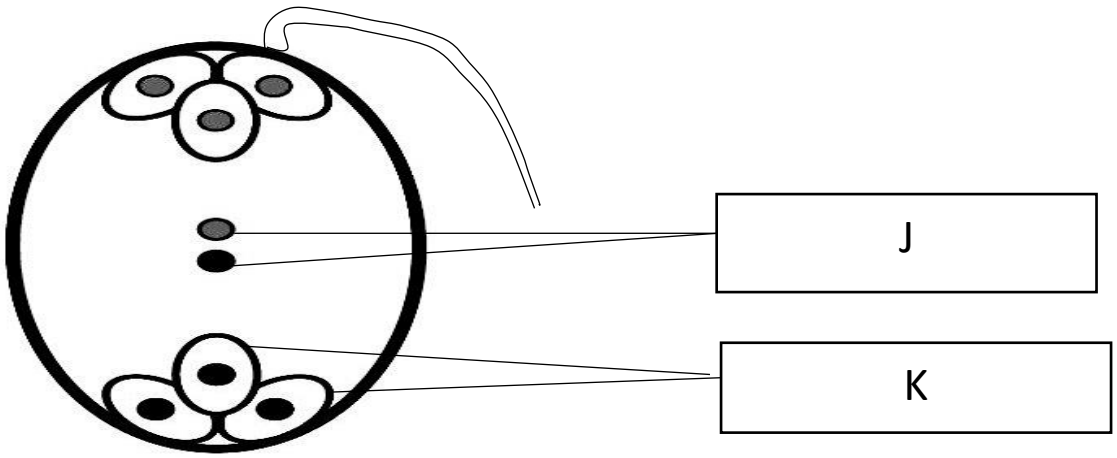
5. Explain why plants absorb water in waterlogged soil but not mineral salts. **(2mrks)**

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

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

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

7. Below is a diagram of an embryo sac.



Identify the structures labelled. **(2mrks)**

J-……

K-……

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

9.

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

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

10.

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

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

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

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

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

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

13.

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

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

14.

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

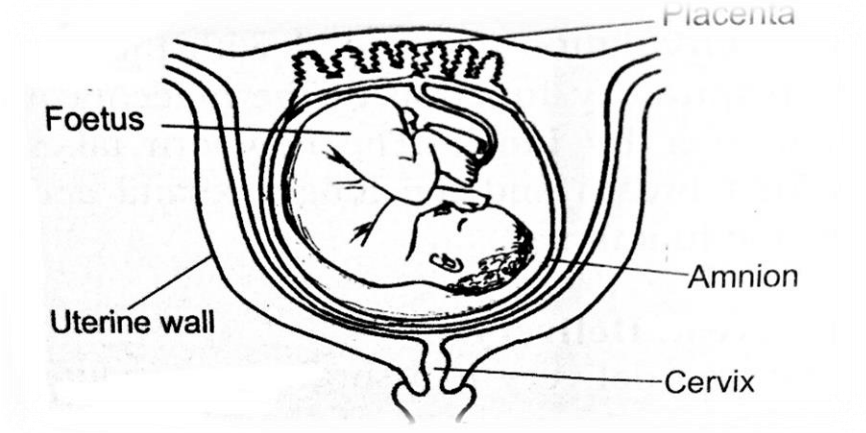
(b) Why are fruits not produced in gymnosperms? **(1mrk)**

15.

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

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

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



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

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

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

Before mutation

L	M	N	O	P	Q

After mutation

L	O	N	M	P	Q

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

b)

i. Identify the nucleic acid whose base sequence is shown below. **(1mrk)**

G-A-C-U-A-G-A-C-G

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

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

20.

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

b) What is the significance of;

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

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

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

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

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

Account for the change in the pulse rate from.

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

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

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

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

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

24.

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

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

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

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

25.

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

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

26.

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

b. Explain how the following features adapt root hairs cells to absorption

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

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

27. A certain metabolic pathway takes place following sequence.

J-K-L-M-N

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

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

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

28.

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

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

c. Name the polysaccharide that offers mechanical support in;

i. Arthropods **(1mrk)**

ii. Plants. **(1mrk)**

29.

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

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

30.

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

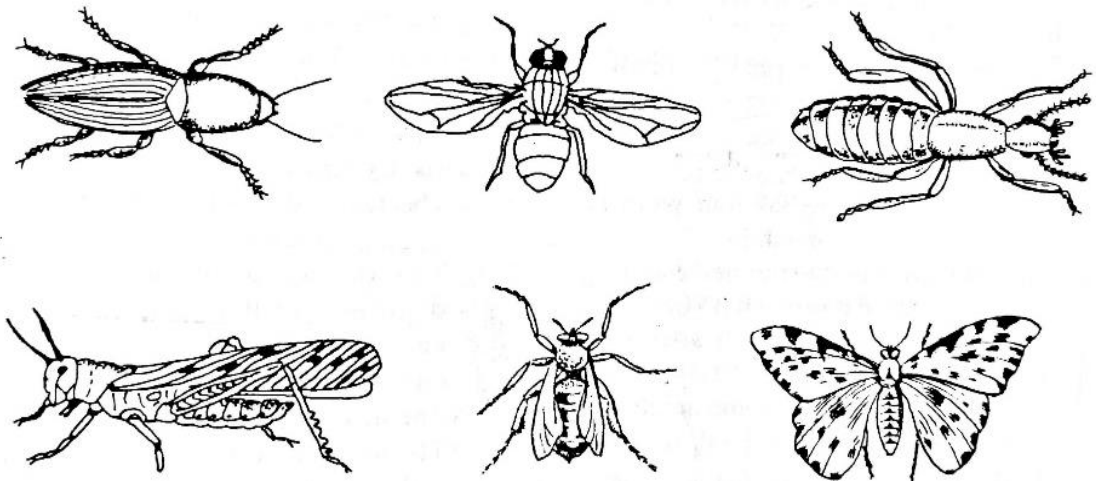
b. What Is the advantage of oxyhaemoglobin over carboxyhaemoglobin? **(1mrk)**

31. Explain why;

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

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

32. The organisms below belong to kingdom Animalia.



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

i. Phylum……

ii. Class ……

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

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 7

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **admission number** in the spaces provided.*
- *Answer **all** the questions in this paper in the spaces provided.*
- ***Answer questions 1-6 (compulsory) and either question 7 or 8.***

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX.SCORE	CANDIDATES SCORE
A			
B	6	20	
	7	20	
	8	20	
TOTAL		80	

SECTION A (40MKS)

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

1. A student boiled some water in a boiling tube and before it cooled down, she covered the surface with a layer of oil. With the water maintained at 37° C. She introduced a mixture of glucose and yeast into the boiling tube. Corked it and fixed a delivery tube, the other end of the delivery tube was immersed into lime water that had been put in a test tube. The set up was left maintained at 37 °C for 30 minutes within which observations were made.

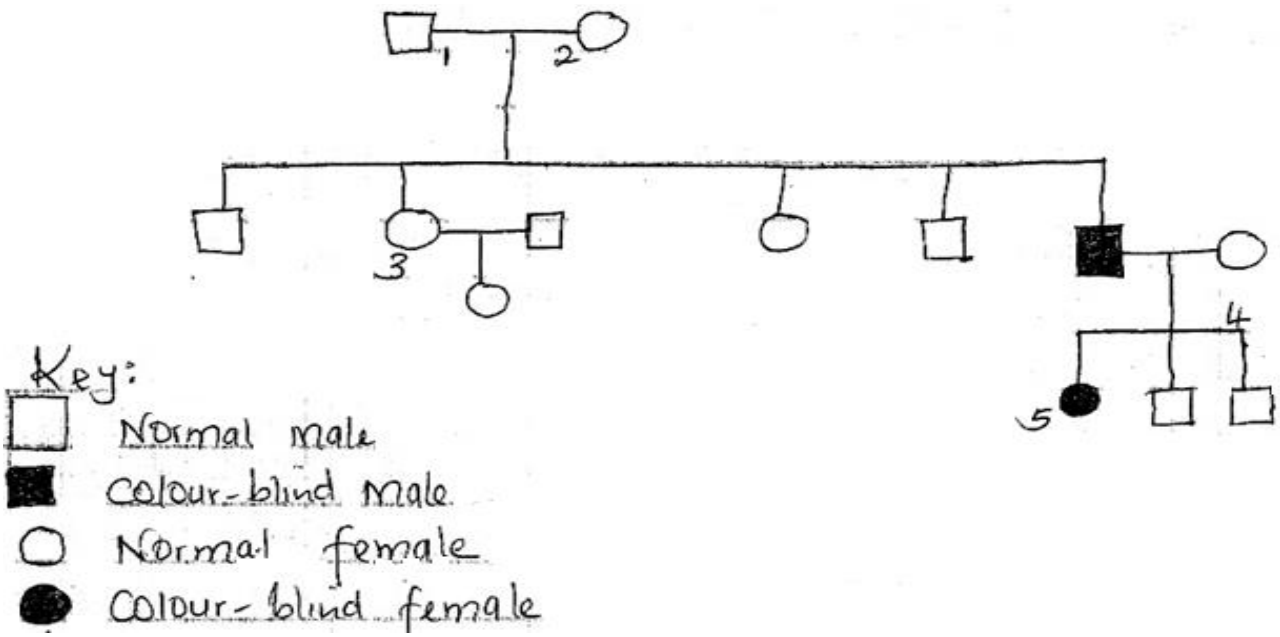
(a) What was the aim of the experiment? **(1 mark)**

b) Why was it important to boil the water at the start of the experiment **(1mark)**

c) Write down three observations made within the 30 minutes time. **(3 mrks)**

d) Account for the observations made in (c) above. **(3 mrks)**

2. The pedigree diagram shows the inheritance of colour blindness (Daltonism) in a family. Colour blindness is sex-linked and is caused by a recessive allele (d). The ability to see colour normally is caused by a dorminant allele (D)



a) How many of the male offspring of parents 1 and 2 were normal? **(1mk)**

b) State the genotype of:

i) Individual 2 **(1mk)**

ii) Individual 5 **(1mk)**

c) A person with a recessive allele for colour-blindness may not be colour blind. Explain why males with allele for colour-blindness are always colour-blind. **(1mk)**

d) If individual 5 marries a normal male, what percentage of their daughters will have an allele for colour-blindness but will not be colour-blind? Show your working. **(4mks)**

3. The following table gives information about concentration of substances in samples of blood plasma, filtrate from the glomerulus and urine.

Substance	Concentration in sample (g/100cm^3)		
	Blood plasma	**Glomerular filtrate**	**Urine**
Glucose	0.10	0.10	0.00
Protein	8.00	0.00	0.00
Salts	0.90	0.90	2.70
Urea	0.03	0.03	1.80

a) Protein is not filtered out of blood plasma

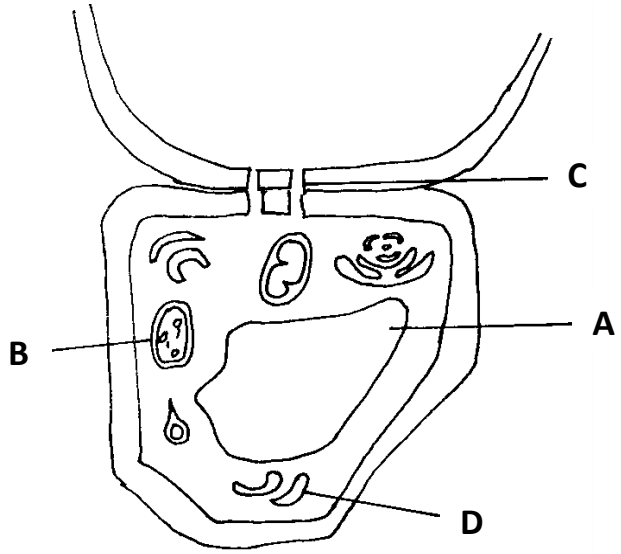
i) Use evidence from the table to support this statement. **(1mk)**

ii) Explain why protein is not filtered out of the blood plasma. **(1mk)**

b) The table shows that glucose is present in the filtrate from the glomerulus but not in the urine. Explain why glucose is not present in the urine. **(1mk)**

c) Urea is formed by the deamination of excess amino acids. Describe how deamination occurs **(5mks)**

4. The diagram below represents a generalized cell structure as seen under an electron microscope.

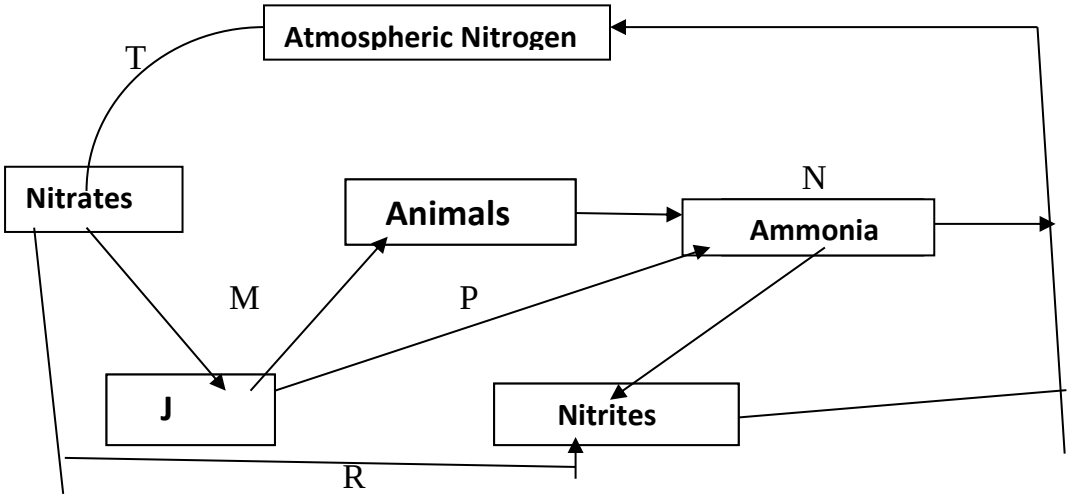


(a) Name the structures labeled A,B and C **(3mks**

(b) How is the structure labeled B adapted to its function **(2mks)**

(c) What difference would be observed between electron micrograph obtained from cheek cell of a frog and the one above **(3mk)**

5. The diagram below represents a nitrogen cycle



a) Name the groups of organisms represented by J **(1mk)**

b) Name the process represented by R, P M and N **(4mks)**

c) Name one process represented by T **(1mk)**

d) i) Name a structure in roots involved in process M **(1mk)**

ii) State one adaptation of structure named in (d) (i) above to its function **(1mk).**

SECTION B (40 MARKS)

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

6. In an experiment, the population growth of yeast cells in a Petri dish was determined over a period of 75 minutes. The results below were obtained.

TIME IN MINUTES	NUMBER OF YEAST CELLS
0	4
5	6
10	8
15	10
25	30
30	50
35	80
40	120
45	140
50	150

55	160
65	166
75	166

(a). Using a suitable scale , plot a graph on the grid provided of number of cells against time in minutes **(6 marks)**

(b). Name the type of the curve you have drawn. **(1 mark)**

(c) Determine the number of yeast cells after 37 minutes. **(1 mark)**

(d) After how long was the population of yeast cells 144? (**1 mark)**

(e). Work out the rate of cell division between 32 minutes and 42 minutes. **(2 mrks)**

(f). Account for the shape of graph between 45^{th} minute and 60^{th} minute. **(3 mrks)**

(g). In a field study to estimate the population of grasshoppers in the school field of $4km^{2,,}$ 60 grasshoppers were caught using sweep nets, marked with red paint and released back to the field. The following day students went back with their sweep nets and caught 100 grasshoppers, in which 20 were found to be already marked.

(i)Calculate the population size of grasshoppers in the field. **(2 marks)**

(ii). Calculate the population density of the grasshoppers in the field. **(2 marks)**

(iii) What factors would maintain the population of grasshoppers and yeast cells at the carrying capacity. **(2 marks)**

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

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

8 (a) Describe the adaptation of hydrophytes to their photosynthetic function. **[10mks]**

(b) Explain how mammalian ileum is adapted to perform its function. **[10mks]**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 8

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your name and admission number in the spaces provided above.*

b) *Sign in the spaces provided above.*

c) *Answer **ALL** questions in the spaces provided.*

d) *All workings **MUST** be clearly shown where necessary.*

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 – 30	80	

*Answer **ALL** questions in the spaces provided*

1. Name the organelle that performs each of the following functions in a cell

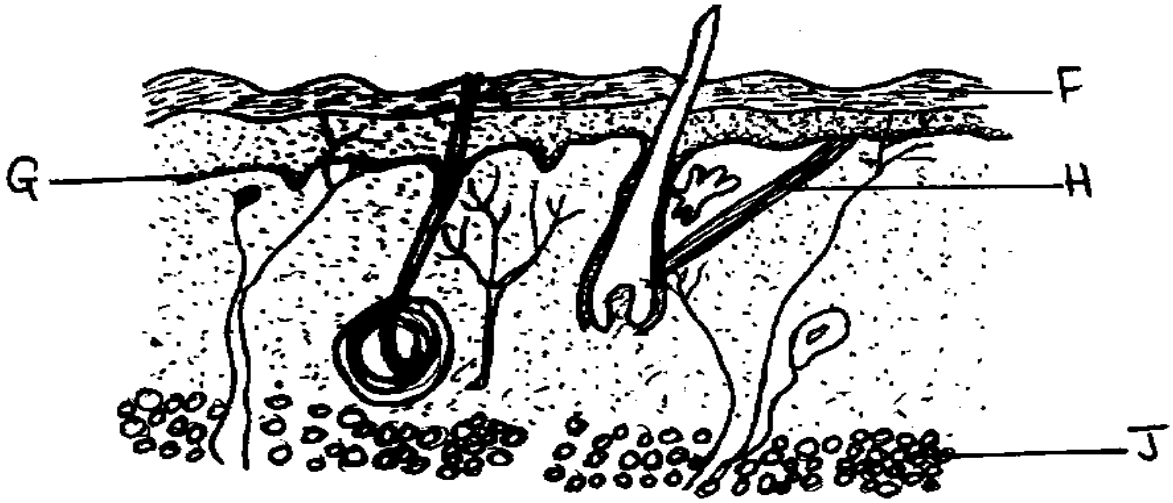
(i) Protein synthesis. **(1mark)**

(ii) Transport of cell secretions. **(1mark)**

2. (a) Define the term 'parthenocarpy'. **(1mark)**

(b) Name **two** plant growth hormones that promote parthenocarpy. **(2marks)**

3. The diagram below shows a longitudinal section of mammalian skin.



a) Name the parts labelled **F** and **G.** **(2marks)**

F……

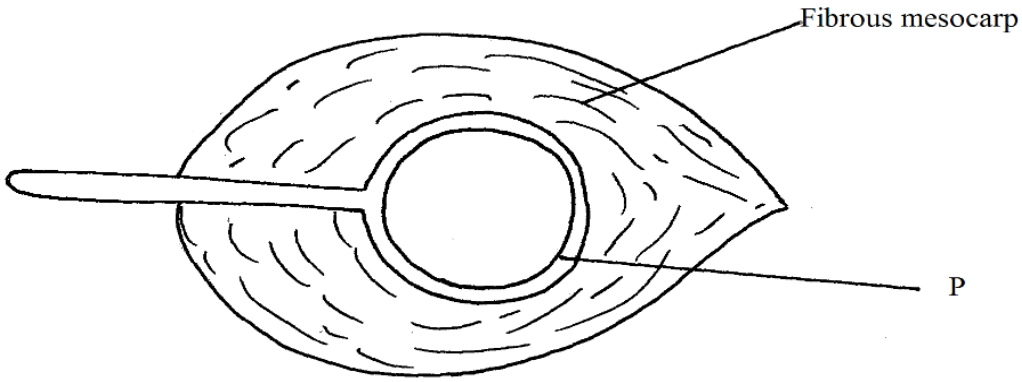
G……

b) State **one** function of each of the parts labelled **H** and **J** **(2marks)**

4. (a) State **two** characteristics used to divide the phylum Arthropoda into classes **(2marks)**

(b) Name the class with the largest number of individuals in the phylum Arthropoda. **(1mark)**

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



(i) Identify the mode of dispersal **(1mark)**

(ii) Describe **two** adaptations of the fruit to its mode of dispersal **(2marks)**

6. (a) What causes the following diseases?

(i) Diabetes mellitus. **(1mark)**

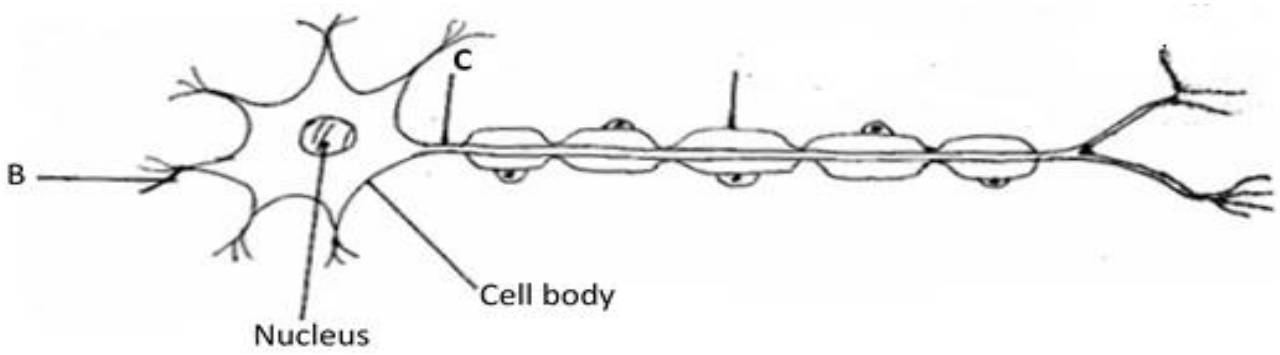
(ii) Diabetes insipidus. **(1mark)**

b) An individual shows the symptoms for diabetes mellitus, how would you determine in the school laboratory whether they are positive for the condition? **(2marks)**

7. (a) Give **two** examples of natural selection in action. **(2marks)**

(b) List **two** features that make man the most dominant species on earth. **(2marks)**

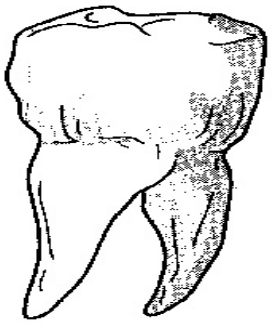
8. Study the diagram **below** of a neurone in human being.



(a)Identify the neurone. **(1mark)**

(b) Name the part labeled **B** **(1mark)**

9. Study the diagram of the mammalian tooth **below** and answer the questions that follow.



(a) Identify the tooth. **(1mark)**

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

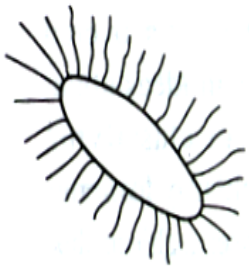
(c) State **one** adaptation of the tooth to its function. **(1mark)**

10. It was found that during germination of pea seeds 9.3cm^3 of carbon (iv) oxide was produced while 9.1cm^3 of oxygen was used up.

a) Calculate the respiratory quotient (RQ) of the reaction taking place. **(2marks)**

b) Explain why it is difficult to measure respiratory quotient in plants during the day. **(1mark)**

11. The diagrams below represent two types of bacteria species that causes some human diseases.



A

B

Identify each bacterium and state the disease it causes. **(4 marks)**

A:

Disease it causes:

B:

Disease it causes:

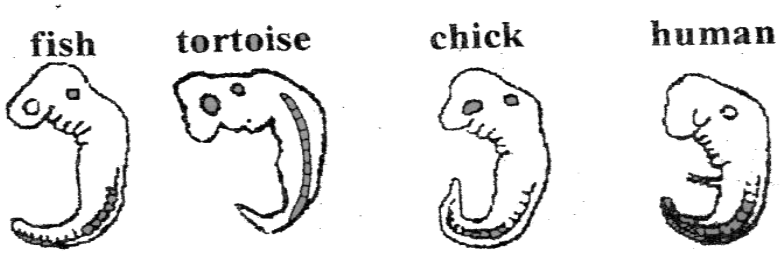
12. a) What is metamorphosis? **(1mark)**

b) What is the biological significance of metamorphosis to an insect? **(2marks)**

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

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

14. The diagrams below show embryos of certain vertebrates animals. Study them and answer the question that follows.



a) Mention two observable structural features in these embryos that suggest that they have a common ancestral origin. **(2marks)**

(b) What phenomenon in organic evolution is exhibited by these diagrams of embryos? **(1mark)**

15. What is meant by the terms? **(2marks)**

a) Hypogynous flower

b) Dichogamy

16. What is the main difference between the phloem tissues of sub divisions Gymnospermaphyta and Angiospermaphyta. **(1mark)**

17. State **two** ways in which the skin of a frog is adapted for gaseous exchange. **(2marks)**

18. What would be the effect of the following treatments on the nerve transmission?

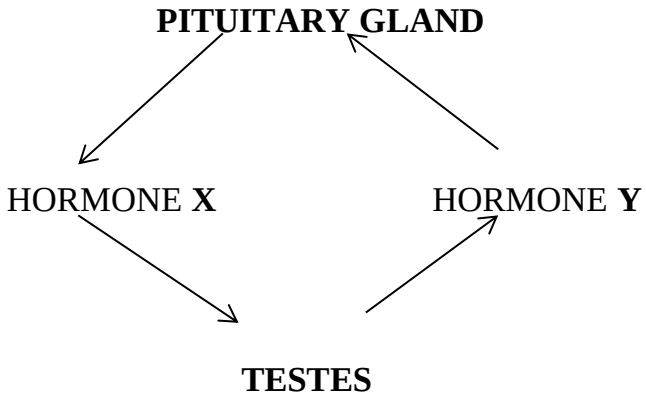
(i) Inducing the axon with metabolic inhibitors. **(1mark)**

(ii) Removing myelin sheath from a nerve fiber. **(1mark)**

19. Give one reason why blood leaving the lungs may not be fully oxygenated **(1mark)**

20. What is the importance of retina in vision? **(2marks)**

21. The diagram below represents a simple endocrine feedback mechanism in human male.



(a) Name the hormone labelled **X** **(1mark)**

(b)State **two** differences that may be observed between a normal male and one who is incapable of producing hormone labelled **Y**. **(2marks)**

22. a) Name the cartilage found between the bones of the vertebral column. **(1mark)**

b) State the function of the cartilage named in (a) above. **(1mark)**

23. The cells shown below were obtained from two different plant cells which were immersed in 2% and 25% salt solutions

A B

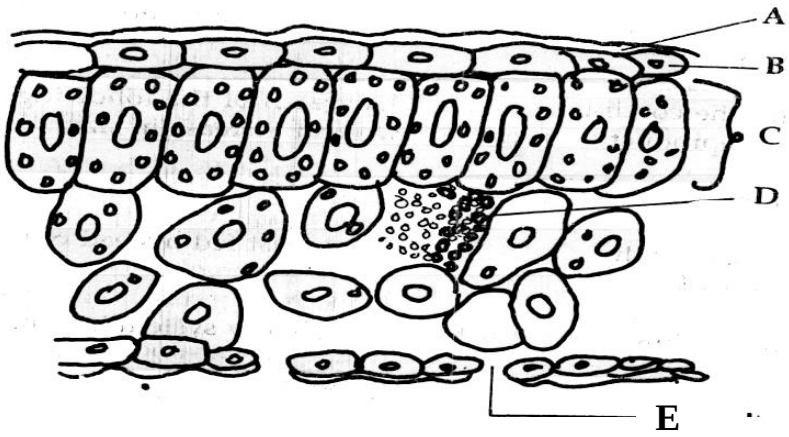
(a) Which of the two cells **A** and **B** was immersed in 2% salt solution? **(1mark)**

(b) Comment on the nature of 25% salt solution in relation to the cell sap. **(1mark)**

(c) What biological phenomenon leads to the observation made in **A**. **(1mark)**

24. Name **one** structure found in the cortex of the kidney **(1mark)**

25. The diagram below shows the internal structure of a leaf



(a)Name the part labelled **B** **(1mark)**

(b) State the function of the part labelled **C**. **(1mark)**

(c) State **two** difference between xerophytic and hydrophytic leaves. **(2marks)**

26. a) Distinguish between gaseous exchange and respiration. **(1mark)**

b) Explain the disadvantages of anaerobic respiration in plant roots. **(2marks)**

27. a) Suggest the significance of the following adaptations in bony fish.

(i) Flexible vertebral column **(1mark)**

(ii) Presence of swim bladder **(1mark)**

b) State **two** features which reduce resistance in fish during swimming. **(2marks)**

28. State **two** protective feature of human eye. **(2marks)**

29. State **two** differences between photosynthesis and respiration **(2marks)**

30. Explain why malaria cannot be transmitted through blood transfusion **(2marks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 8

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

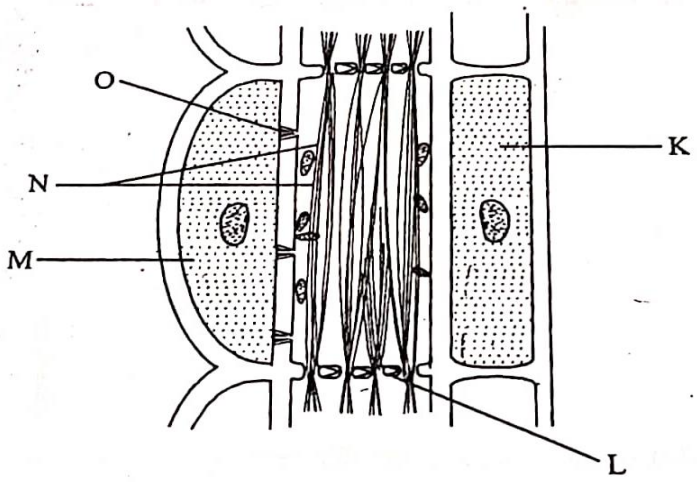
3) *Write your name and Index Number in the spaces provided above.*
4) *This paper consists of **two** sections. Section **A** and section **B.***
5) *Answer **ALL** questions in section **A** in the spaces provided. In section **B** answer question **6** (compulsory) and either question **7** or **8** 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	
	7/8	20	
	Total score	80	

QUESTIONS

1. The diagram below represents a plant tissue



a) Name the structures **L** and **O.** **(2 marks)**

b) State the function of structure N and cell labelled M. **(2marks)**

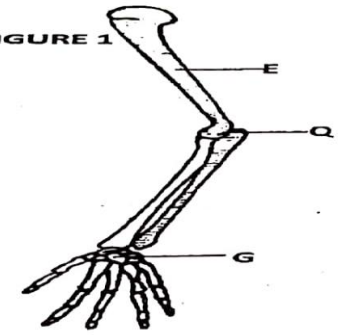
c) Give two structural differences between phloem tissue and xylem tissue. **(2marks)**

d) Distinguish between active and passive immunity. **(2marks)**

2. The following figures represent the forelimb of a certain animal species. Study them and answer the questions that follow

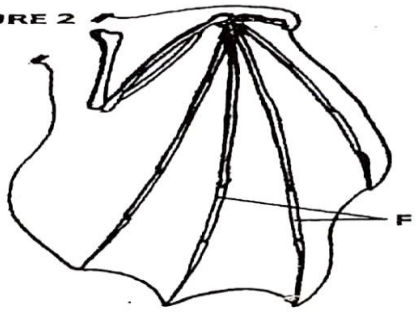
Human Hand

FIGURE 1



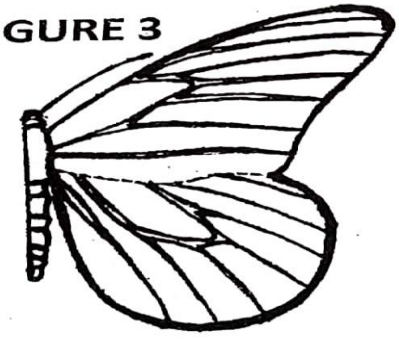
Bat Wing

FIGURE 2



Butterfly Wing

FIGURE 3



a) Name the bones labelled E and G. **(2marks)**

b) State the type of skeleton represented by figure 1. **(1mark)**

c) Name the type of joint at point Q. **(1mark)**

d) Which two figures represent analogous structures? **(1mark)**

e) Give **adaptational** differences between structures in figure 1 and 3. **(3 marks)**

3. Colour blindness is a disorder caused by gene mutation and it is controlled by a recessive gene. A man with normal colour vision marries a carrier woman:

a) Using letter **B** to represent the gene for **normal color vision**, what is the chance that their son will be colour blind? Show your working. **(4marks)**

b) Name another trait in humans inherited in the same way as colour blindness. **(1mark)**

c) Briefly describe inversion in gene mutation. **(1mark)**

d) Distinguish between back cross and testcross. **(2marks)**

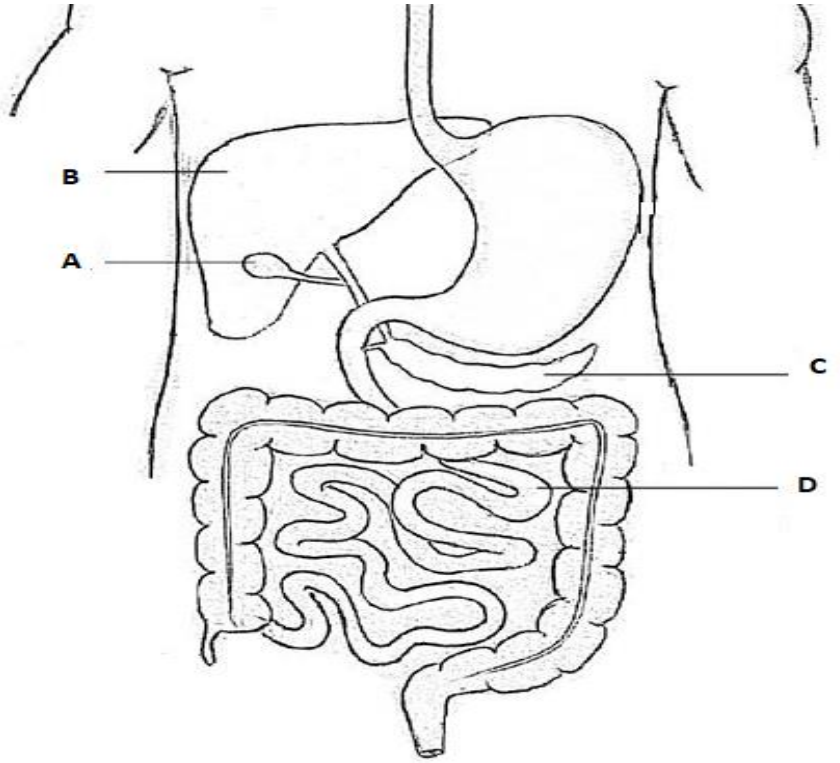
4. a) Nitrogen in the atmosphere cannot be directly utilized by plants. State two ways by which this nitrogen is made available for plant use. **(2marks)**

c) State the importance of saprophytic bacteria in the environment**.** **(1mark)**

d) Briefly explain the how excessive use of fertilizers affects the large water bodies. **(3marks)**

e) Explain how competition regulates the animal population in a habitat. **(2marks)**

5. The figure below shows the parts of the human digestive system. Study it and answer the questions that follow.



a) Name the organs labelled A, B and D. **(3marks)**

b) State the role of part labelled C. **(1mark)**

c) Name the two salivary glands in human beings. **(2marks)**

d) Give two adaptations of part labelled D to its function. **(2marks)**

6. An experiment was carried out to investigate transpiration and absorption of water in sunflower plants in their natural environment with adequate supply of water. The amount of water was determined in a two hour intervals. The results are as shown in the table below.

TIME OF THE DAY	AMOUNT OF WATER IN GRAMMES	
	Transpiration	**Absorption**
11:00-13:00	33	20
13:00-15:00	45	30
15:00-17:00	52	42
17:00-19:00	46	46
19:00-21:00	25	32
21:00-23:00	16	20
23:00-01:00	8	15
01:00-03:00	4	11

a) Using the same axes, plot graphs to show transpiration and absorption of water in grammes against time of the day. **(7marks)**

b) At time of the day was the amount of water the same for transpiration and absorption? **(1 mark)**

c) Account for the shape of the graph of :

i) transpiration **(3marks)**

ii) absorption **(3marks)**

d) What would happen to transpiration and absorption of water if the experiment was continued till 0500 hours? **(2marks)**

e) Name two environmental factors that may affect rate of transpiration and absorption at any given time. **(2marks)**

f) Explain how the factors you named in (e) above affect transpiration. **(2marks)**

7. a) Explain how blood sugar is regulated in the human body. **(12marks)**

b) Explain the adaptation of the mammalian skin to thermoregulation. **(8marks)**

8. a) Describe the factors that make the leaf of a terrestrial plant to absorb maximum light for photosynthesis. **(12marks)**

b) Describe how support is achieved in herbaceous plants and shrubs. **(8marks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 9

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

(a) *Write your name and Index Number in the spaces provided above.*

(b) *Sign and write the date of examination in the spaces provided above.*

*(**c**) Answer **all** questions in the spaces provided in this booklet.*

For Examiner's Use Only

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

17	18	19	20	21	22	23	24	25	26	27	28	Grand Total	

Turn over

*Answer **all** questions in the spaces provided*

1. a) Grazers and browsers co-exist without problems with each other. Explain. **(2marks)**

b) With reference to the leaves only give **two** adaptations of submerged hydrophytes**.(2marks)**

2. a) i) Name the part of the eye where image is formed. **(1mark)**

ii) State **two** characteristics of the image formed on part named in (a) above. **(2marks)**

b) State the functional difference between semi circular canals and the vestibule apparatus of the ear. **(2marks)**

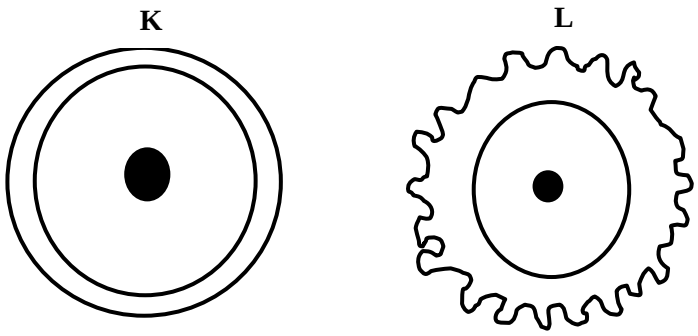
3. A layer of glycerine was applied on upper surface of a freshwater floating plant that had been kept in the dark for 24 hours. The plant was left undisturbed in bright light. After three hours test for starch carried out on the leaves produced a brown colour of iodine solution. Account for the observation. **(3 marks)**

4. A form four student was walking around the school compound and saw leaves from Nandi flame tree on the ground.

(a) Name the hormone responsible for this phenomenon. **(1 mark)**

(b) State the significance of the above phenomenon to the tree. **(2 marks)**

5. The following are diagrams of two pollen grains.



(a) State **one** observable difference between K and L. **(1 mark)**

(b) State the agent of pollination for each of them. **(2 marks)**

K ……

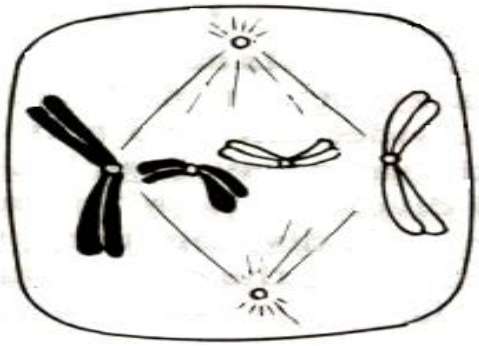
L ……

6. During oxidation of certain food substances, the respiratory quotient was found to be 0.718.

i) Name the type of food substance being oxidized. **(1mark)**

ii) State **two** advantages of using the food substances named. **(2marks)**

7. The diagram below represents a cell at one stage of the cell division.

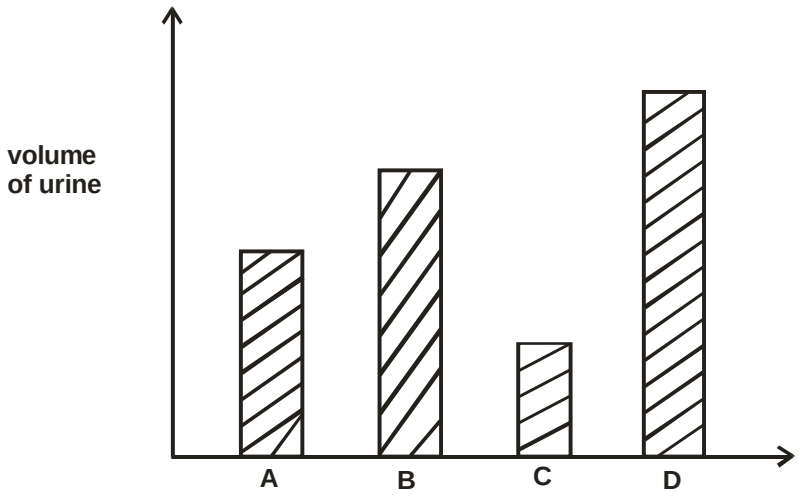


(a) Identify the stage. **(1 mark)**

i) Is the cell of a plant or an animal? **(1 mark)**

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

8. The quantity of urine passed per day was measured in four mammals; A, B, C and D of the same species in their natural habitats. The results were as shown below.



i) In what form is nitrogenous waste likely to be in organism D? Explain. **(3 marks)**

9. Explain why it is advisable to breathe through the nose rather than the mouth in man. (**2 mks)**

10. Name the valve which opens during:

i) Systole **…….....(1 mark)**

ii) Diastole**……..……. (1 mark)**

11. State the branch of Biology that would be used in solving the problem of disputed parentage. **(1mark)**

12. Explain why carbohydrates are stored in their polysaccharide forms in both plants and animals. **(3 marks)**

13. Name the organelles that are abundant in:

(a) Goblet cells .....**(1 mark)**

(b) Liver cells.....**(1 mark)**

14. Give a reason why it is difficult to calculate Respiratory Quotient (RQ) in plants. **(2 marks)**

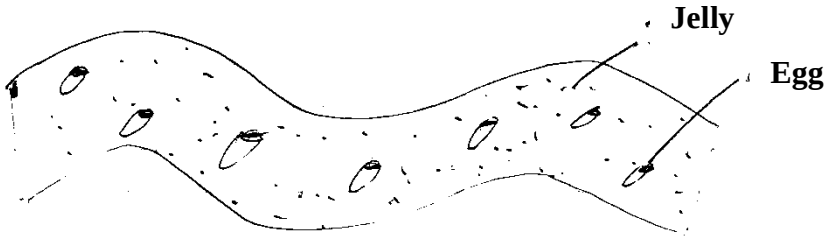
15. A biological washing detergent contains enzymes which remove stains like mucus and oils from clothes which are soaked in water with the detergent.

(a) Name the two groups of enzymes that are present in the detergent. **(2 marks)**

b) Why would the stains be removed faster with the detergent in water at 35°C rather than at 15°C? **(2 marks)**

16. Explain why it is important to go for Voluntary Counselling and Testing (VCT) on HIV/AIDS. **(2 marks)**

17. The diagram below shows the eggs of a certain amphibian.



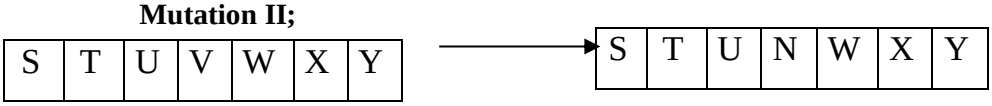
a) State **three** functions of the jelly. (**3 marks)**

b) What is the biological importance of the organism laying many eggs? **(1 mark)**

18. The diagram below show various types of gene mutations.

Mutation I;

Mutation II;



i) Identify the type of mutations shown **above** **(2 marks)**

ii) Name **one** disorder that results from gene mutation II. **(1 mark)**

19. State **three** advantages of metamorphosis to the life of an insect **(3marks)**

20. (a) State **two** limitations of fossil records as an evidence for organic evolution theory. **(2marks)**

(b) State an idea that led to the formulation of Lamarck's theory of evolution. **(1mark)**

21. Explain what happens to red blood cells placed in distilled water for 20 minutes(**3 marks)**

22. Below is a photograph of an organism

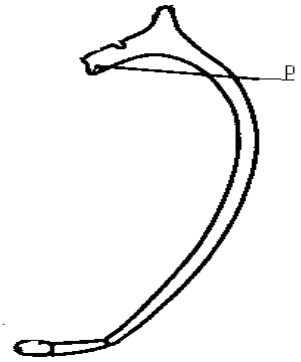
i) Identify the class to which this organism belongs to**.** **(1 mark)**

ii) Give reasons for your answer in (i) above. **(2 marks)**

23. What are the functions of the odontoid process found on the axis bone of the vertebra **(2mks)**

24. Give **three** main reasons why plants do not require an elaborate excretory system like animals **(3marks)**

25. Study the diagram of an animal below and answer the questions that follow.



(i) Name the part labeled P **(1mark)**

(ii) How is the above structure adapted to its function? **(2marks)**

26. State how herbaceous plants obtain their support **(3marks)**

27. a) Name **two** structures for gaseous exchange in aquatic plants. **(2 marks)**

b) Explain why guards cells have thicker inner walls and thinner outer walls. **(1 mark)**

28. Explain the significance of etiolation in plants growing in the dark **(2 marks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 9

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

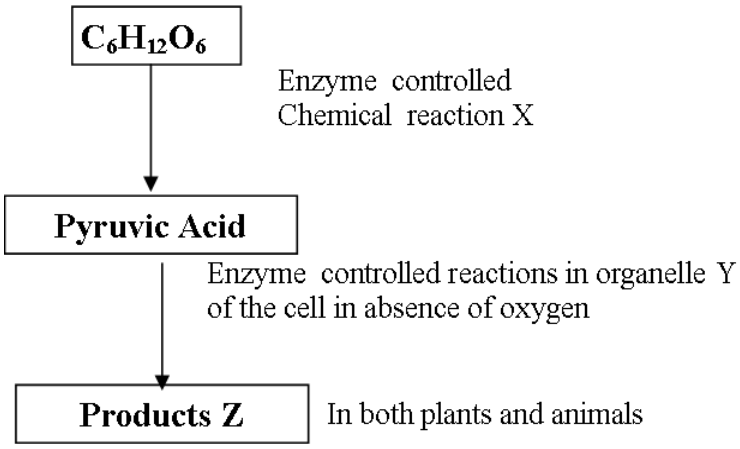
- *Write your name and index number in the spaces provided above.*
- *Sign and write the date of examination in the spaces provided.*
- *Question **six** is compulsory.*
- *Choose either question 7 or 8*

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE SCORE
1	8	
2	8	
3	8	
4	8	
5	8	
6	20	
7	20	
8	20	
TOTAL	80	

QUESTIONS

1. Study the flow chart below of a process that takes place in both plants and animals.



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

b) i) In the above process name the chemical reaction represented by X. (**1mark)**

ii) Name the part of the cell where the enzyme controlled reactions in b(i) above takes place. **(1mark)**

c) Name the products Z in

i) Plants**……** **(1mark)**

ii) Animals**……** **(1mark)**

d)What would be the fate of pyruvic acid if oxygen supply is availed in the mitochondria of an animal cell **(2marks)**

(e) Define the term oxygen debt **(1mark)**

2. .In a certain bird species red flight feathers is controlled by gene R while white flight feather is controlled by gene r. The heterozygous condition Rr results into pink flight feathers.

(a) Using a punnet square, find the genotype of a cross between pink flight feathered bird and white flight feathered bird. **(4 marks)**

(b) Which type of dominance is illustrated here? **(1 mark)**

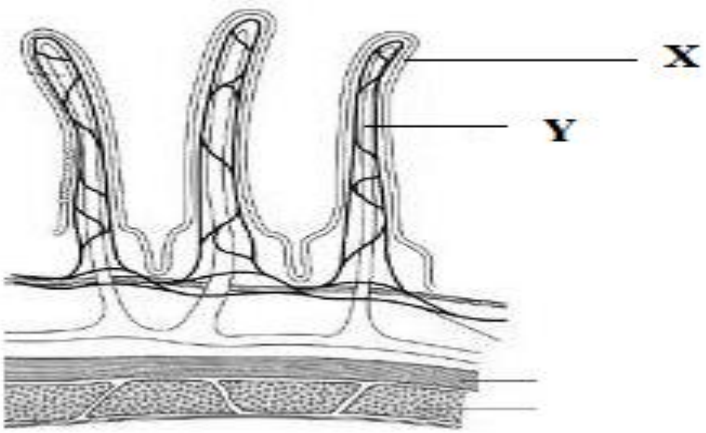
(c) i) Identify the nuclei acid whose base sequence is shown below. **(1 mark)**

G - A - C - U - A - G - C - G – U

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

(iii) If this nucleic acid was involved in protein synthesis, how many amino acid would be present in the protein synthesized. **(1 mark)**

3 .The diagram below represents a longitudinal section through the ileum wall.



a) Identify the structures labeled X and Y **(2 marks)**

b) State one function of X and Y **(2 marks)**

X……

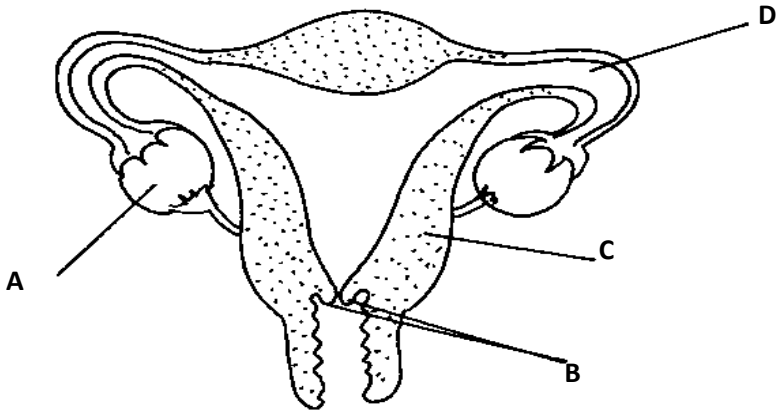
Y……

c) State two functions of the ileum **(2 marks)**

d) Explain the role of the liver in digestion **(1 mark)**

e) State the endocrine (hormonal) role of pancreas in a mammal **(1 mark)**

4. The diagram below represents the female reproductive system.



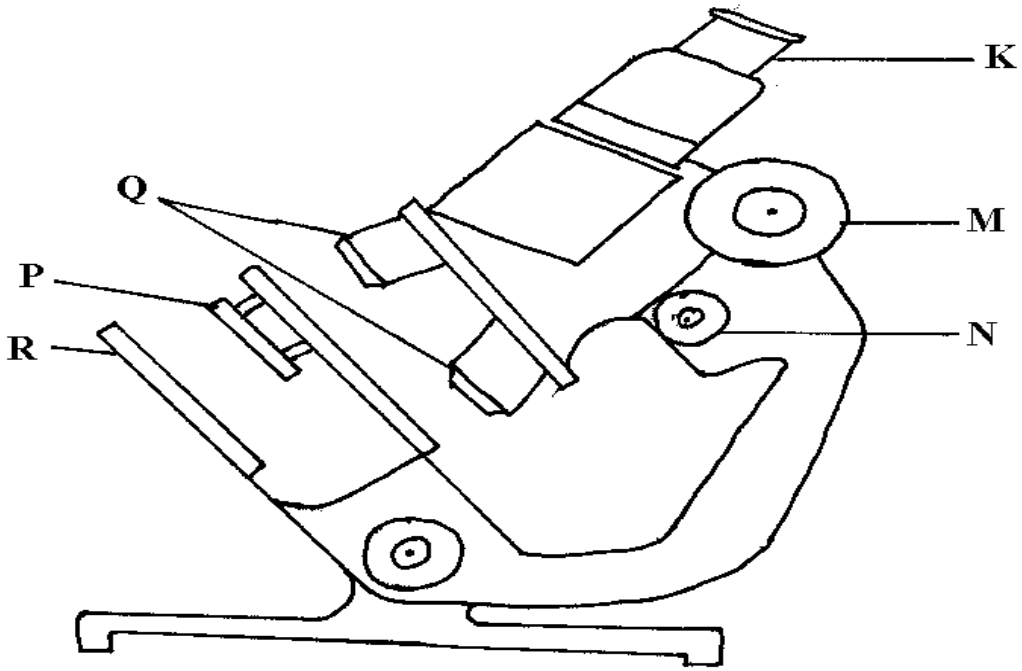
(a) Name the structures labeled **A** and **C** **(2 marks)**

(b) State the conditions that results if implantation occurs at point labeled **D**. **(1 marks)**

(c) Name the hormone secreted by the part labeled **A** and for each give **<u>one</u>** function **(4 marks)**

(d) What role does part labeled **B** play during pregnancy? **(1 mark)**

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



a) Name the parts labeled **(2 marks)**

K ……

M ……

b) State the functions of **(2 marks)**

P ……

Q ……

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

(i) A sharper outline of the features. **(1 mark)**

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

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

(i) Cutting a very thin section **(1 mark)**

(ii) Staining the section **(1 mark)**

(iii)Putting the section in water **(1 mark)**

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

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

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

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

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

c) Account for:

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

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

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

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

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

i) Factors within the seed **(2marks)**

ii) Factors outside the seed. **(2marks)**

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

7. Describe how the mammalian skin is adapted to its functions **(20 mrks)**

8. a) Describe how xerophytes are adapted to living in their habitat. **(10 mks)**

b) Explain how an upright position is maintained in herbaceous plants. **(10 mks)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 10

231/1

BIOLOGY

PAPER 1

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

(a) *Write your name, index number and school in the spaces provided above*

(b) *Sign and write the date of the examination in the spaces provided above*

(c) *Answer ALL the questions in the spaces provided on the question paper*

(d) *Candidates should answer the questions in English*

(e) **Wrong Spelling of Technical Terms shall be Penalized**

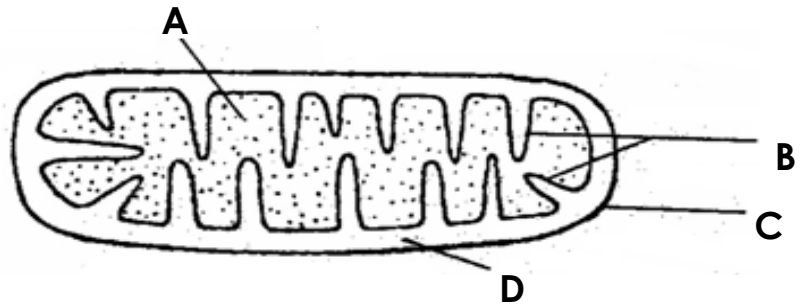
FOR EXAMINERS USE ONLY

MAX SCORE	STUDENT'S SCORE
80	

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

1. Name the causative agent of cholera. **(1 mark)**

2. The diagram **below** represents a cell organelle.



(a) Identify the organelle. **(1 mark)**

(b) Name the part labelled **B**. **(1 mark)**

(c) State the function of part labelled **A**. **(1 mark)**

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

(a) Condenser. **(1mark)**

(b) Diaphragm. **(1 mark)**

4. (a) Explain **three** ways in which a red blood cell is adapted to its function. **(3 marks)**

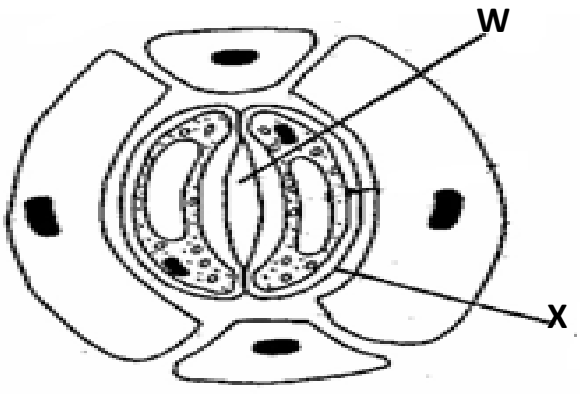
(b) In which form is carbon (IV) oxide transported. **(1 mark)**

5. State the functions of the following organelles.

(i) Centriole. **(1 mark)**

(ii) Nucleolus. **(1 mark)**

6. The diagram **below** shows part of plant tissue.



(a) Name cell labelled **X** and part labelled **W**. **(2 marks)**

(b) State **two** adaptations of cell labelled **X** to its function.

7. (a) Differentiate between hypogeal germination and epigeal germination. **(2 marks)**

(b) State **two** causes of dormancy in seed. **(2 marks)**

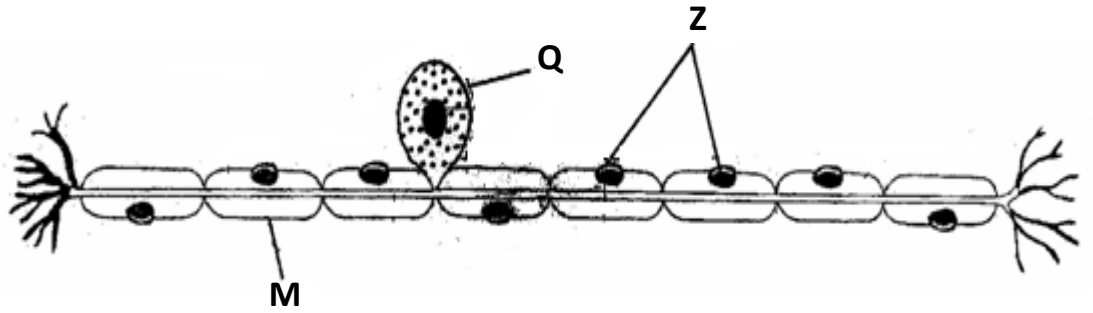
8. (a) Define polyploidy. **(1 mark)**

(b) Name **three** disorders resulting from gene mutations. **(3 marks)**

9. (a) Distinguish between homologous and analogous structure. **(2 marks)**

(b) Explain the term continental drift as used in evolution. **(2 marks)**

10. The diagram **below** represents a sensory cell.



(a) Identify with a reason the type of neurone above. **(1 mark)**

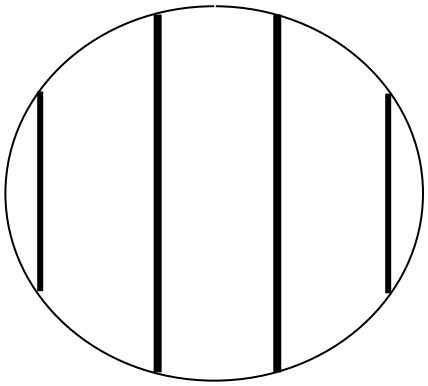
Reason: **(1 mark)**

(b) Name parts labelled. **Q** and **Z** **(2 marks)**

11. (a) Name **three** supportive tissues in plants. **(3 marks)**

(b) Name the type of muscles found in the gut. **(1 mark)**

12. A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view.



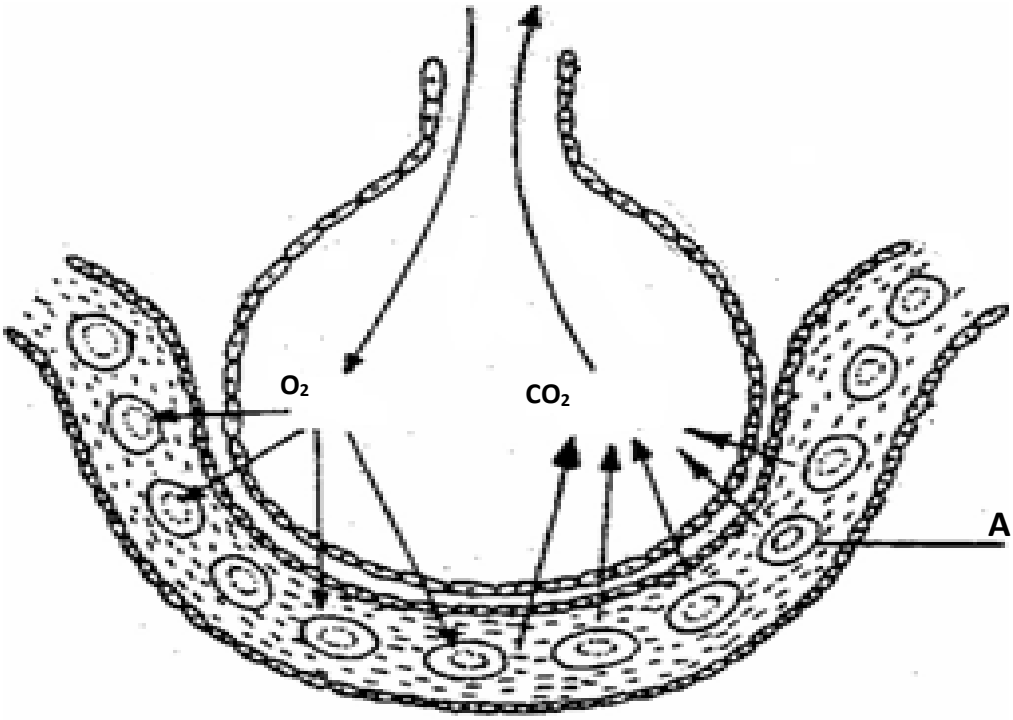
(a) Define the term resolving power. **(1 mark)**

(b) If the student counted 20 cells across the field of view calculate the size of one cell in micrometers. **(2 marks)**

13. (a) Distinguish between transpiration and guttation. **(2 marks)**

(b) State **two** importance of guttation in hydrolytes. **(2 marks)**

14. The diagram **below** shows the exchange of gases in alveolus.



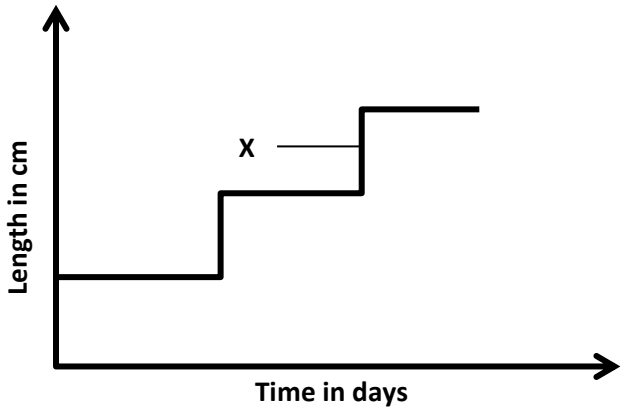
(a) State how the alveoli are adapted to their function. **(3 marks)**

(b) Name the cell labelled **A**. **(1 mark)**

15. (a) Distinguish between respiratory quotient and oxygen debt. **(2 marks)**

(b) Name the site where anaerobic respiration occurs in the cell. **(1 mark)**

16. Study the graph **below** and answer the questions that follow.



(a) What is the name given to the type of graph? **(1 mark)**

(b) What is the name used to describe point **X**. **(1 mark)**

(c) State the importance of part **X**. **(1 mark)**

(d) Name the phylum in which the graph represented in above occurs. **(1 mark)**

17. (a) Define the term natural selection. **(1 mark)**

(b) Name **three** evidence of organic evolution. **(3 marks)**

18. State **one** adaptation of the following parts of mammalian eye.

(i) Fovea centralis. **(1 mark)**

(ii) Sclera. **(1 mark)**

(iii) Cilliary body. **(1 mark)**

19. Name the cartilage found between vertebrae of the vertebral column. **(1 mark)**

20. (a) Differentiate between gaseous exchange and ventilation. **(2 marks)**

(b) Name the respiratory sites of the following:

(i) Fish **(1 mark)**

(ii) Insects **(1 mark)**

21. (a) Name **two** cardiovascular diseases. **(2 marks)**

(b) If the nerve supply to the heart of a mammal is severed the rythymic heart contraction and relaxation will go on and heart continues to beat. Explain why. **(2 marks)**

22. Name **two** major branches of Biology. **(2 marks)**

23. (a) State the functions of the following apparatus.

(i) Bait trap. **(1 mark)**

(ii) Pooter. **(1 mark)**

24. State **two** structural adaptations of veins to their function. **(2 marks)**

25. Name the process that results to formation of tissue fluid. **(1 mark)**

26. What is serum? **(1 mark)**

KCSE 2025 TOP SCHOOLS' PREDICTIONS

EXPECTED EXAM 10

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATE

(a) *Write your name, school, index number in the space provided at the top of the paper.*
(b) *Sign and write the date of examination in the space provided above.*
(c) *This paper consists of two sections,* ***A*** *and* ***B****.*
(d) *Answer all the questions in section* ***A*** *in the spaces provided.*
(e) *In section* ***B*** *answer question* ***6 (compulsory)*** *and either* ***question 7 or 8****.*

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	
		80	

SECTION A (40 marks)

Answer all the questions

1. a) Using the diagrams below, construct a dichotomous key that can be used to identify the leaves. **(2mks)**

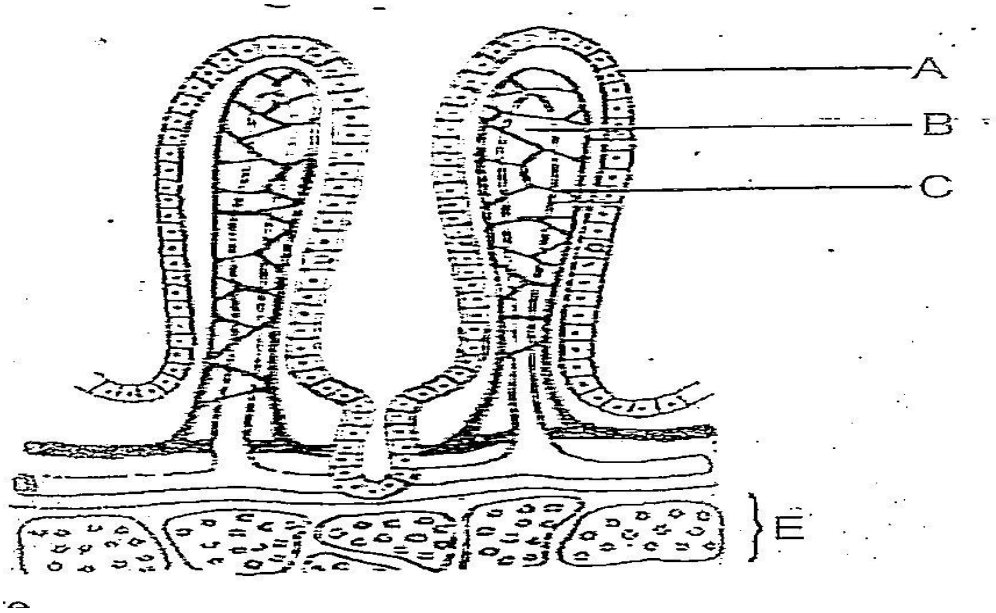
COTTON WOOD

WHITE CLOVER

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)**

(c) Give the functions of the part labelled B and C **(2 marks)**

(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)**

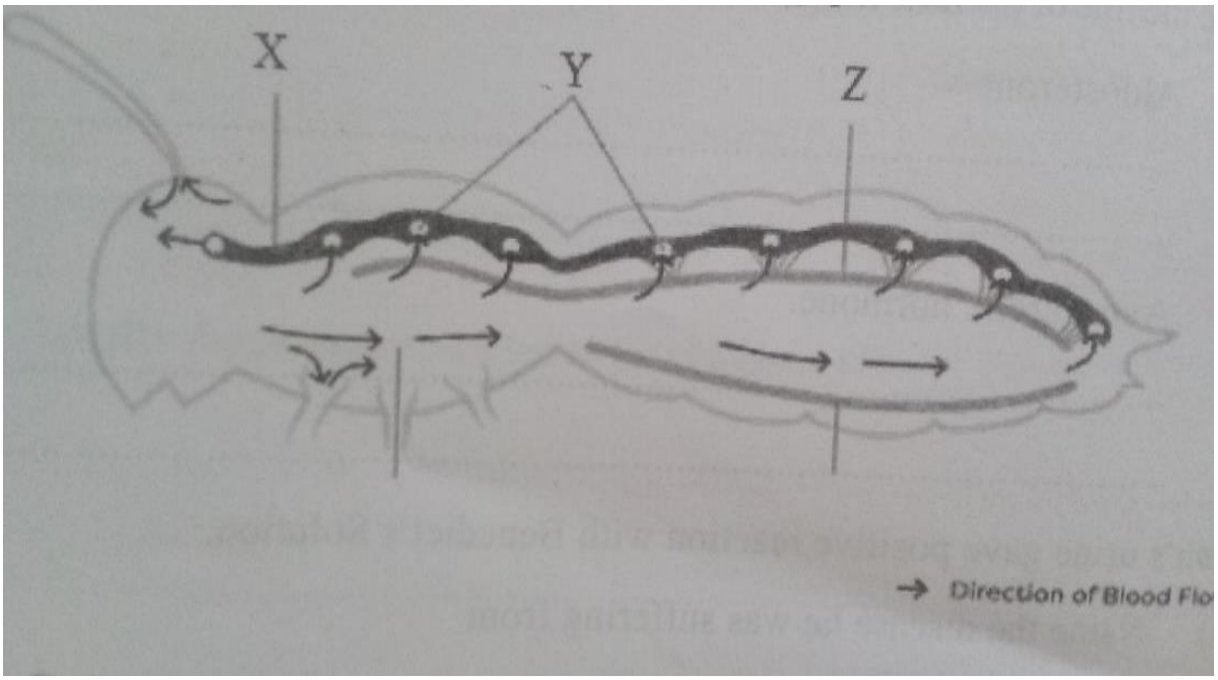
(b)i) What is the probability of their daughters being bald**?** **(1mk)**

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)**

(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

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 50^{th} minute? **(2mks)**

c) Account for the level of glucose in present Y

i) During the first 45 minutes. **(2mks)**

ii) After 45^{th} 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)**

THE END

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