BIOLOGY PAPER 3

EXPECTED QUESTIONS IN KCSE

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

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For More e-learning resources contact Kenya Educators via the contacts above.

PREDICTION 1

231/3
BIOLOGY
FORM 4 2021

PRACTICAL CONFIDENTIAL

Each Candidate Should Be Provided With the Following Items

- Solution A about 10mls (amylase enzyme solution)
- Solution B (benedict's solution)
- Solution C (10 mls starch solution labeled as solution C)
- NaCl solution 0.1% NaCl
- 1.4% NaCl solution
- Iodine solution labeled D
- Means of timing. A wall clock will be appropriate
- 10 ml measuring cylinder
- Scalpel
- Means of labeling (5 labels)
- Four test tubes
- Means of heating
- Distilled water labeled as solution Y
- Mortar and pestle
- Cork borer
- 2 medium irish potatoes
- 20mls concentrated salt solution labeled as solution Z
- 2mls hydrogen peroxide labeled as solution C

PREDICTION 1

NAME _____ SCHOOL _____

INDEX NO_____CANDIDATE'S SIGNATURE _____

DATE _____

231/3

BIOLOGY
PRACTICAL
FORM 4 2021

Paper 3
Time: 1 ¾ hours.

INSTRUCTIONS TO THE CANDIDATES

- Answer **ALL** questions in the spaces provided.
- You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole question paper carefully before commencing your work.
- Answers **MUST** be written in the spaces provided in the question paper.
- Additional pages **MUST** not be inserted.
- Candidates will be penalized for recording irrelevant information and wrong spelling especially technical terms.

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1	14	
2	12	
3	14	
Total Score	**40**	

1. You are provided with the following:
   - Solution A
   - Benedict's solution labelled as solution B
   - Solution C

- 0.1% NaCl solution
- 1.4% NaCl solution
- Iodine solution labeled as solution D

    - Label the test tubes as P, Q and R; in each test tube place 3mls of solution C into each test tube:

a) Carry out iodine test on portion of the solution from test tubes P, Q and R and record the observation in the table below. (3 marks)

Test tube	Observation
P	
Q	
R	

b) To test tube Q, add 3 drops of 0.1 % sodium chloride solution and 2ml of solution A. Place test tube P, Q and R in a water bath and maintain at 37^{o}C for 30 minutes. Using a drop of the solution from each test tube, repeat the procedure in (a) above and spare the rest for the next question. Record your observation in the table below (2 marks)

Test tube	Observation at the end of the experiment
Q	
R	

c) Put 2cm^{3}of solution from test tube P in a clean test tube and add 2cm^{3}of Benedict's (solution B) shake then heat the mixture to boil in a hot water bath. Record your final observation in the table below. (2 marks)

Test tube	Observation after experiment
Q	
R	

d) Why was test tube P included in the experiment? (1 mark)

e) Account for the observations made in test tube Q and R at the end of the experiment (4 marks)

i) Test tube Q

ii) Test tube R

f) Suggest the identity of solution A (1 mark)

g) Why was the water bath maintained at 37^{o}C? (1 mark)

2. a) Study the photographs below for specimen R and S.

S

R

(i) State four observable differences between the specimen R and S (4 marks)

Specimen R	Specimen S

(ii) Suggest the advantages of the adaptations on the limbs of specimen S (2marks)

b) Name the phylum and class to which the specimen belongs. (2 marks)

Phylum ----------

Class ----------

c) i) Give the type of metamorphosis in S (1 mark)

ii) Draw the life cycle of the type of metamorphosis in the organism mentioned in C (i) above (3 marks)

3. (a) You are provided with specimen Q, using a cork borer, remove eight strips of 2cm length from specimen Q. Place two into solution labeled Y and another two strips into solution labeled Z. Leave the set up to stand for 20 minutes.

NB Preserve the other two for use later in question 3(b) (i)

(i) State the observation after 20 minutes when the strips are touched. (6 marks)

	Initial length	Final length	Change in length	Flexibility	Texture
Strips in solution Y	2cm				
Strips in solution Z	2cm				

(ii) Account for the observations in (c) (i) above (4 marks)

(b) (i) using a mortar and a pestle crush one of the remaining strip, place the extract in a test tube and add solution C. State your observation. (1 mark)

(ii) Repeat the procedure in (b) (i) with distilled water instead of hydrogen peroxide. State your observation. (1 mark)

(c) Explain why:

(i) It was necessary to crush specimens in the experiment. (1 mark)

(ii) Hydrogen peroxide should not accumulate in living tissue. (1 mark)

PREDICTION 2

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
TIME: 1¾ HRS

CONFIDENTIAL INSTRUCTIONS

These instructions are to enable the Head of Institution and the teacher in charge of Biology to make adequate preparations for 231/3 Biology Practical.

No one else should have access to this information either directly or indirectly.

Each candidate requires the following

- 20mls of solution L
- 4 test tubes in a test tube rack.
- Benedict's solution
- Iodine solution
- 1% copper sulphate
- Sodium hydroxide (10%)
- DCPIP
- Source of heat/water bath
- Test tube holder
- Visking tubing 8 cm long
- Thread/string 2 pieces 10cm long each.
- 50 mls beaker
- Distilled water
- 10mls measuring cylinder

NB Solution L contains glucose and ascorbic acid dissolved in water

PREDICTION 2

NAME …… **INDEX NO** ……..

SCHOOL …… **SIGNATURE** ……..……

DATE ……..……...

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
$1^{3}/_{4}$ HOURS

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

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $1^{3}/_{4}$ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	14	
3	14	
TOTAL SCORE	40	

This paper consists of 5 Printed pages.
Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

1. (a) You are provided with a solution L. Using the reagents provided; determine the food compounds in L. Fill in the table below.

FOOD COMPOUND	PROCEDURE	OBSERVATION	CONCLUSION

(b) Place 10mls of solution L in a visking tubing. Tie both ends and place it in 50mls of distilled water contained in a beaker.leave the set up for 20 minutes and make observations.

(i) Observations. (1**mark**)

……

……

(ii) Account for the observation in b (i) above. (2**marks**)

……

……

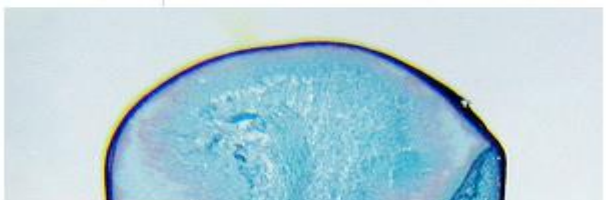
……

(iii)Give the equivalent of a visking in the bodies of living organisms. (1mark)

……

……

2. Study the photomicrograph of the longitudinal section of a maize fruit below and answer the questions that follow.



A

(a) (i) Name the parts labelled A, B, C and D. (4**marks**)

A

…….

B

…….

C

…….

D

…….

(ii) Give the role played by A and D. (2 **mark**)

A

……

……..….

D

……

……

(b) (i) Name the type of germination exhibited by maize grain. (1 **mark**)

……

……

(ii) Place the organisms from where the photomicrograph was obtained into its Kingdom

Division

Class (3**marks**)

(iii) State three characteristics of members of the class identified in b (ii) above (3**marks**)

……

……

……

……

(c) Give one reason why the maize grain is classified as a fruit. (1**mark**)

……

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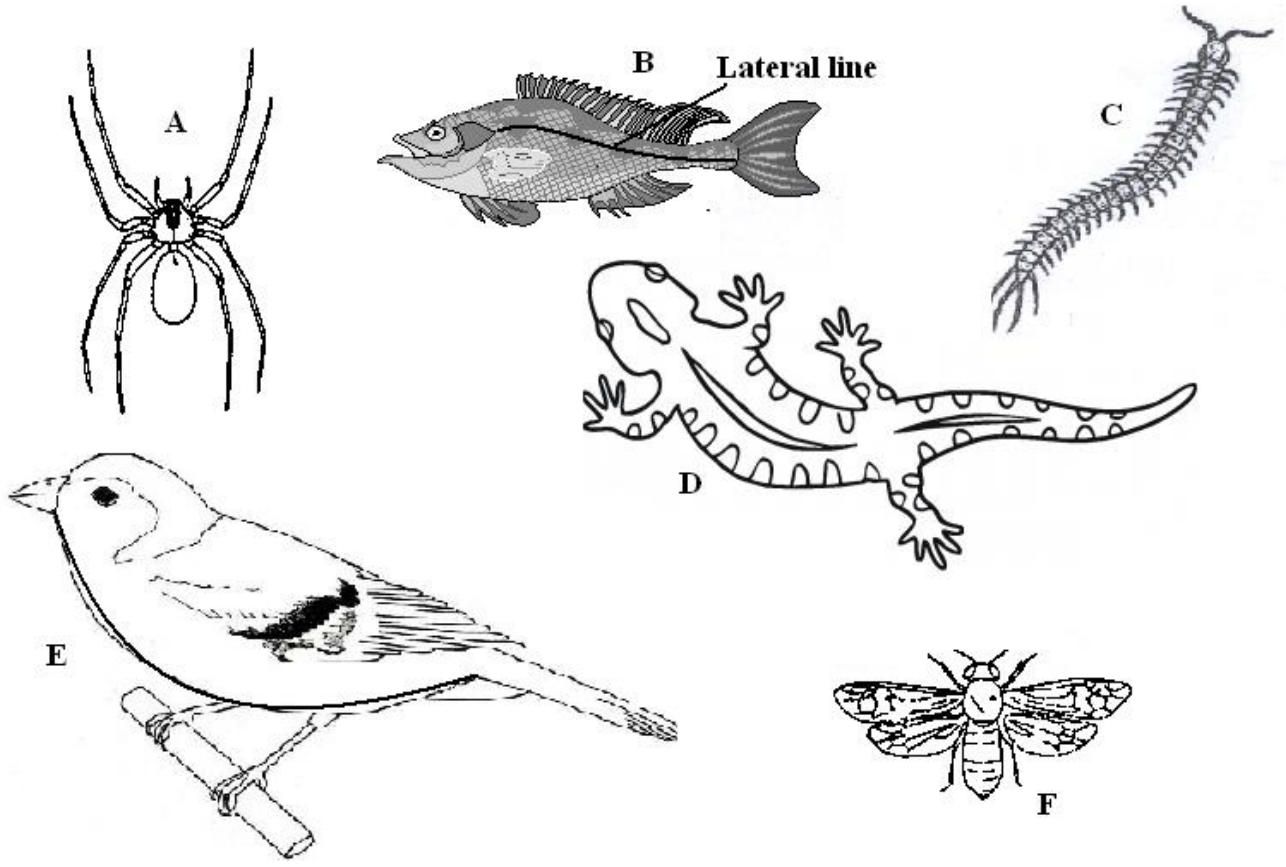
3. Study the organisms drawn below and answer the questions that follow.



(a) Use the dichotomous key below to identify the class the organisms belong to. (12 **marks**)

1. (a) Phylum Chordata …… go to 2

   (b) Phylum arthropoda ……. go to 3

2. (a) Has scales on the body …… go to 4

   (b) Has no scales on the body ……..… Mammalia

3. (a) Has cephalothorax ……. Arachnida
   (b) Has no cephalothorax ……. go to 5
4. (a) Has fins …… Pisces
   (b) Has no fins ……... go to 7
5. (a) Has three pairs of legs ……. Insecta
   (b) Has more than three pairs of legs …… go to 6
6. (a) Two pairs of legs per segment …… Diplopoda
   (b) One pairs of legs per segment ……. Chilopoda
7. (a) Has feathers ……Aves
   (b) Has no feathers …… go to 8
8. (a) Has a tail …….. Reptilia
   (b) Has no tail …….. Amphibia

Specimen	Step followed	Identity
A		
B		
C		
D		
E		
F		

(b) If the actual length from the tip of the mouth to the tip of the tail of the specimen B is 100mm, calculate the magnification. (2**marks**)

……

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PREDICTION 3

CONFIDENTIAL

Each candidate should have:

One ripe banana

Scalpel/blade

PREDICTION 3

NAME _____ CLASS_____ADM. NO. _____

School.....
231/3
BIOLOGY
PAPER 3

KCSE PREDICTION 3

INSTRUCTIONS TO CANDIDATES

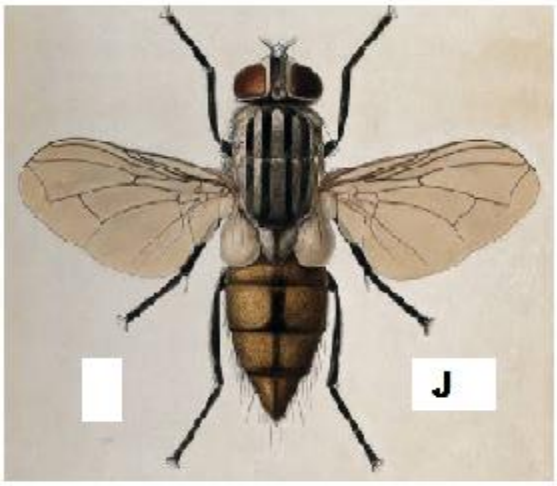
- *Write your **name** and **index number** in the spaces provided above.*
- ***Sign** and write the **date** of examination in the spaces provided above.*
- *You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.*
- *Answers must be written in the spaces provided in the question paper.*

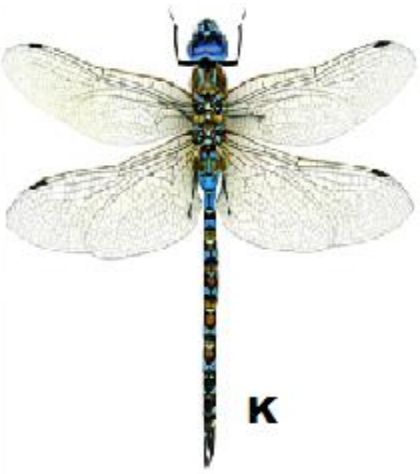
For Examiner's Use only:-

Question	Maximum Score	Candidate's Score
1	14	
2	13	
3	13	
TOTAL	40	

*This paper consists of **7** printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. Below are photographs of two specimens, **J** and **K.** Both of them belong to the same phylum and class. Observe them carefully before you answer the questions that follow.





a) Name the class to which **J** and **K** belong and support your answer with two reasons.

Class

……1mk

Reasons 2mks

i) ……

ii) ……

b) Suggest why the circulatory fluid in **J** and **K** has no haemoglobin.

2mks

……

……

c) Observe their wings and suggest the type of evolution that could have taken place to give rise to **J** and **K**, and then give a reason for your answer.

Type of evolution

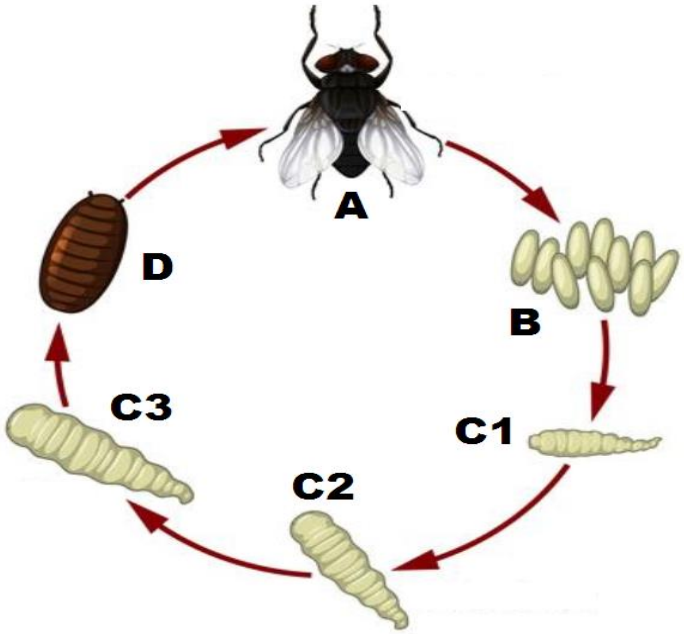
……1mk

Reason

……

……2mks

d) Below is a diagram showing the life cycle of specimen J.



i) Identify the stage labeled **D**.

……1mk

ii) Name the hormone responsible for the change from **D** to **A**.

1mk

……

iii) Explain the differences in the change from **C2** to **C3** and from **C3** to **D**. 4mks

……

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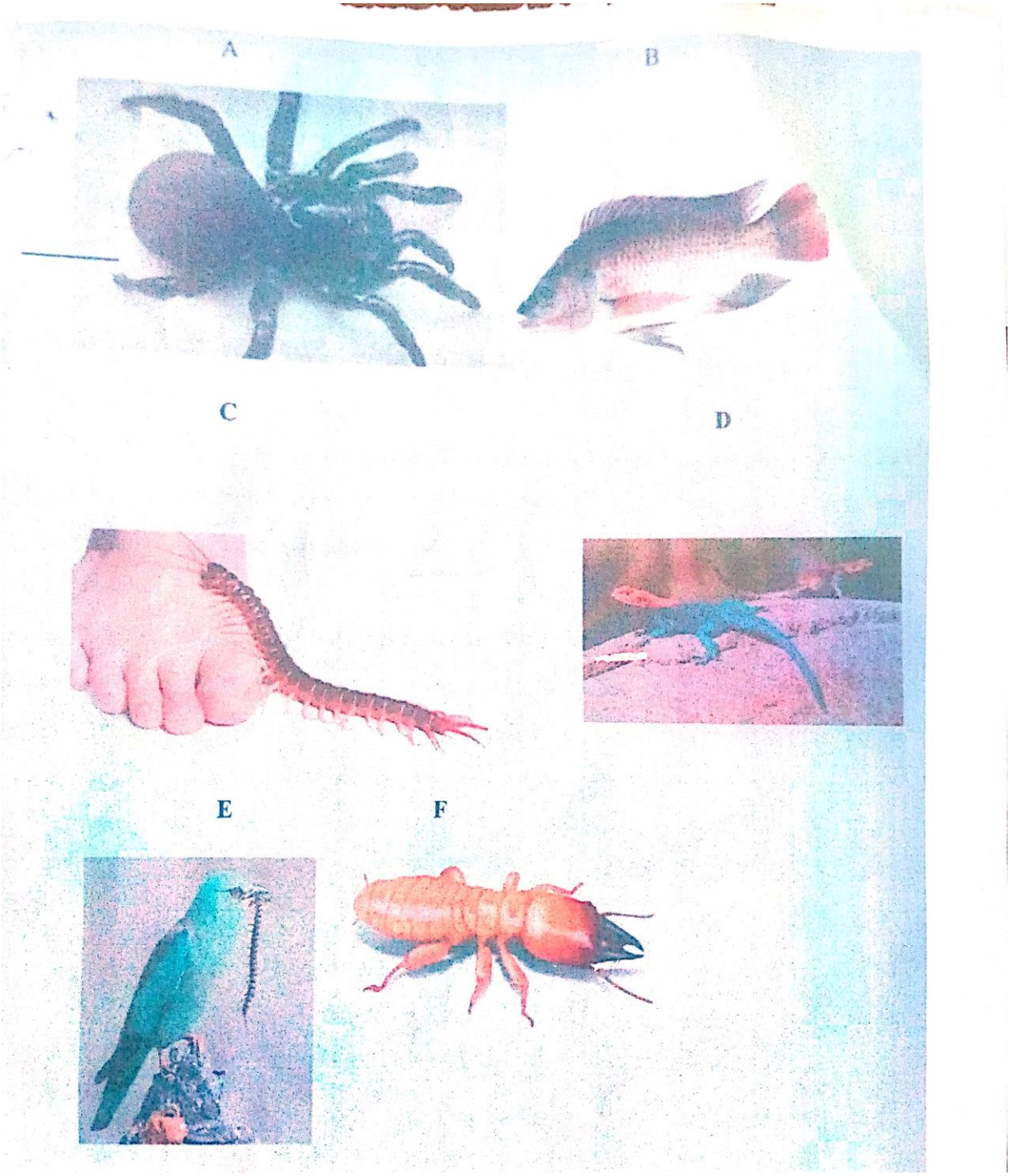
……

Q2. Study the organisms below and answer questions in spaces provided .



a. Complete and use the key below to identify the organism. 2mks

1a. Organism with endoskeleton ..... go to 2
1b. _____ ..... go to 3

2a. Has scales on the body..... go to 4
2b. Has no scales on the body..... mammalian.

3a. Has cephalothorax ..... Arachnida.
3b. Has no cephalothorax.....go to 5

4a. _____..... pisces
4b. Has no fins ..... Go to 7

5a. Has three pairs of legs ..... Insects.
5b. Has more than three pairs of legs ..... go to 6

6a. Two pairs of legs per segment .....Diplopoda
6b. One pair of legs per segment.....chilopoda.

7a. Has feathers ..... Aves
7b. Has no feathers .....go to 8

8a. Has a tail.....Reptilia
8b. Has no tail.....Amphibia.

b). Identify the organisms above using the completed key above. 6mks

Specimen	Steps followed	Identity
A		
B		
C		
D		
E		
F		

c). Name the phylum in which specimens C, E and F belong to
.....1mk

d). Give three reasons for your answer in (c). 3mks

……
……
……
……
……

e).Name one feature that is common in organisms **B**, **D** and **E**. 1mk

……

Q3.You are provided with a specimen labeled **T** which is a fruit. Use it to answer the questions that follow.

a) Make a **transverse** section of the specimen **T**. Draw and label at least 3 parts. 6mks

b) With reasons, state the identity of fruit **T.**

Type of fruit……1mk

Reason

……1mk

c) Suggest the possible agent of dispersal and give **two** reasons

Agent

……1mk

Reason

……

……

2mk

d) What is the placentation of **T**?

……1mk

e) Specimen **T** was green in colour before it was treated with a plant hormone.

Suggest the plant hormone.

……1mk

END

PREDICTION 4

BIOLOGY PAPER 3 (231/3)

CONFIDENTIAL

Candidates require the following in the working bench

QUESTION 1

a. Mixture J: Solution containing a mixture of sucrose and vitamin C.
b. Benedict's solution,
c. Dilute hydrochloric acid solution.
d. Iodine solution
e. Dichlorophenol – indophenol (DCPIP) solution,
f. Sodium hydrogen – carbonate,
g. Means of heating,
h. 5 test tubes,
i. Test tube holder
j. Test tube rack

QUESTION 2

a. Photograph Q: complete hibiscus flower (Each candidate should be provided with a real flower)
b. Photograph Q: Half flower of hibiscus
c. Scalpel / razor blade

PREDICTION 4

NAME……. STRM……ADM……..

DATE……. ……. SIGN…….…….

231/3

BIOLOGY PRACTICAL

PAPER 3

Time: 1 ¾ Hours

KCSE PREDICTION 4

(Kenya Certificate of Secondary Education)

INSTRUCTIONS TO CANDIDATES

- Answer all the questions in the spaces provided.
- You are required to spend the first **15** minutes of **1** ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.
- Candidates may be penalized for recording irrelevant information and for incorrect spelling especially of technical terms.

FOR EXAMINER'S USE ONLY

Question	Max Score	Candidate's Score
1	13	
2	13	
3	14	
TOTAL	40	

This paper consists of 7 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.

1. You are provided with an unknown mixture labelled J

   You are also provided with Benedict's solution, dilute hydrochloric acid solution, iodine solution, Dichlorophenol-Indophenol (DCPIP) solution. Sodium hydrogen-carbonate solution, means of heating, test tubes, test tube holder and a test tube rack.

   a) Using the reagent provided only, test for the food substances in mixture J. Record in the table below the chemical test, the procedure of the test, your observations and conclusions. 8mks

Chemical test	**Procedure**	**Observations**	**Conclusions**

b) Which of the components of mixture J does not undergo digestion in the mammalian digestive system? 1mk

……

c) i)Name a deficiency disease that may result from a deficiency of the component identified in (b) above. 1mk

……

d) Name a common carbohydrate that could be present in mixture J. 1mk

……

e) State the role of hydrochloric acid and sodium hydrogen carbonate in the experiment. 2mks

Hydrochloric Acid

……

……

……..

Sodium Hydrogen Carbonate

……

…………

……

2. The photographs below show a flower specimen. Study it carefully and use to answer the questions that follow.

a) On the photograph, label the following parts 3mks

   i. Stigma

   ii. Style

   iii. Staminal tube

b) i) Classify the plant from which the flower was picked into the taxonomic groups listed below. 4mks

Kingdom

……

Division

……

Sub division

……

Class

……

ii) Name three observable features from the photograph of the class you named in (a) (i) above. 3mks

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……

……

……..

c) Suggest the pollination agent of this flower. Give reasons for your answer.

Pollinating agent **1mk**

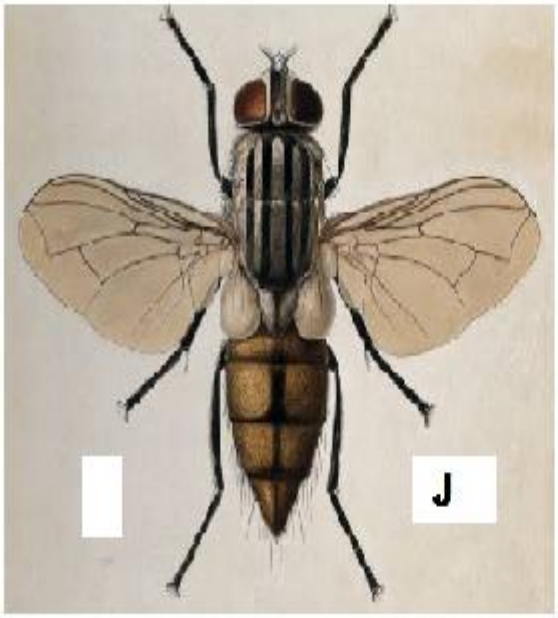
……

Reasons **2mks**

……

……

3. Below are photographs of two specimens, **J** and **K.** Both of them belong to the same Phylum and Class. Observe them carefully before you answer the questions that follow.



a) Name the class to which **J** and **K** belong and support your answer with two reasons.

Class 1mk

……

Reasons 2mks

……

……

……

……

b. Suggest why the transport fluid in **J** and **K** has no haemoglobin. 2mks

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……..

c. The actual length of specimen K is 8cm, given that both J and K are under the same magnification, determine the actual length of J 3mks

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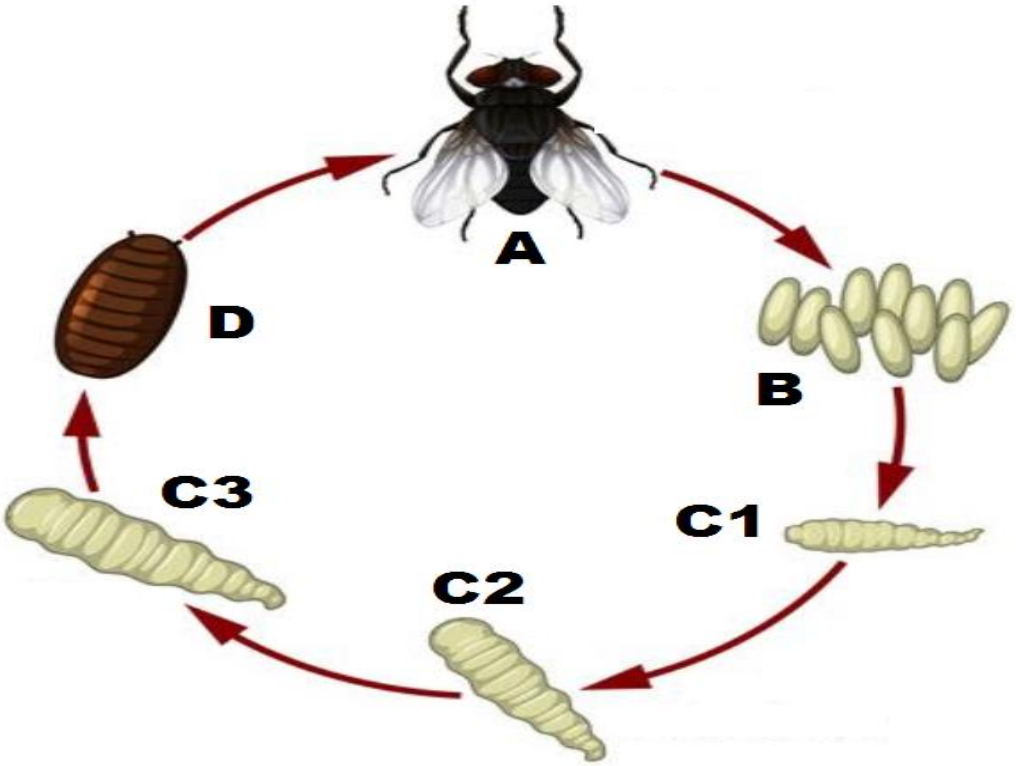
d. Below is a diagram showing the life cycle of specimen J.



i. Identify the stage labeled **D**. 1mk

……

ii. Name the hormone responsible for the change from **D** to **A**. 1mk

……...……...

iii. Explain the differences in the change from **C2** to **C3** and from **C3** to **D**. 2mks

C2 to C3

……

……..

C3 to D

……

……

iv. State the importance of the process illustrated above in the life cycle of the organism 2mks

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PREDICTION 5

231/2
BIOLOGY
PAPER 3
PRACTICAL

KCSE PREDICTION 5

CONFIDENTIAL

Each candidate should be provided with:-

1. Iodine solution
2. Benedicts solution
3. 1 piece of visking tubing of 10cm
4. Two pieces of thread of 10cm each
5. 30mls of glucose solution labeled L
6. 30mls of starch solution labelled K
7. 4 test tubes
8. Test tube holder
9. Two droppers
10. Means of heating

PREDICTION 5

NAME …….. **INDEX NO** ……..

SCHOOL …… **SIGNATURE** ……..……

DATE ……..……...

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
$1^{3}/_{4}$ HOURS

KCSE PREDICTION 5

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

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
$1^{3}/_{4}$ HOURS

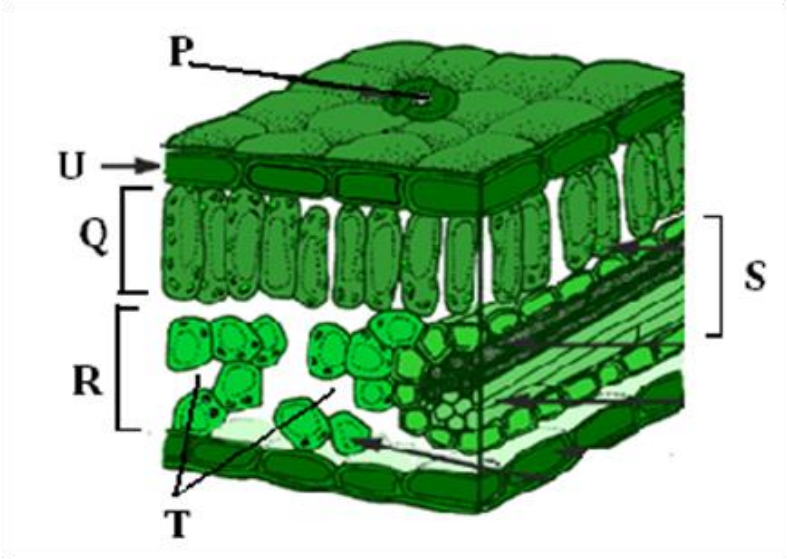
INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $1^{3}/_{4}$ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.
- This paper consists of 6 Printed pages. Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	15	
3	13	
TOTAL SCORE	40	

1. The photograph below shows the arrangements of different type of cells and tissues in a certain living organism. Study it and answer the questions that follow.



a) i) From what part of the plant was the photograph obtained. (1 mark)

.....

ii) Name the parts labeled. (3marks)

P .....

Q .....

R .....

S .....

T .....

b. i) State the function of the part labeled Q. (1mark)

.....

ii) State two adaptations of structure Q to its function. (2 marks)

.....

.....

c. State two environmental factors which regulate the function of the part labeled P. (2 marks)

.....

.....

d. Measure the length of one cell of region labeled Q on the photomicrograph whose magnification is X5000.What is the actual length of the cell in micrometer? Show your working. (3marks)

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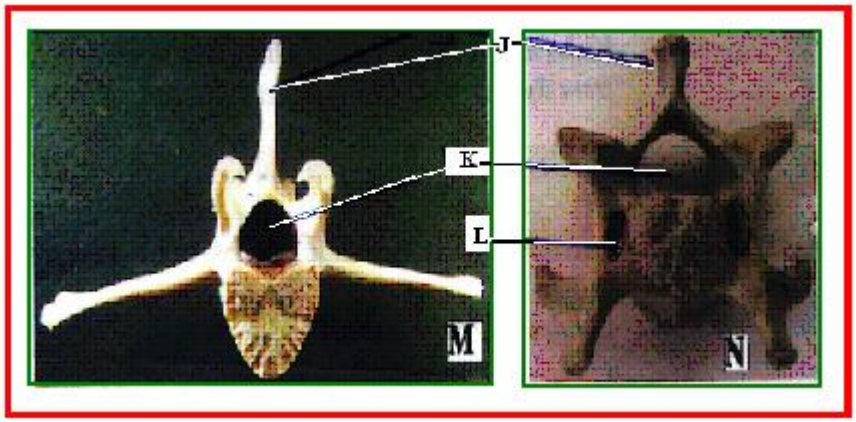
2. You are provided with photographs of specimens labeled M and N. Examine them and answer the questions that follow.



a) i) Identify the specimens represented by the photographs.

M: ..... (1 mark)

N: ..... (1mark)

ii) label the parts labeled

J: ..... (1mark)

K: ..... (1 mark)

L: ..... (1mark)

b) i) State four observable differences between specimens M and N. (4 marks)

.....

.....

.....

.....

ii) Name the region of the body from which the specimens were obtained.

M: .....

N: .....

c) How is specimen N adapted to its function? (4 marks)

.....

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.....

3. You are provided with solution labeled L and K.

a) Use the reagents provided to determine their identity. Record your procedure, observation and conclusion in the table below. (6 marks)

Food substance	procedure	observation	conclusion

b. Tie one end of the visking tubing provided tightly. Put solution K in the visking tubing and tie the open end. Imerse the visking tubing in the beaker containing solution L .Let the set up stand for about 30 minutes.

i) Test the contents in the visking tubing with iodine and benedict's solution. Record your procedure,observation and conclusion in the table below. (3marks)

Test with	procedure	observation	conclusion
Iodine solution			
Benedict's solution			

ii) Test the contents in the beaker with iodine and Benedict's solution. Record your procedure, observation and conclusion in the table below.

Test with	procedure	observation	conclusion
Iodine solution			
Benedict's solution			

c. Account for your observation in b(i) and (ii) above

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PREDICTION 6

BIOLOGY

PRACTICAL

PAPER 3

CONFIDENTIAL INSTRUCTIONS TO SCHOOLS

The information contained in this paper is to enable the head of the school and the teacher in charge of biology to make adequate preparations for this year's Lanet Joint Examination in Biology practical Examination.

No one Else should have access to this paper or acquire knowledge of its contents. Great care **MUST** be taken to ensure that the information herein does not reach the candidates either directly or indirectly.

The teacher in charge of Biology should **NOT** perform any of the experiments in the same room as the candidates or give any other information related to the experiments to the candidates.

Each Candidate will require:

- a test tube
- Test tube rack
- Soaked pea seeds with only radicle visible, marked **N**.----6pcs per student
- 10ml measuring cylinder
- A small piece of tissue paper for closing the test tube mouth
- A Wooden splint
- Bromothymol blue 2ml per student, marked D

PREDICTION 6

BIOLOGY

PRACTICAL

PAPER 3

CONFIDENTIAL INSTRUCTIONS TO SCHOOLS

The information contained in this paper is to enable the head of the school and the teacher in charge of biology to make adequate preparations for this year's Lanet Joint Examination in Biology practical Examination.

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Each Candidate will require:

- a test tube
- Test tube rack
- Soaked pea seeds with only radicle visible, marked **N**.----6pcs per student
- 10ml measuring cylinder
- A small piece of tissue paper for closing the test tube mouth
- A Wooden splint
- Bromothymol blue 2ml per student, marked D