

GOLDLITE ONLINE SERVICES Kenya Certificate of Secondary Education SMARTFOCUS QUICK REVISION SERIES 2025

**PRACTICAL PAPER 3** 



### 25 SERIES EXAMS PLUS CONFIDENTIALS

# **KNEC COMPLIANT**

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1. You are provided with specimen W, liquid G (Hydrogen peroxide) and 1% copper sulphate solution, 2M sodium hydroxide solution, distilled water, ethanol and iodine solution. Use them to carry out tests below.

Place five pieces of specimen W into a mortar and crush into paste using a pestle. Transfer the paste into 100ml beaker and add 30ml of water and stir then divide the solution into two equal portions in two different boiling tube. Label the portions X and Y.

- a) Divide portion X into two separate test tubes.
  - i) To the first test tube add 2ml of hydrogen peroxide and record your observations. (1mark)

	ii)	Boil the contents of the second test tube then add 2m peroxide and record your observations	ml of hydrogen (1mark)	
b)	Exp	olain your observation in (ii) above.	(2marks)	
· · · · · ·				

c) Use portion Y to test for the food substances present using the reagents provided. (9marks)

Food substance	Procedure	Observation	Conclusion

d) Name the enzyme in the human digestive system required for the complete digestion of the food substance absent. (1mark)

2. You are provided with specimen Q. Observe it then compare with the photograph R shown below and answer the questions that follow.



Photograph R

(a) Name the classes of organisms represented by Q, R and P and give a reason for each one basing on observable features only (6marks)

SPECIMEN	CLASS	REASON
Q		
R		
Р		

(b) Specimen P probes into nectaries of specimens Q and R. State two characteristics of living organisms achieved after the process
 (2marks)

.....

(c) Explain the adaptations of specimen in photograph R to pollination (2marks)

(d) Carefully remove one stamen of specimen Q then draw a well labeled diagram. (3marks)

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3. You are provided with photographs of specimens **P** and **Q** examine them carefully and answer the questions that follow.



- a) Name the region of the mammalian skeleton from which the specimen P and Q were obtained from. (2 marks)
- b) With a reason identify the specimen represented in the photographs above Specimen P Identity (1mark)
   Reason (1mark)
- Specimen Q
   Identity
   (1mark)

   Identity
   (1mark)

   Reason
   (1mark)

   c)
   State two ways specimen Q is suited to its function
   (2marks)
- d) State **two** structural differences between specimen **P** and **Q** (2marks)

Р	Q

e) The actual length of the hand-lens next to specimen **Q** is 6. 5cm.Use this information to calculate the actual lateral length of specimen **P** (3marks)

You are provided with olive oil, liquids labeled L1 and L2, and an Irish potato. Label test tubes A and B. Place 2cm<sup>3</sup> of water into each test tube. Add 8 drops of olive oil into each test tube. To test tube A, add 8 drops of liquid L1. Shake both test tubes. Allow to stand for 2 minutes.

(a) (i) Record your observations (2 marks) Test Tube A ..... ..... Test Tube **B** ..... (ii) Name the process that has taken place in test tube A (1 mark) \_\_\_\_\_ (iii) State the significance of the process named in (a) above (1 mark) ..... (v) Name the digestive juice in humans that has the same effect on oil as liquid L1 (1 mark) ..... (v) Name the region of the alimentary canal into which the juice is secreted (1 mark) ..... (b)

(i) Label two test tubes C and D place 2cm3 of liquid L2 into each test tube. Add a drop of iodine solution into each test tube. Record your observations. (*1 mark*)

.....

(ii) Suggest the identity of L2 (1 mark)

.....

(iii) Cut a cube whose sides are  $1 \text{ cm}^3$  from the Irish potato. Crush the cube to obtain a paste. Place the paste into a test tube labeled C and D. add  $2\text{ cm}^3$  of amylase solution. Leave the set up for at least 30 minutes.

Record your observations (2 marks)

C

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D (iv) Account for the result in (b)(iii) above (2 marks)

.....

.....

(c) Cut another cube whose sides are 1cm from the Irish potato. Crush the cube. Place the crushed paste into a test tube. Carry out food test with reagents provided. Record your procedure and results.

Procedure: (1 mark)

Results: (1 mark)		
	 ••••••	 

2. Study the photographs A and B that shows part of plants in natural habitat.

А





a) Name the type of the plant response shown in:

i) A	
ii) B	(1 mark)

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В

b) Explain the mechanisms of the response in	
A	(3 marks)
В	(5 marks)
c) State the biological significance of the response to plants in	
A	(1 mark)
В	(1 mark)

d) Suggest the nature of the habitat that plants with the type of response A grows. (1 mark)

..... ..... 3. Study photographs shown below then answer the questions.



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**B1** 

B

(a) State the type of evolution represented by structures Q1, R1 and S1. (1mk)
b) Explain the type of evolution identified in (a) above. ( <b>1mk</b> )
(c) Give the evolution term used to describe structures;
(i) Q1, R1 and S1. (1mk)
(ii)A1, B1 and C1. (1mk)
d). what type of evolution is illustrated by the limbs (A1, B1 and C1)? (1mk)
e). (i) Name classes for organisms labeled Q, R and S.
Q (1mk)
R
S
(ii) Give two reasons for placing S in the class above (2mks)
•••••••••••••••••••••••••••••••••••••••
f) (i) Suggest the diet of animals <b>B</b> and <b>R</b> .
B
R(1mk)
(ii) How is beak of animal <b>B</b> adapted to its function? (1mk)
•••••••••••••••••••••••••••••••••••••••
•••••••••••••••••••••••••••••••••••••••

1. The photographs below show a variety of animals collected by a group of students during a field study.



- a) Using the **observable** features only in the order given below, construct a dichotomous key that can be used to identify the animals (13marks)
  - Body symmetry
  - Limbs
  - Six legs
  - Wings
  - Eight legs
  - Pair of legs per segment
  - Body segmentation

b) (i) Name the	e phylum to which the housefly and the spider belong	(1mark)
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ii) Give a reason for your answer in b(i) above

(1mark)

2. Study photograph P below and use it to answer the following questions.



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a) On the photograph label a bract	(1mark)
b) Describe the arrangement of stamens and structure of corolla and calyx	
i) Stamens	(1mark)
ii) Corolla	(1mark)
iii) Calyx	(1mark)
c) i) Name the class of the plant from which the photograph was taken	(1mark)
ii) Using only observable features on the photograph give one reason for your i) above	answer in c (1mark)
d) i) Suggest the agent of pollination for the flower shown on the photograph	(1mark)
ii) Give two reasons for your answer in d (i) above	(2marks)
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Biology Paper 3

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e) i) Which type of ovary is found in the flower on the photograph	(1mark)
ii) Give a reason for your answer in e (i) above	(1mark)
f) The actual length of the flower measured 14cm. Work out the magnification	of the
photograph	(2marks)

3. You are provided with two visking tubings, a solution labeled X, iodine solution, benedict's solution and a piece of thread. Tie one end of the visking tubing tightly using the thread provided. With the help of a syringe, put 20ml of the solution labeled X into the visking tubings. Tie the other end of the visking tubing tightly. **Ensure that there is no leakage at both ends of the visking tubing.** Wash the outside of the visking tubing with water. Place the visking tubing upright in 100ml beaker. In **set up A** add the starch solution + solution X into the beaker to reach the level of starch solution in the visking tubing. In **set up B** add the starch solution + boiled solution X1 into the beaker to reach the level of starch solution in the visking tubing. Allow the set ups to stand for an hour in water bath maintained at 37<sup>o</sup>C. After an hour, the contents of the visking tubing and the beaker were tested using iodine solution and benedict's solution. *Arrange your set-up as shown below* 



For Marking Schemes and more papers Contact 0724351706 Or Visit www.goldlitekcserevision.co.ke Biology Paper 3 3 © 2024 Biology 231/3 Record in the table below the observations after the contents in set up A and B were tested using iodine solution and benedict's solution. (8 marks)

	VISKING TUBING		BEAKER	
Set up	Iodine solution	<b>Benedicts solution</b>	Iodine solution	Benedict's solution
A				
В				

1.(a)You are provided with the following:

- Specimen Y
- Hydrogen peroxide
- 2 test tubes in a test tube rack.
- 2 labels
- 10ml measuring cylinder.
- A scalpel.
- 2 wooden splints.
- 100ml beaker.

### Procedure

(i) Label two test tubes A and B.

(ii) Measure 2cm<sup>3</sup> of hydrogen peroxide and put in test tube **A**. Repeat the same procedure for test tube **B**.

(iii) Cut a small piece of specimen Y to two smaller pieces using a scalpel. Place one of the

pieces in test tube A and retain the other piece for the subsequent procedure for test tube **B**.

(iv) Immediately, introduce a glowing splint into the mouth of the test tube. Record your observations in the table below.

(v) Put the other piece of specimen Y in an empty 100ml beaker then add 50ml boiling water

from a hot water bath maintained at  $80^{\circ}$ C. Leave the set up for 5 minutes

(vi) Remove specimen Y from the boiling water using a pair of forceps and place in test tube **B**. Immediately, introduce a glowing splint at the mouth of the test tube. Record your observations in the table below.

(a) Record your observations in this table

Test tube	Observations		
	On placing specimen Y On introducing a glowing splint		
Α	(1mark)	(1mark)	
В	(1mark)	(1mark)	

(b) Explain your observations :.

(i) On placing specimen <b>Y</b> on test tube <b>A</b>	(2marks)
(ii) On introducing the glowing splint on test <b>B</b>	(2marks)
(c) State the role of experimental set up in test tube <b>B</b> .	(1mark)
(d) Specimen <b>Y</b> is an organ in animals. State its <b>one</b> other function apart from the o	ne being
investigated above.	(1mark)
(e) You are provided specimen <b>X</b> . Make a longitudinal section through one of the sp	becimen X
using the scalpel to obtain two halves.	
(i) Carefully observe <b>one</b> of the halves and make a drawing. on the diagram label th	e position of
the plumule and radicle.	(3marks)
(ii) State one internal factor necessary for the germination of specimen X.	(1 mark)

.....

(ii) Using a mortar and pestle provided, crush the remaining pieces of X while adding water to form a solution. Transfer the solution into a 50ml beaker provided and label as solution X. Using the reagents provided, test for the food substance present in solution X. (3marks)

FOOD SUBSTANCE	PROCEDURE	OBSERVATION	CONCLUTION



(a) Identify the organ above

(1mark)

..... ..... (b) State the function of the part labeled H (1mark) ..... ..... (c) State the term used to describe the petals. (1mark) ..... ..... (d) State with a reason the class into which the organ belongs. Class Reason .....(1mark) (e) (i) Using observable feature only, name the argent of pollination (1mark) ..... ..... (ii) Give a reason for your answer in (e)(i) above. (1mark) ..... ..... (f) State the importance of the organ to a plant (1mark) ..... .....

(g) Measure the length of the petal from point A to B. (1mark)

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(h) If the actual length between A and B is 5cm, calculate the magnification of the photograph above.	(2marks)
	•••••
<b>3.</b> (a) Below are photographs of <b>Venus flytrap</b> (an insectivorous plant). Study them and	l answer
the questions that follow.	
(i) Name <b>one</b> major nutrient that is deficient in the soil where the above plant grow	vs.(1mark)
(ii) Name the type of response shown by plate C	(1mark)
(iii) Describe how the above plant traps the insect	(3marks)



(b) Below is a mammalian skeleton. Study it carefully an answer the questions that follow



(i) Name bone W	(1mark)
	• • • • • • • • • • • • • • •
(ii) Name the type joint formed by bone <b>W</b> at the distal end.	(1mark)
(c) The part labeled V has one major adaptation:	
(i) Identify the adaptation	(1mark)
(ii) Explain the importance of the adaptation in (c)(i) above to females	(1mark)

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(d) State the function of the part labeled U	(1mark)
(e) Distinguish between <b>pitching</b> and <b>rolling</b> as used in bony fish	(1mark)

You are provided with solution X and Y, Iodine solution, Benedict's solution, visking tubing and two pieces of thread.

(a) Using the reagents provided, carry out appropriate tests on solutions X and Y.

Ensure that droppers are not interchanged.

Iodine test

(4marks)

Solution	Procedure	Observation	Conclusion
Solution X			
Solution Y			

#### Benedict's test

(4marks)

Solution	Procedure	Observation	Conclusion
Solution X			
Solution Y			

(b) Tie one end of the visking tubing tightly with a thread. Using a dropper, place about 3ml of solution Y in the tubing and tie the open end tightly. Rinse the visking ensuring there is no leakage and immerse it in solution X in a beaker. Leave the set up to stand for about 20 minutes.

Using the contents of the visking tubing and the beaker, carry out the appropriate tests using the reagents provided.

i) Iodine test

(2mks)

Contents	Observation	Conclusion
Visking tubing		
Beaker		

### ii) Benedict's test

Contents	Observation	Conclusion
Visking tubing		
Beaker		

(c) Account for the observation made in (b)(ii) above in the visking tubing. (2mks)

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2. You are provided with the following materials and apparatus.

- Two prepared slides labelled E and K respectively containing a certain tissue obtained from the human body.
- Access to a light microscope with at least low and medium power objective lens.

Observe the prepared slides of a human tissue under medium power objective lens of the light microscope.

a) Identify with reasons the structures seen under the medium power objective of the light microscope. Draw and label the structures in the table below. (6marks)

	Identity	Reason	Diagram
Е			
K			

b) Calculate the magnification of the image observed in the slide labelled K under low power objective lens (2marks)

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c)Explain why the high power objective lens cannot be used with coarse adjustment knob during observation of the prepared slides above. (1mark)

.....

d) State the adaptations of the human structures observed in slide E to its functions (3marks)

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e)(i) If a slide of a complete human tissue showing all the components is prepared, which amongst the two tissues is likely to be observed in abundance. (1mark)

ii) Give reason for your answer in e(i) above	(1mark)
	·····

3.Below are photographs of mammalian bones J and R obtained from the same region of the body. Study them and answer the questions that follow.

(a) Giving reasons, identify bone J and R.

(4mks)



(b) (i) Name the parts labeled 1,2,F and G	(4mks)
1	
2	
F	
G (ii)Which of the labeled part of bone J does structures 1 and 2 on bone I (2mks)	R articulate.
	•••••
(iii) Make a drawing to show how and bones J and R articulate	(3mks)

1.	<ol> <li>You are provided with the following reagents and materials. Test tube A put 4cm<sup>3</sup> egg albumen+1cm<sup>3</sup> solution Q + 2 drops of sodium hydroxide Test tube B put 4cm<sup>3</sup> egg albumen+1cm<sup>3</sup> solution Q + 2 drops of dilute hydrochloric acid Test tube C put 4 cm<sup>3</sup> egg albumen+1cm<sup>3</sup> solution Q + 2 drops of distilled water Immerse the all the test tubes in a water bathe maintained at 60 °C for 10 minutes</li> </ol>			e acid
	(a) (i)	)	State the observations made in test tube <b>A</b> and <b>B</b> . Test tube <b>A</b>	(1 mark)
			Test tube <b>B</b>	(1 mark)
 (b) 	Ex	xplain	n why the investigation was carried out at the specified temperature range	(1 mark)
 (c	) Sta	ate th	ne purpose of test tube <b>C</b> .	(1 mark)
 (d) 	(i)		Identify solution $\mathbf{Q}$ with a reason.	(2 marks)
••••	(ii	)	Name the region along the alimentary canal of a human where the proces illustrated occur.	ss being (1mark)
•••	(iii	i)	Give a reason for your answer above.	(1mark)
•••		•••••		

(e)	Explain what would happen to the excess products of digestion of egg albumen	(5 marks)
2.	You are provided with specimens labelled <b>L</b> and <b>M</b> which were soaked in water at temperatures for 3 days.	room
(a)	Identify the type of fruit represented by specimen L.	(1 mark)
(b)	Cut specimen <b>L</b> and <b>M</b> longitudinally into two equal parts. Place the specimen white tile and observe using a hand lens.	on a
(i)	Draw and label the internal structure of specimen L.	(4 marks)
(ii)	State two observable differences between specimen L and M.	(2 marks)
(c)	Add a drop of iodine solution to the cut surface of specimen <b>L</b> . Explain the obs made.	ervations (2 marks)

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C 1'

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- (d) Crush the two remaining specimen L. Add 3 ml of water. Decant to obtain the extract.Using Benedict's solution provided carry out a food test on the extract.
  - (i) Fill in the table below.

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. . .

(3 marks)

Procedure	Observation	Conclusion

(ii) Account for the observations made in (d) (i) above. (2 marks)

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3. You are provided with a specimen labelled **J** and **K**.Use it to answer the questions that follows





Specimen K

(a) (i)	Name the kingdom in which specimen <b>J</b> belongs to.	(1 mark)
(ii)	Name the parts labelled <b>1</b> and <b>2</b> on.	(2 marks)
(iii)	State two roles played by the rhizoids found on the photograph J.	(2 marks)
(iv)	Name two other members belonging to the same kingdom as specim in the photograph above.	en labelled <b>J</b> (2 marks)

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(b) (i)	With reasons group the specimen on the photograph ${f K}$ into:	
	Sub –Division	(1 mark)
	Reason	(1 mark)
	Class	(1 mark)
	Reason	(1 mark)
(ii)	State three ways in which conservation of the specimen from we extracted is importance in terms of global warming	hich <b>K</b> was (3 marks)

### Question 1

You are provided with specimen W and the following Reagents;

- Dilute Hydrochloric Acid
- Dilute Hydrogen Peroxide
- Dilute Sodium hydrogen Carbonate
- Three test tubes
- 2-10ml measuring cylinders
- Scalpel
- 3 labels

Procedure

- (i) Label the 3 test tubes A, B and C.
- (ii) Using a scalpel obtain three cubes of  $1 \text{ cm} \times 1 \text{ cm}$  from specimen W and reserve the rest of W.

(iii) Using a scalpel separately chop the first and second cubes into tiny pieces. Place into test tube A and B respectively.

(iv) Place the remaining cube in test tube C as a whole.

(v) In test tube A add  $2cm^3$  of dilute hydrochloric Acid. In each of the test tube B and C add  $2cm^3$  of dilute sodium hydrogen carbonate.

(vi) In test tube A, B and C add into each 4cm<sup>3</sup> of hydrogen peroxide.

(vii) Leave the set up to stand for 10min.

a)(i) Observe the amount of effervescence produced in each test tube and complete the tale below.

(6marks)

Test	tube	Contents	Amount of effervescence	e
A				
В				
С				
(ii)	Explain the observation made	le in test-tube A.		(2marks)
(iii)	From the experiment above,	state two factors that were under in	vestigation	(2marks)
b)	What would be the expected	l result if W was first boiled before l	being used in this experime	ent. Explain (2marks)
c) (i)	Write a word equation that I	eads to production of effervescence	in a(i) above .	(1mark)
(ii)	Give a term that refers to ho	meostatic function demostated in th	e experiment above.	(1mark)

(iii) Name part of human body where the function stated in c (ii) above takes place. (1mark)

2. The photograph labelled F and specimen E shows organs from a given group of organisms.

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. . . . . . . . .



(a)(i)	Name the plant organ represented by E and F	(1mark)
(ii)	Give three reasons for your answer in a (i) above	(3marks)
	• · · · · · · · · · · · · · · · · · · ·	
(b)	Using observable features in specimen E and photograph F.	
(i)	Place with two reasons the division to which the two belongs.	(3marks)
	Division Reasons	
c)	State three functions of E and F to a plant	(3marks)
d)	Using the graph paper provided calculate the surface of E after the petiole	(3marks)

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### Question 3

Examine the photograph of bones obtained from a mammal.



(a)	Identify them	(3marks)
	AB C	
b)	Name the type of joint formed between	
(i)	The distal End of bone A and B	(1mark)
		•••••
(ii)	The proximal end of bone B and the C	(1mark)
c)	How is the specimen labeled A adapted to its functions?	(4marks)
d) (i)		
••) (•)	Name the part labeled T on specimen C	(1mark)
	Name the part labeled T on specimen C	(1mark)
<i>c)</i> (-)	Name the part labeled T on specimen C	(1mark)
(ii)	Name the part labeled T on specimen C State two functions of the part T.	(1mark) 

### **QUESTION ONE**

1. You are provided with specimen labeled K. Using a hand lens examine the specimen.

**a.** State the phylum to which the specimen belongs. (1mk)

.....

**b.** Using observable features only,name the class to which the specimen belongs.

(i) Class.....(1mk)

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

.....

**c.** Cut three of specimen K into tiny pieces. Place the pieces into boiling tube.Add 5ml of distilled water.Boil for 5 minutes.Decant the extract into a clean test tube.Using the reagents provided, identify the food substances in the extract.Record the food substances being tested for, procedures, observations and conclusion in the table below.(8mks)

Food substance	Procedure	Observation	Conclusion

### **QUESTION TWO**

2.(a)Below is a photomicrograph of blood smear showing several elements.



i.On it label any three elements of blood (3 marks)

ii. Briefly explain the mode of action of elements M and J (2 marks)

J.....

iii.What are the effects of high attitude on the numbers of element N.? (1 mark)

.....

iv.State the function of element N and explain one functional adaptation of element N.

### I)Function of N (1 mark)

.....

II. Functional adaptation of N (2 marks)

.....

.....

(2b) Study the diagram below and answer the questions that follow.



(i) Name the parts labeled A and B A	(2 marks)
В	
(ii)State the adaptation of the part labeled A to its function.	(2 marks)
iii) Identify the structures that perform similar functions as D a a)Amoeba	bove in: - nark)
b)Fish(1m	nark)

### **QUESTION THREE**

3. a) You are provided with a photograph of flower.Use it to answer the questions that follow.



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

	(1mk)
ii) With reason state the agent of pollination.	
Agent of pollination	(1mk)
Reason	(1mk)
b)The photographs below O R and S are sections of some plant parts	









PHOTOGRAPH S

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

Fruit	Placentation	Reason
Q		
R		
S		

(ii) Giving a reason in each ,name the mode of dispersal of the specimen in photograph Q and S.

Q	
Mode(1mk)	
Reason	
(1mk)	
S	
Mode(1mk)	
Reason(1mk)	

- 1) You are provided with specimen M.
  - a) (i) Identify the part of the plant from which the specimen was obtained. (1mk)(ii) Give a reason to your answer in a) (i) above. (1mk)
  - b) Name the hormone that causes specimen M to ripen. (1mk)
  - c) Cut specimen M into two halves. Squeeze the juice from the two halve into a beaker. Filter the juice and discard the residue. Using the reargent provided test for the food substance in the juice. fill the table below.

Food substance	procedure	Observation	Conclusion

(4mks)

d) Photograph H 1 shows specimen H 1 obtained after germination of a seed from specimen M. study it and answer the question that follow.



### photograph H 1

- (a) Identify the type of germination exhibited by specimen H. (1mk)
- (b) Give areason for your answer in d (a) above. (1mk)
- (c) Identify and label on the diagram the name of the curved part. (1mk)
- e) Name the deficiency disease in humans that may result from lack of the food substance found in (c) above. (1mk)
- f) State the type of placentation in specimen M. (1mk)
- g) (i)State the mode of dispersal for specimen M. (1mk)
  - (ii)How is specimen M adapted to the mode of dispersal stated in g. (i) above. (2mks)
- 2) The photograph below shows a dissection of a rabbit displaying urinary and reproductive system.



- a) On the diagram label the following parts (4mks). Adrenal gland
   Prostate gland
   Epididymis
   Vas deferens.
  - b) State the functions of the parts you have labeled on the diagram.

Part	Function	
		(4m)

- b) state the homeostatic function of kidney. (1mks)
- c) (i) state the function of ureter. (1mk)

(ii) why do testis hang outside the body. (1mk)

3) you are provided with specimen O and P. You are also provided with photograph Q1 and R1. study them and answer the questions that follow.



photograph Q 1


### photograph R 1

- a) I dentify specimen O, P, Q1 and R1. (4mks)
- b) Draw the dorsal view of specimen O. label on the drawing the vertebraterial canal. (2mks)
- c) I dentify and label the following parts on photograph on specimen Q. (3mks)

obturator foramen

Acetabellum

Pupis symphysis

- d) which bone articulates with specimen R on the posterior end. (1mk)
- e) I dentify and give two charecterestics of the bone that articulates with specimen O on the posterior end.

Identity (1mk)

Charecterestics (3mks)

### Time: 1 <sup>3</sup>⁄<sub>4</sub> hours

1. The diagrams below are bones obtained from different mammals



- ii) Name the parts labeled B and C. (2 mrk )
- iii) State the function of the part labeled B. (1 mrk )
- 2. 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

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Food substance	procedure	observation	conclusion
starch			
Reducing			
sugars			

- b. Tie one end of the visking tubing provided tightly. Put solution K in the visking tubing and tie the open end. Immerse the visking tubing in the beaker containing solution L. Let the set up stand for about 20 minutes.
- i) Rinse the visking tubing with distilled water then test the contents in the **visking tubing** with iodine and Benedict's solution. Record your observation and conclusion in the table below.

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ii) Test the contents in the beaker with iodine and Benedict's solution. Record your procedure, observation and conclusion in the table below. (2marks)

Test with	observation	Conclusion
Iodine solution		
Benedict's solution		

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

(4mks)

3. Study the photograph of some animals in a certain ecosystem and answer the questions that follow.



a)State the type of biotic relationship exhibited by the animals shown in the photograph .	(1mk)
b.i)Identify which of the two animals , A and B will have the least biomass and give a reason for your answe	er (1mk)
ii) Draw a pyramid of biomass for the organisms in the ecosystem	(3mks)
c)Explain two survival adaptive features for the organisms illustrated in the photograph	(3mks)
C i)Name the tropic level occupied by the antelope	(1mk)
ii)Give a reason for your answer in c (i) above	(1mk)
f) Suggest three ways in which the above ecosystem would be affected if there is a prolonged drought	(3mks)

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1. You are provided with a visking tubing, a solution labeled K, Iodine solution labeled solution H, Benedict's solution labeled solution J and a piece of thread.

(a)Using the reagents provided, put 2ml of the solution K in a test - tube in each case, test for the food substances present. (6mks)

Food substance	Procedure	Observations	Conclusion
Starch			
Reducing sugars			

Tie one end of the visking tubing tightly using the thread provided. With the help of a dropper, put 10ml of the solution labeled K into the visking tubing. Tie the other end of the visking tubing tightly.

## Ensure that there is no leakage at both ends of the visking tubing.

Wash the outside of the visking tubing with water. Place the visking tubing upright in a 100ml beaker. Add distilled water into the beaker to reach the level of the liquid in the visking tubing. Allow the set up to stand for 30 minutes.

(b)Using 2ml in a test - tube in each case, test for the food substances in the liquid outside the visking tubing . (2mks)

Food	Procedure	Observations	Conclusion
substance			
Starch			
Reducing			
sugars			

(a) Account for your results in (a) and (b) above.

2. You are provided with specimens labelled P and Q and a photograph labelled L in two views. All are bones obtained from a mammal. Examine them.



(a) Identify the bones and name the part of the mammalian body from which each was obtained. (6mks)

Bone	Identity of the bone	Where found
Р		
Q		
L		

- (b) Draw and label the anterior view of specimen Q.
- (c) State two differences between specimen P and Q. (2mks)

(5mks)

(d) Name the bone(s) that form a joint with bone L at its anterior and posterior end and in each case name the type of join they form. (4mks)

Anterior end

- (i) Bone(s) -
- (*ii*) Type of joint –

# Posterior end

- (i) Bone(s)-
- (*ii*) Type of joint.
  - 3. The photograph labelled D and E show two types of leaves



a) I) with a reason, state the class of plants from which the leaf in photograph E was obtained. (2mks)

Class:

Reason:

ii)State two features in the leaf shown in photograph D that adapt it to its functions. (2mks)

b) Study photographs K, L, and Q provided below and then answer the questions that follow.



(i)	Identify the part of photograph labelled K1 and L1.	(2mks)
	K1 –	
	L1 –	
(ii)	State the role played by parts K1 and L1 in a plant	(1mk)

(iii) Name the type of response used by the structures K1 and L1 to play the role you have mentioned in (ii) above. (1mk)

(iv)	Name the hormone involved in the response you mentioned in (iii) above.	(1mk)
------	---	-------

- (c) (i) Name the type of evolution demonstrated by photograph K and Q. (1mk)
- (ii) What type of structures are represented by your answer in c(i) above. (1mk)
- (iii) Give reasons for your answer in c(ii) above. (2mks)

**1.** You are provided with 10cm<sup>3</sup>solution Q, a mixture of certain food substance, Iodine solution and Benedict's solution. Using the provided labels identify two test tubes as A and B. Divide solution Q into two equal portions and place into the two test tubes labeled A and B.

a) Using the contents of test tube A, and the provided reagents, carry out food test hence fill the table below. (6 marks)

Food substance	Procedure	Observation	Conclusion

b) Add 3cm<sup>3</sup> of solution N into test tube B then place in a water bath maintained at 30<sup>o</sup>c for 10 minutes.
Remove from the water bath and repeat the test in (a) above. Then fill the table below.
(4marks)

procedure	Observation	Conclusion
	procedure	procedure Observation

(c) Suggest the identity of N

(1mark)

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1

d) Account for the results in table for (b) above. (3marks)

2. The photographs below show evidence of different structures that indicate evidence of evolution.







PHOTOGRAPH 6

(a) Name the evidence represented by photographs 1, 2, 3 and 4. (1 mark)

2

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(b) Name the type of structures represented by photograph 4.	(1 mark)
(c) Name the common evolutionary phenomenon exhibited by st (1 mark)	ructures in photographs 1, 2 and 3.
(d) (i) All the birds with the different beaks and feet shown abov of evolution shown by the emergence of the different beaks and (1 mark)	e once had a common ancestor. Name the type feet many years later.
(ii) In photograph 3, a webbed feet of a duck is represented. S	uggest how Lamarck would have explained the
emergence of this type of feet.	(3 marks)
(iii) Photograph 6 shows a fossil of a trilobite. Trilobites are explained the cause of their extinction.	extinct. Suggest how Darwin would have (2 marks)
e) Name the organism that exhibits the evidence in photograph 5	. (1 mark)
f) (i) Give two observable features that would help in classifying class.	organisms in photograph 1 into their correct (2 marks)
<b>3.</b> You are provided with specimen <b>M</b> and <b>N</b> obtained from two	different plants. Take specimen M and
carefully cut it longitudinally into two halves. Place a drop of 100	time solution on each cut surface of the

specimen. Leave it for two minutes, then wash the cut surface with water. Repeat the same procedure with specimen N. Using a hand lens, observe the colour changes. 1 1 .. . .

a) 1) State observations in each case; M and N	(2 marks)
Specimen M	
Specimen N	
ii) Explain the distribution of colour on the surfaces of each specimen <b>M</b> and <b>N</b>	I. (2 marks)

b) The photograph below illustrates the germination of specimen N after it was planted.



i) Giving a reason, identify the type of germination shown.

(2 marks)

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Туре		
Reason		
ii) Name the parts <b>B</b> and <b>C</b>	(2 marks)	
B		
C		
iii) Give three roles of part A during germination	(3 marks)	
c) Explain how the part labeled <b>C</b> eventually straightens up after a few	w days of growth (3 marks)	

## Answer all the questions in the spaces provided.

- 1. You are provided with substance L.Carry out food tests on the substance using the reagents provided .Record your procedure , observations and conclusions in the table below.(9mks)
- 2. During a visit to a museum, students were shown ten specimens of organisms on display. The teacher provided a dichotomous key (shown in a separate page) to enable them to place each species on display into its taxonomic group. Five of the specimens that were on display are shown in the diagrams provided.

## Dichotomous Key.

1.(a) Animal with a flattened body	.go to 9.
(b)Animal without a flattened body	. go to 2.
2.(a)Animal with body in a shell	Mollusca.
(b)Animal with body in shell	go to 3.
3.(a)Animal with segmented body	go to 4.
(b)Animal with body not segmented	Nematoda.
4.(a)Animal with jointed appendages go to 6.	
(b) Animal without jointed appendages to 5.	
5.(a)Animal with long and cyndrical body	annelida.
(b)Animal with short stout body	Trenada.
6.(a) Animal with antennae	go to7.
(b) Animal without antennae	go to 8.
7.(a)Animal with one pair of antennae	Insecta.
(b) Animal with more than one pair of antennae	crustacean
8.(a)Animal with pincer –like mouthparts	Arachida.
(b) Animal with sucking mouth parts	Acarina.
9.(a)Animal with long ribbon-like body	cestoda.
(b) Animal with circular body	rinoidea).

Use the dichotomous key to identify the taxonomic group of each of the five specimens shown in the drawings.



In each case, show in sequence the steps (ef 1a,2a,5a, 7b) in the key that you followed to arrive at the identify of each specimen.(5mks)

Anim	nal Steps followed	Identity
Е		
F		
G		
Η		
J		

b)i)Nam the phylum and the class to which specimen M belongs(2mks)

Phylum:

Class:

ii) Name the observation features that enabled you to place it in the class above.(3mks)

(c)With the help of a hand lens, examine the body of specimen M.

i)State with a reason in each case he observable features that enable the specimen to be a disease vector.(2mks

(ii) Name one disease transmitted by specimen M.(1mk)

iii) State two methods that can be used to prevent specimen M from spreading diseases.(2mks)

3. You are provided with specimens labeled  $S_1 S_2$  and  $S_3$ 

- a. Using a scarpel blade split S<sub>1</sub> longitudinally and draw a well labeled diagram to show the internal structures. State your magnification (4mks)
- b. With a reason ,state the class to which the plant from specimen  $S_1$  belongs to.

Class(1mk)

Reason(1mk)

c. Specimen  $S_2$  is a germinated seedling of  $S_1$ . In the table below, name three structures and say which structure in  $S_1$  developed into the structure in  $S_2$ .

Structure in S <sub>1</sub>	Structure in S <sub>2</sub>

d.(i) Using specimens  $S_1$  and  $S_3$  ,name the type of germination in :-

 $S_{1}$ 

 $S_3(1mk)$ 

ii. Give the difference between the this type of germination in (d) (i) above (2mks)

iii.Account for the type of germination in :-  $S_1$  2mks  $S_3$ (2mks)

- 1. You are provided with liquids labelled **Q1** and **Q2**. Spare about 10ml of the liquids for part (a) of this question. Using a piece of thread, tie tightly one end of the visking (dialysis) tubing. Open the other end of the tubing and half fill it with liquid **Q1**. Tightly tie this end. **Ensure there is no leakage in both ends**. Immerse the tubing in a beaker containing liquid **Q2**. Leave the set up for at least 30 minutes.
- a) Using iodine and Benedict's solution provided; test for the food substance in liquids Q1 and Q2. Record the procedure, observation and conclusion in the table below.

(6mks)	)
--------	---

LIQUID	PROCEDURE	OBSERVATION	CONCLUSION
A			
В			

After at least 30 minutes remove the visking tubing from the beaker and wash the outside of the tubing thoroughly to remove traces of liquid Q2.

 b) Using the same reagents, test the food substance in liquid Q1 in the visking tubing. Record your observations and conclusion in the table below. (2mks)

Liquid	Observation	Conclusion
--------	-------------	------------

Q1	

- c) (i) Name the physiological process being demonstrated by this experiment. (1mk)
  - ii) Name two parts of the human body where the process named in (c) (i) above takes place. (2mks) Account for the results obtained after carrying a second food test on liquid Q1. (2 mks)
- 2. You are provided with diagrams of specimens taken from a mammal. Study them carefully and answer the questions that follow.





(a) X	Identify the diagrams labeled below.	(3 marks)
Y		
Z (b)	State the diet of the animal from which diagram x (1 marks)	was taken and give a reason for your answer.
(i) (ii)	Diet Reason	(2 marks)
(c) A	Name the parts labeled	(3 marks)
B		
D (d)	How are the following structures adapted to their f D C	Functions (2 marks)
(e)	State the function of the parts labeled.	(2 marks)
(f)	State one structural difference between Y and Z	(1 mark)
3. E	xamine the seedling below and use them to answer the	ne question that follow.
	an a	
	٠	
:	CA F	30
	Ro	R4
	E	
	m de de	
		ala
	5.	
	5.2 53	Ŧ

a) Name the part labeled C,D, E and state their importance for the seedling.

C:		(1mk)
Impor	tance	(1mk)
D.		(1mk)
Impor	tance	(1mks)
(ii)	Е	(lmk)
Impor	tance.	(lmk)
(b) (i) Wh	The R series of seedlings on the roots later in its life:	(lmk)
		(mm)
(ii)	Name the organisms that would be found in the swellings	(1mk)
(iii)	Explain the relationship that exists between the named organisms and the	ne plant. (1mks)
		(c) (i) State the types of
germin	nation exhibited by R series of the seedlings. (1mk)	
(ii)	Give a reason for your answer in (c) (i) above.	 (1mk)
(d)	State any two external factors necessary for germination.	 (2mks)

- 1. You are provided with a specimen labelled J.
- (a) With reasons identify the organ of a plant represented by J. (1mk)

Reasons (2mks)

(b) Using observable features <u>only</u> identify the class to which J belongs.

Class (1mk)

Observable features. (1mk)

(c) In a previous experiment the lower epidermis and the upper epidermis were peel off, the number of stomata was determined using a microscope at high power objective. The results obtained are recorded in the table below.

Arrange number of stomata in the field of view	
Lower epidemis	Upper epidermis
30	13

(1) Account for the average number of stomata on the upper and lower side of specimen J.

Upper epidermis. (3mks)

Lower epidermis. (3mks)

2 You are provided with photographs of:

Specimen SI – mango fruit

Specimen T1 – Garden pen pod





**S**1



**S**1

(i) Name the parts labelled a,b,c,d and e (5mks) Study the photographs of specimen  $T_1$  and name the parts labelled u,v,w,x,y and z (4mks labeled u- v-w- x-y-z-Identify the type of presentation in each fruit. (iii) (2mks)  $S_1$  $T_1$ (b) Using observable features identify the method of dispersal for each fruit and in each care give reasons for your answer.  $\mathbf{S}_1$ Method of dispersal (1mk) Reasons (3mks)  $T_1$ Method of dispersal (1mk) Reasons (2mks) (c) Name the type of fruits represented by  $S_1$ (1mk)

- $T_1 \qquad (1mk)$

(d) What is the importance of fruit and seed dispersal. (3mks)

- Q3 You are provided with solution S
- (a) Using the reagents provided to carry out the appropriate food tests and complete the table below. (8mks)

Food substance	Procedure	Observation	Conclusion

- 1. You are provided with a specimen labelled **W** obtained from a live organism in its natural habitat. Study and use it to answer the questions below.
  - a) Make a well labelled drawing of **W** to show the external features of the specimen. (4 marks)

- c) i) Suggest the trophic level occupied by the organism from which it was obtained in the habitat. ....(1 mark)
  ii) Give a reason from your answer in 1 c i) above. (1 mark)
  d) State two observable adaptations of the specimen W for its function. (2 marks)
- e) i) A photomicrograph of the transverse section of part of specimen W, showing its internal structure

.....



ii) Draw a large diagram to show the layers present in the leaf section shown in 1. e i) above ( Do not draw any cells). Label the layers drawn clearly. (2 marks)

f) The photomicrograph below shows cells from one type of tissue found in specimen W. Label the layer on your drawing in 1 e ii) above, with letter X, to show where more of this type of tissue would be found in an organism growing in a dry habitat. (1 mark)



- 2. You are provided with specimens labelled **M** and **N** which represent the developmental stages of an organism.
  - a) State three observable features on specimen N used to classify it into its correct class. (3 marks)
    b) Name the stage of development of specimen M in the lifecycle of specimen N. (1 mark)
    Give reasons for your answer in 2 b) above. (2 marks)
  - c) i) Examine the two specimens M and N carefully using the handlens provided. Record your observations on the mouthparts and the likely method of feeding in the table below.
     (4 marks)

SPECIMEN	OBSERVATION	METHOD OF FEEDING
М		
Ν		

- ii)
   State two feeding advantages of the M in the lifecycle of specimen N.
   (2 marks)

   d)
   State two advantages of metamorphosis in the lifecycle of N.
   (2 marks)
- **3.** Study the photographs below depicting plants growing in different habitats. Use them to answer the questions that follow.





Т

a)	Identify the habitats in which they are found.	(3 marks)
	Y	
	Ζ	
	Τ	
b)	State the significance of the following structures found in the specimens shown above.	(2 marks)
	R	
	S	
c)	State two structural adaptations expected in the leaf of specimen Z.	(2 marks)
d)	State one observable adaptation in specimen for the habitat in which it is found.	(1 mark)
e)	Explain the effect of releasing too much waste containing fertilizer nutrients.	(2 marks)

1. You are provided with a photograph of two flowers, **A** and **B**. Observe the photograph carefully to answer the questions that follow.



(a) Identify the parts labelled:

К	(1 mark)
L	(1 mark)
M	(1 mark)
(b) State <b>two</b> observable differences between flower <b>A</b> and <b>B</b> .	(2 marks)
(c) i) Name the agent of pollination in flower <b>A</b> .	(1 mark)
(ii) How is it suited to the agent named in c(i) above?	(1 mark)
••••••	

(d) You are provided with specimen S and T. Use them to answer the questions that follow.

- i) Draw a plan diagram of the cut surface of specimen **S** and label it. (4 marks)
- ii) With reason, identify the type of fruit **T**: Identity (1 mark) Reason (1 mark)
- 2. The photograph below shows longitudinal section through the kidney of animal **P** and fresh water animal **Q**.



- c) The section of the kidney of organism P shows that the organism suffers from a common kidney disease.

  Name the disease.
  Name the disease.
  State two control measures for the disease.
  State two control measures for the disease.

  d) Explain the role of the part labelled E in coordination in animal.
  (2 marks)
  e) If the actual size of apparatus R is 50 mm, calculate the actual length of organism Q. (Show your working).
  (2 marks)
- 3. You are provided with substance L, solution M, distilled water, one boiling tube, three test tubes, labels, one visking tubing, pieces of thread, Iodine solution and Benedict's solution.
- i) Label the boiling tube **W**. Measure 20 ml of distilled water and put into the boiling tube.

Tie one end of one of the visking tubing with a piece of thread provided. With the help of a syringe, place  $3 \text{ cm}^3$  of substance **L** into the visking tubing then add three drops of Iodine solution. Record the observations in the table below. Using another syringe, add  $3 \text{ cm}^3$  of solution **M**. Tie the other end of the visking tubing tightly. Ensure there is no leakage on both ends of the visking tubing. Wash the outside of the visking tubing with water. Place the visking tubing upright in boiling tube labelled **W** with the 20 ml of distilled water.



Set up **K**: visking tubing in water in boiling tube

Immerse the boiling tube in hot water in a beaker maintained at 35  ${}^{0}$ C to 40  ${}^{0}$ C as shown above. Allow the set up to stand in hot water bath for 10 minutes. <u>Preserve</u> the substance in the **boiling tube (outside the visking)**. Record the observations in the table below. (2 marks)

Boiling tube	Observation		
	After adding Iodine solution	After 10 minutes in the water bath	
W			

ii) Using the 2 ml of the substance outside the visking tubing test for the food substance using Benedict's solution provided. Record the observations in the table below. (4 marks)

Food substance	Procedure	Observations	Conclusion

a. Suggest the identity of:

	i)	substance L.	(1 mark)
	ii)	substance $\mathbf{M}$ in human beings.	(1 mark)
b.	Name reg	gions in human beings where a similar reaction occurs.	(2 marks)
 c.	Account	for the observations made in boiling tube $\mathbf{W}$ in procedure (i) and (ii)	above. (3 marks)

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)
		Р	
		Q	
		R	
		S	
		Τ	
b.	i)	State the function of the part labeled Q.	(1mark)
	ii)	State two adaptations of structure Q to its function.	(2 marks)
c.	Sta	ate 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)

2. 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	

ĻL		

- 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. (4mks)

d. What does a visking tubing equite to in a living organism?

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



	the dichotomous key below to identify the class the organisms belong to.	(12 <b>marks</b> )
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	A	mphibia
-----------------	---	---------

Specimen	Step followed	Identity
1	1	
Δ		
2 1		
P		
В		
C		
D		
E		
Ľ		
F		
<b>1</b> .		

(b) Name the type of reproduction shown by specimen B and state it disadvantage. (2marks)

- 1. You are provided with a suspension labelled M.
  - a) Using the reagents provided only, test for the food substances present in the suspension. In the table below, record the food tested, procedure, observation and conclusions. 12 marks.

Food TEST	Procedure	Observation	Conclusion

b) Name two enzymes that may be required to digest suspension M in the alimentary canal in human. (2mark)

c) State role of the following in the experiment.

(2marks)

- (i) Sodium hydrogen carbonate
- (ii) Dilute hydrochloric acid
- 2. Experimental evidence shows that most mutations results to variations among organisms. The illustrations I, II, III and IV below show different possible types of chromosome mutations. Study them keenly.



- a) Identify the types of chromosome mutations illustrated. (4 marks) Illustration Name of mutation I II
  - III
  - IV
- b) State the effect of the mutation illustrated in III.

II. (1 mark) FOR MS CALL 0724351706 BIOLOGY PP3 FORM 4 Page 1 of 2
- c) In most cases, the mutation in II could be lethal. Explain. (2 marks)
- d) During which stage of mitosis does the mutation in I above occur? (1 mark)
- e) i) Define a mutation (1 mark)
- ii) Give two possible environmental mutagens. (2marks)
- 3. The diagrams below represent body parts of some organisms (animals). Study them and answer the question that follow



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

Habitat Reason

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

The type of evolution (2mks)

Reason

a.

(ii) Suggest the significance of the above named type of evolution for the organism (1mk)

(1mk)

c. (i) Explain briefly the meaning of analogous structures (1mk)

(ii) Give one example of analogous structure

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- 1. You are provided with the following materials;
  - Specimen A
  - Scalpel
  - 50ml beaker
  - Glass rod
  - 8cm visking tubing
  - 2 pieces of strings
  - 20ml distilled water in a wash bottle
  - 100ml beaker
  - 10ml Iodine solution
  - 1. You are provided with a specimen labeled A. Make a transverse section of the specimen.

(3mks)

(a) Draw and label the section

(b) What type of fruit is specimen A? (1mk)

.....

(c) Slice off about 2cm thick disc from the specimen. Peel it. Place the piece into a beaker and mash it into a paste using a glass rod. Add 20ml of distilled water and stir. Tie one end of the transparent tubing provided. Decant the extract into the tubing and tie the other end tightly, ensuring there is no leakage.

Immerse the tubing with its contents in a 100ml beaker containing Iodine solution for 20 minutes.

- (i) Record your observations in the table below (4mks) Extract inside visking tubing Iodine solution outside the visking tubing Before the experiment After the experiment
- (i) Explain the results obtained from c(i) above. (5mks)

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





(a) With **observable** reasons identify the class of the specimen in the photograph .

(	(i)	Class(1mk)
(	ii)	Reasons (2mks)
(b) (	i) Nan	the structures labeled (4mks)
Ι	P	
(	Q	
I	R	
S	5	
(	ii)	State the function of the parts labeled (2mks)
τ	U	
V	V	
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(c) Study the photographs below depicting plants growing in different habitats.



(i)	Identify the habitats in which they are found	(2mks)
Y		
Z		
(ii)	State the significance of the following structures found in the specimens shown	above
	(2mks)	
R		
S		

3

3. Below are photographs showing some observable features of animals



- (a) Using the features in the order given below, construct a dichotomous key that can be used to identify the specimens in the photographs. (10mks)
- Presence or absence of backbone
- Presence or absence of wings
- Presence or absence of scales
- Presence or absence of pouch
- Bipedal or quadripedal

(b) Study the photographs below showing blood vessels in man.



(i)	Using observable features identify the blood vessels	(2mks)
	E	
	<b>F</b>	
(ii)	Using observable features only, give two differences between the two blood	d vessels
	(2mks)	

E	F

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## **SERIES 23**

1. You are provided with:

-Solution Q

-Distilled water in 100 ml beaker

-Visking tubing and two threads

-Glass rod

-2 test tubes and two labels

-Benedict's solution 10% sodium hydroxide solution and 1% copper sulphate solution.

### PROCEDURE:

-Tie the visking tubing tightly at one end using the thread and put about 5ml of solution Q. Tie tightly the other end ensuring that there is no leakage.

-Place the visking tubing in the distilled water in 100ml beaker and support it by tying the thread on a glass rod over the beaker.

- Allow the set up to stand for 30mins. Observe any changes in the visking tubing.

-Remove the visking tubing from the distilled water.

-Using a syringe draw about 5ml of the contents in the beaker labeled distilled water. Put it in the test tube and label it G. Repeat the same procedure to obtain 5ml of solution in the visking tubing, put in another test tube and label it H.

a) Using the reagents provided, carry out food tests to determine the components in substance G and H and fill the table below.

Substance	Food Test	Procedure	Observation	Conclusion
C				
G				

Н		

8marks

b) Substance Q is a urine sample obtained from a patient in a hospital laboratory. Name two conditions that the patient was suffering from. (2marks)

c) (i) What physiological activities that took place in the experiment you undertook above. (2mark) Account for your answer in C (i) above. (2marks) 2. Study the photomicrographs below and use them to answer questions that follow.



a) Identif	y the type of cell division above.	(1mark)
b) Giv	e a reason for your answer (i) above.	(1mark)

#### . . . c) With a reason identify each stage.

c) With a rea	son identify each stage.		(4marks)
Diagram	Stage	Reason	
D1			
D2			
D3			
D4			

(d) The photographs below show two fruits and their half-sections.

(iii) With reasons, in each case state the ty	pe of fruit and method of dispersals for
specimen S and T.	(2marks)
Specimen S	
Type of fruit:	
Reason:	
Method of dispersal:	
Reason:	

Specimen T	(2mks)
Type of fruit:	
Reason:	
Method of dispersal:	
Reason	
(iv)Draw and label a diagram ofcut specimens S.	(4marks)

3, Study the diagrams below and answer the questions that follow.



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C	
D	
(ii) State the adaptation of the part labeled A to its function.	(2marks)
(iii) State <b>one</b> function of the part labeled C.	(1mark)
b) State <b>three</b> adaptations of the part labeled D.	(3marks)
	••••••
	••••••

### **SERIES 24**

- 1. You are provided with specimen R, use it to answer the questions that follow.
  - a) Cut a longitudinal section of specimen R to obtain two halves. Draw a surface of the cut specimen and label a seed and pericarp. (4mks)
  - b) State the type of placentation in the specimen. (1mk)
  - c) Crush the remaining pieces of the specimen using a motor and pestle. Add 10ml of water to obtain a paste. Decant the fluid in a beaker provided. Using the reagents provided, test for the food substance in the fluid. Record your observation in the table below.
    (8mks)

(*)			
Food substance	Procedure	Observation	Conclusion

2. Below is a plant organ used in the study of biology. Study it and answer the questions that follow.



a. Identify the organ.

(1mk)

b.	Name part H and state its functions. H –	(2mks)
	Function –	
c.	State the term used to describe the petals.	(1mk)
d.	State with a reason the class into which the organ belongs? Class –	(2mks)
	Reason –	
e.	i. Name the agent of pollination.	(1mk)
	ii. state a reason for your answer in (i) above (1mk)	
f.	State the importance of the organ to a plant.	(1mk)
g.	Measure the length of the petal from point A to B.	(1mk)

h. If the actual length of the petal is 5cm, calculate the magnification of the photograph above.

(2mks)

3. The specimens in the diagrams below were obtained by a class during an ecological study. Use the dichotomous key provided below to place all the specimens into their families.



Dichotomous Key.

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1	<ul><li>a) Animal with Wings</li><li>b) Animal without wings</li></ul>	
2.	<ul><li>a) Animal with one pair of wings</li><li>b) Animal with two pairs of wings</li></ul>	Muscidae Aeshnidae.
3	<ul><li>a) With three pairs of legs</li><li>b) With more than 3 pairs of legs</li></ul>	Formicidae go to 4
4.	<ul><li>a) With four pairs of legs</li><li>b) With more than four pairs of legs</li></ul>	Araneidae go to 5
5.	a) With two pair of antennae b) With one pair of antennae	go to 6 go to 7
6.	<ul><li>a) With six pairs of legs</li><li>b) With ten pairs of legs</li></ul>	Microcerberidea. Alpheoidea.
7.	<ul><li>a) With a cylindrical body</li><li>b) With a dorso – ventrally flattened body</li></ul>	Sphearotheridae.

i. Give the families and the steps followed to identify the specimens E, F, G, H, and J. (10 mks)

Specimen	Steps followed	Identity
Е		
F		
G		
Н		
J		

ii. The scientific name for specimen E is *Musca domestica*. Classify the specimen into the following taxonomic units. (6mks)

Kingdom-

Phylum –

Class -

Family -

Genus -

Specific name –

### **SERIES 25**

1. (a) You are provided with a straw and calcium hydroxide in a test tube.

- Dip one and a half of the drinking straw into the calcium hydroxide solution.
- Place your mouth at the open end of the drinking straw. Breathe out such as to bubbles gas into the calcium hydroxide solution five times.

(i)	Record your observations.	(1mk)
(ii)	Explain you observations in a(i) above.	(2mks)
(iii)	Write an equation of the reaction that occurred in the test tube.	(2mks)
(iv)	A part from the chamical substance under investigation, name two other pro-	duots that ware hubbl

(iv) Apart from the chemical substance under investigation, name two other products that were bubbled into the test tube. (2mks)


- (v) Name the parts followed by gases from the lungs until it is exhaled. (2mk)
- (b) Examine photograph M below and use it to answer the questions that follows:-



(i) State three observable features which adapt specimen M to gaseous exchange. (2mks)

(ii) Stat	e the sub-division and class to which specimen M belongs;-	
S	Sub-division:	(1mk)
C	Class:	(1mk)
2. You a	re provided with soaked bean seed, Iodine solution, Biuret's reagent, a scalpel and a h	and lens.
By use	e of a scalpel, carefully cut the bean seed longitudinally such as to separate the two cot	yledons.
(a) By (i)	use of a dropper, smear Iodine solution onto the exposed surfaces of the first cotyledo Record your observation.	on. (1mk)
(ii)	Account for observation in a(i) above.	(1mks)
(b) By (i)	use of a dropper, smear some Biuret's reagent onto the exposed surface of the second Record your observation.	cotyledon (1mk)
(ii)	Account for your observation in b(i) above.	(1mk)
(c) Ex	plain how the type of germination in the specimen occurs.	(3mks)
(d) Sta (i)	ate the role of the following in the germination of a seed. Oxygen	(1mk)
(ii)	Water	(2mks)

-----

(iii) -	Cotyledon	(3mks)
3. You are	e provided with specimen labelled as K and L in a petri-dish. Examine the	em. (2mks)
(a) Ident	K: L:	(2111K3)
(b) (i) Di	raw and label the anterior parts of specimen K.	(4mks)
(ii)Sta	ate ways by which specimen K is adapted to its functions.	(3mks)
- - -		
(c) From	which parts of the body were specimens K and L obtained?	(1 1)
	Specimen K:	(1mk)
(d) Nam	Specimen L:	(1mk)
(i) Name	Proximal end	(1mk)
(ii)	Distal end	(1mk)
(e) Name	e the type of joint formed by specimen L at the anterior part;	(1mk)
-		
-		