

Name..... ADM.....

CLASS.....

SIGN.....

DATE.....

231/1

**BIOLOGY THEORY**

**MARCH/APRIL 2015**

2 HOURS

# MOKASA JOINT EXAMINATION 2015

*(Kenya Certificate of Secondary Education)*

## **BIOLOGY THEORY**

### **Instructions**

- Write your name, class and admission number in the space provided above.
- Write the date of the examination and sign in the space provided above.
- Answer *all* the questions in the spaces provided.
- You will be *penalized* for wrong spelling especially technical terms.

### **For Examiner's Use Only**

<b>Question</b>	<b>Maximum Score</b>	<b>Candidate's Score</b>
1-27	80	

*This paper consists of 10 printed pages.*

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

1. State **two** characteristics of living organisms that are specific to plants. (2marks)

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2. State **one** use for each of the following apparatus in the study of living organisms. (1mark)

a) Pooter. (1mark)

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b) Bait trap. (1mark)

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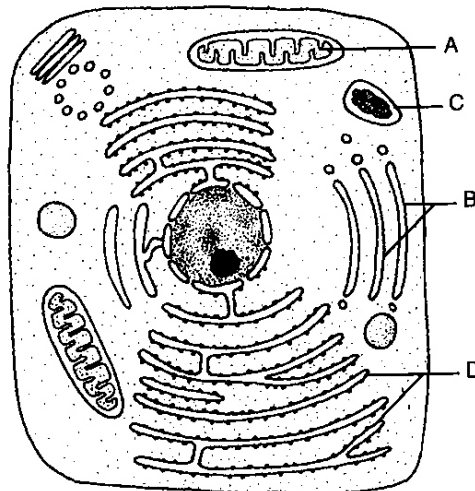
3. (a) Name **two** tissues in plants which are thickened with lignin. (2marks)

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(b) How is support attained in herbaceous plants? (1mark)

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



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

i) **A** .....

ii) **D** .....

b) State the function of the structures found on the part labeled **D**. (1marks)

.....

5. a) Using a microscope, a student counted 55 cells across a field of view whose diameter was 6000 $\mu$ m. Calculate the average length of the cells. **Show your working**. (2marks)

c) State the function of the following parts of a light microscope

i) Fine adjustment knob. (1mark)

.....

ii) Condenser (1mark)

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6. (a) Name the fluid that is produced by sebaceous glands. (1mark)

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(b) What is the role of sweat on the human skin? (2marks)

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7. What is the importance of the following in an ecosystem? (2marks)

a) Decomposers

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b) Predation

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8. (a) State **two** functions of bile juice in the digestion of food. (2marks)

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(b) How does substrate concentration affect the rate of enzyme action? (1mark)

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9. Name the features that increase the surface area of small intestines. (2marks)

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10. Describe what happens during the light stage of photosynthesis. (3marks)

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11. (a) Define the following terms. (2marks)

i. Population

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ii. Community

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(b) Name a method that could be used to estimate the population size of the following organisms.

i. Fish in a pond. (1mark)

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ii. Black jack in a garden. (1mark)

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12. (a) What is meant by the term allele? (1mark)

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(b) Explain how the following occur during gene mutation.

(i) Deletion. (1mark)

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(ii) Inversion. (1mark)

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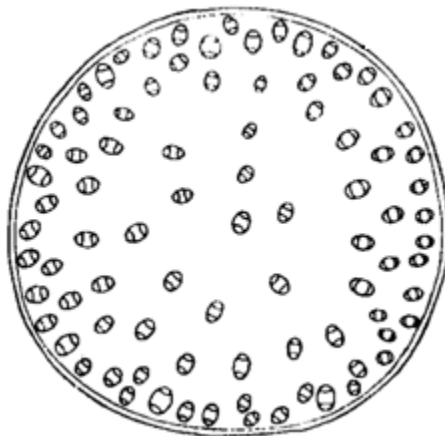
(c) What is a test-cross? (1mark)

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.....

13. Explain what happens when there is oxygen debt in human muscles. (2marks)

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.....

14. The diagram below shows a transverse section of a plant organ.



a) Name the class to which the plant organ was obtained. (1mark)

.....  
.....

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

.....  
.....

15. Giving a reason in each case, name the class to which each of the following organisms belong:

(4marks)

Pea plant

.....

Reason

.....

.....

Bat

.....

Reason

.....

16. (a) Name the causative agents of the following diseases in humans.

(2marks)

Typhoid

.....

Amoebic dysentery

.....

(b) Name the disease in humans caused by *Plasmodium falciparum*.

(1mark)

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17. State **three** differences between Chilopoda and Diplopoda.

(3marks)

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18. What are the limitations of fossil records as evidence of organic evolution? (1mark)

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19. The diagram below represents a member of the kingdom Animalia.



i) Name the phylum to which the organism belongs. (1mark)

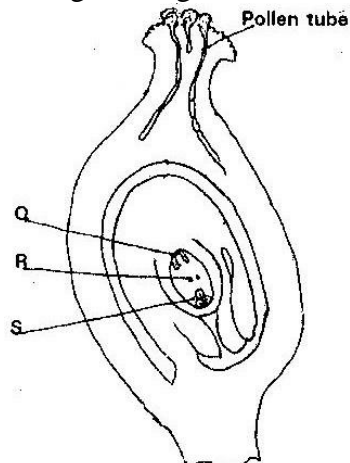
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ii) Using observable features in the diagram, give three reasons for the answer in (i) above.

(3marks)

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20. The diagram below shows a stage during fertilization in plants.



a) Name the parts labeled **Q** and **R**. (2marks)

Q .....

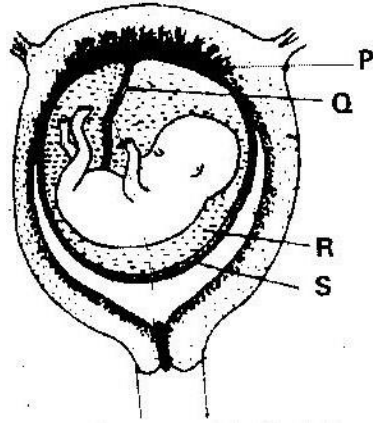
R .....

b) State the function of the pollen tube. (1mark)

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c) On the diagram, label the micropyle. (1mark)

21. The diagram below represents a human foetus in a uterus.



a) Name the types of blood vessels found in the structure labeled Q. (2marks)

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b) Name **two** features that enable the structure labeled P carry out its function. (2marks)

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22. Name the type of skeleton that makes up each of the following animals. (3marks)

a) Cockroach

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b) Bird

.....

c) Earthworm

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23. (a) Highlight **two** survival values of tropic response. (2marks)

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(b) What is a klinostat? (1mark)

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24. Name:-

a) The pressure sensitive swellings at the base of some leaves and petals which through loss or gain of turgidity bring about nastic movements. (1mark)

.....

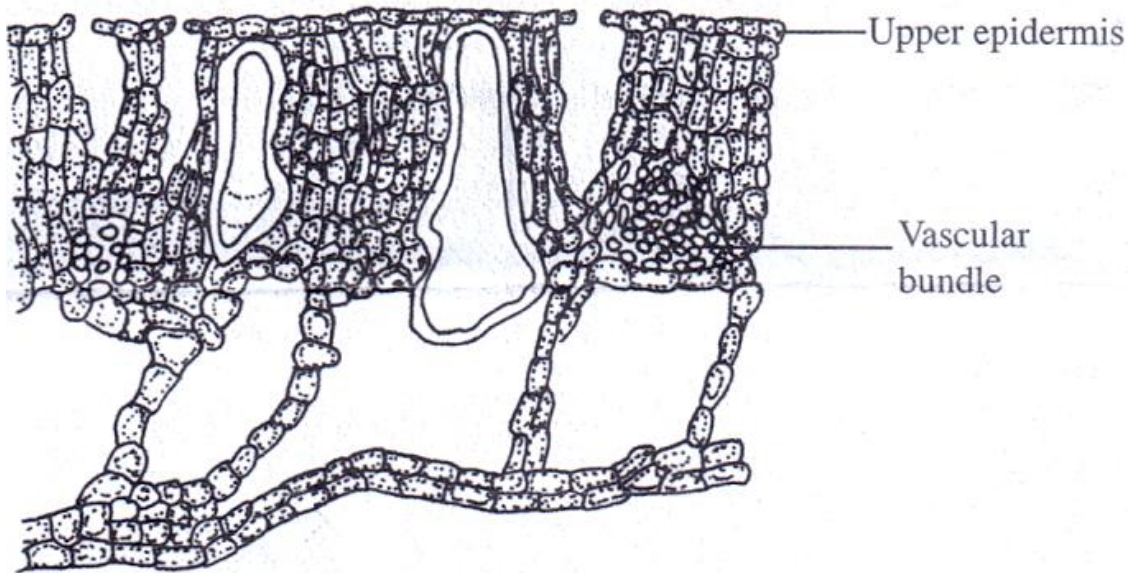
b) The structure in cockroach used for detecting stimuli. (1mark)

.....

c) The growth movement of part of plants in response to a unidirectional external stimulus. (1mark)

.....

25. The diagram below shows a transverse section of a leaf. Study it carefully then answer the questions that follow.



a) Name the habitat of the plant from which the leaf was obtained. (1mark)

.....

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

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26. (a) Name the gaseous exchange surface in insects. (1mark)

.....

(b) How is the surface named in (a) above suited to its function. (2marks)

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27. Most carbon (IV) oxide is transported from tissues to the lungs within the red blood cells and not in the blood plasma. Give two advantages of this mode of transport. (2marks)

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**231/2**  
**BIOLOGY PAPER 2**  
**(THEORY)**  
**PRE MOCK - MARCH 2015**  
**TIME: 2 HOURS**

**NAME:** .....**CLASS:**.....**ADM NO:** .....

**SIGNATURE**.....**DATE**.....

**INSTRUCTIONS TO CANDIDATES:-**

- Write your **name** and **adm number** in the spaces provided above.
- This paper consists of **two** sections; **A** and **B**.
- Answer **all** the 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 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 or	20	
	8	20	
<b>TOTAL SCORE</b>		<b>80</b>	

*This paper consists of 10 printed pages. Candidates should check to ascertain that all the pages are printed as indicated and that no questions are missing.*

**SECTION A (40 Marks)**

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

1. In human beings, a **downward pointed frontal hairline** (“windows peak”) is a heritable trait. A person with windows peak always has at least one parent who has this trait; where as persons with **frontal hairline** may occur in families in which one or even both parents have windows peak. Using **W** and **w** to symbolize genes for this trait

(a) Determine the F1 generation if a homozygous windows peak male parent is married to a homozygous frontal hairlined female parent (4mks)

(b) State two causes of variations (1mk)

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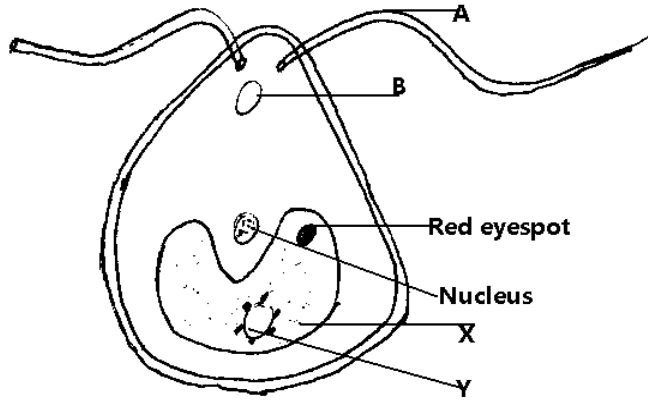
c) Name two sex linked genetic disorders affecting human females and males (2mks)

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.....

(d) What is genome

.....  
.....

2. The diagram below shows an organism obtained from an aquatic ecosystem



(a) **State** the kingdom in which the organism belongs. (1mk)

.....

(b) **Name** the parts labeled (1mk)

**B**

.....

**Y**

(1mk)

.....

(c) **State** the functions of the following parts

**A**

(1mk)

.....

.....

**X**

(1mk)

.....

.....

**Z**

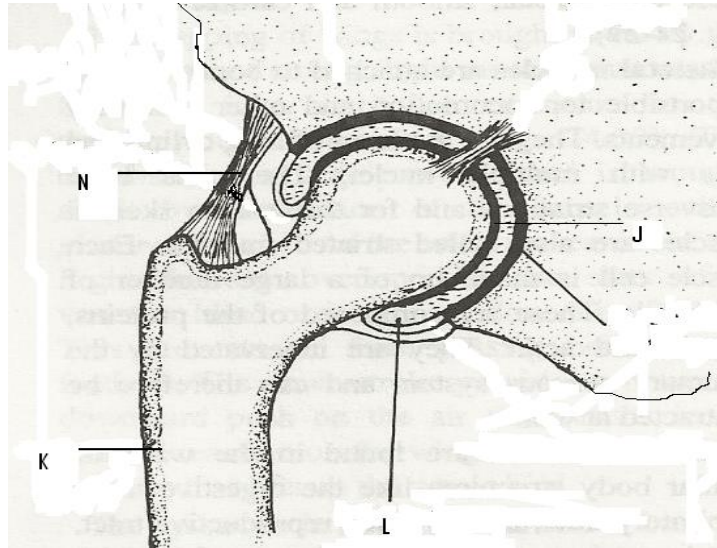
(1mk)

.....

(d) Explain briefly why the organism is described as eukaryotic (2mk)

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.....

3a) The diagram below shows some of the features of a synovial joint. Study the diagram carefully and answer the questions that follow.



(a) Name the type of synovial joint. (1 mark)

.....

(b) Name the parts labeled J, and L (2 marks)

J .....

L .....

(c) State **two** roles of the part labeled L. (2 marks)

.....  
.....  
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(d) Suggest **one** advantage of this type of joint. (1 mark)

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b) State how the following tissues are adapted to provide mechanical support in plants (2mks)

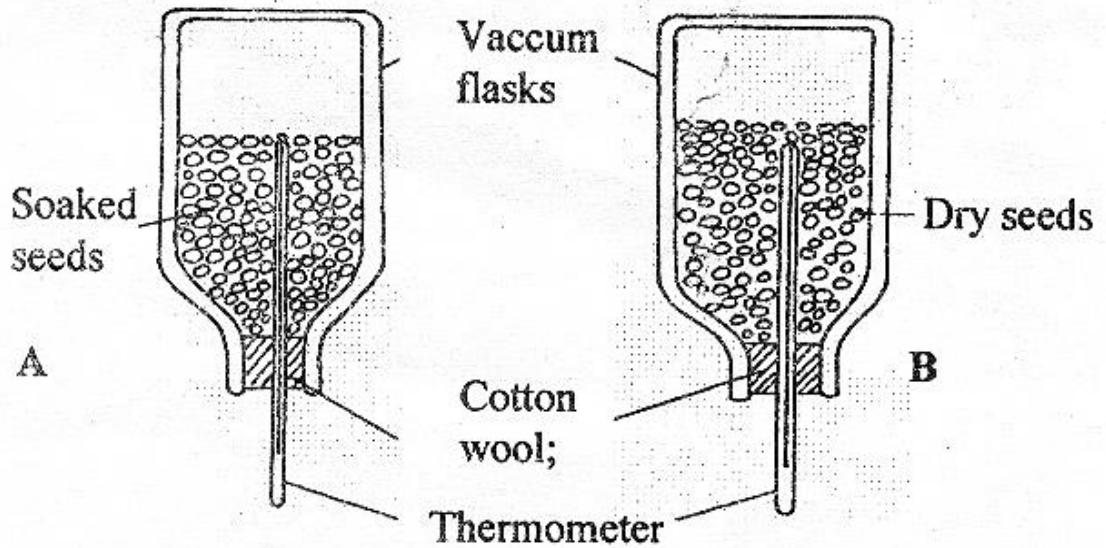
i) Parenchyma

.....

ii) Collenchyma

.....

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



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

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.....

b) State the observations made in each of the flask after 24 hours (2mks)

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

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

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

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

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

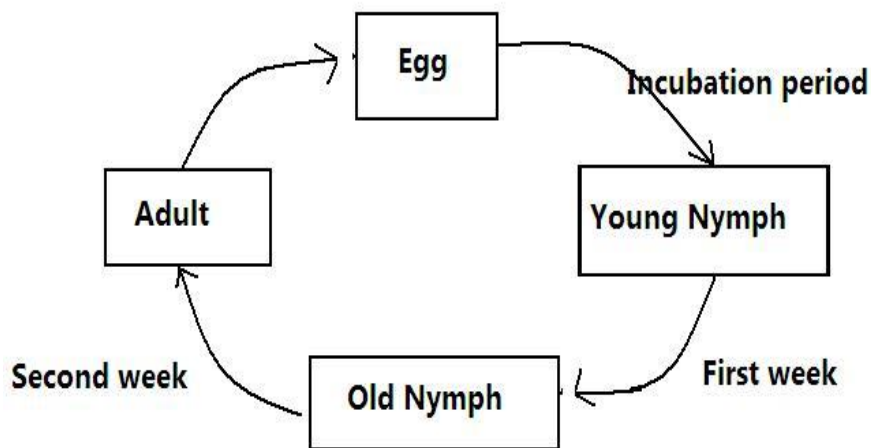
i) Vascular cambium (2mks)

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.....

ii) Cork Cambium (2mks)

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.....

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



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

(i) First week (1mk)

.....

(ii) Second week (1mk)

.....



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

.....

c) Name the series of stages through which the nymph undergoes to reach adult stage (1mks)

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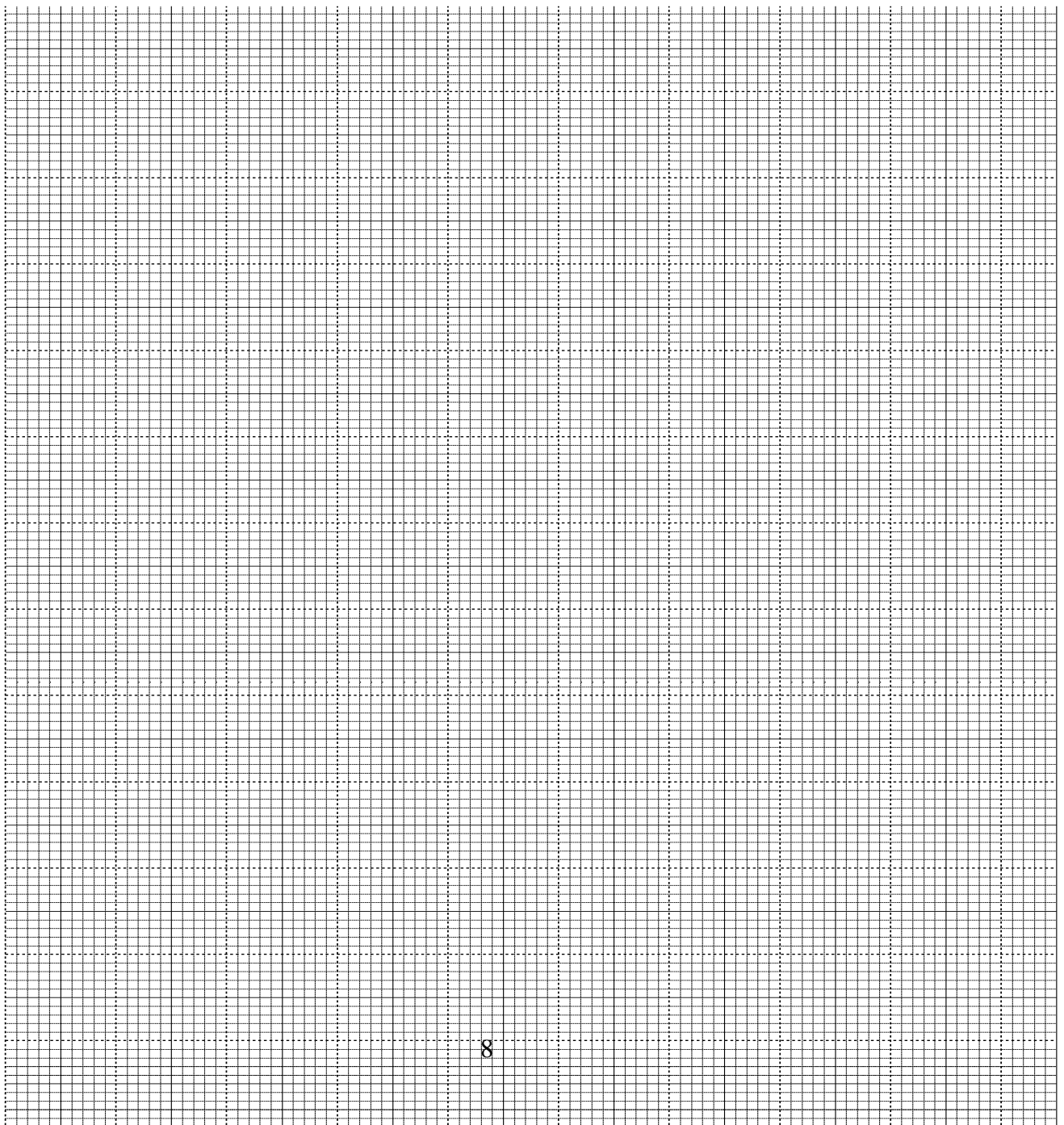
**SECTION B (40 Marks)**

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

6. The menstrual cycle is a sequence of events repeated monthly in the female production system. The table below shows the concentration of oestrogen and progesterone hormones and body temperatures of female against time.

Time in days	Oestrogen mg/100cm of blood	Progesterone mg/100cm <sup>3</sup> of blood	Temperature in 0°c
1	20	0	36.4
2	20.5	0	36.6
3	25	0	36.7
4	27.5	0	36.8
5	30	0	36.7
6	32.5	0	36.6
7	35	0	36.8
8	40	0	36.7
9	48	0	36.6
10	56	0	36.8
11	64	0	36.7
12	72	0	36.6
13	80	0	36.4
14	170	20	36.3
15	140	50	36.6
16	80	80	37.0
17	70	130	37.2
18	65	170	37.0
19	60	160	37.1
20	65	150	37.15
21	130	130	37.2
22	140	110	37.1
23	130	90	37.0
24	100	70	37.1
25	80	50	37.2
26	60	20	37.0
27	20	0	36.4

a). Using the same axis draw graphs of oestrogen and progesterone against time/days (8mks)



b) State the possible event taking place in the uterus during the first week? (1 mark)

.....  
.....

c) State the events taking place in the ovary between day 1 and day 13. (2 marks)

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d) Account for the sudden increase in the progesterone concentration between day 14 and day 18. (2 marks)

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.....

e) Account for the change in temperature between day 14 and 17. (1 mark)

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f) Account for the change of the curve of progesterone between day 19 and 27. (2marks)

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a) State the function of the following.

(i) Ovary (1mark)

.....  
.....

(ii) Progesterone (1 mark)

.....  
.....  
(iii) Oestrogen (1 mark)  
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- 7 a) Describe how the following evidences support the theory of organic evolution: geographical distribution, fossil records and comparative anatomy (10mks)
- b) Explain tropic responses in plants and their survival values (10mks)
- 8 a) Describe the structural adaptations of mammalian heart to its Functions (10mks)
- b) Explain the role of osmosis in organisms (10mks)

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Name ..... Index No. ....

Candidate's Sign .....

Date .....

**231/2**  
**Biology**  
**Paper 2**  
**(Theory)**  
**MARCH/APRIL 2015**  
**Time: 2 Hours**

**MOKASA JOINT EVALUATION EXAMINATION**  
**Kenya Certificate of Secondary Education**  
**231/2**  
**BIOLOGY**  
**Paper 2**  
**(Theory)**  
**March/April 2015**  
**2 Hours**

- Write your name, Index Number in the spaces provided above
- Write the date of examination in the space provided above
- Answer ALL the questions in section A in the spaces provided below each question in the question paper
- 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			
B			
	<b>TOTAL</b>		

**SECTION A:**

1. a) Define the following terms

(i) Stimulus

(1 mark)

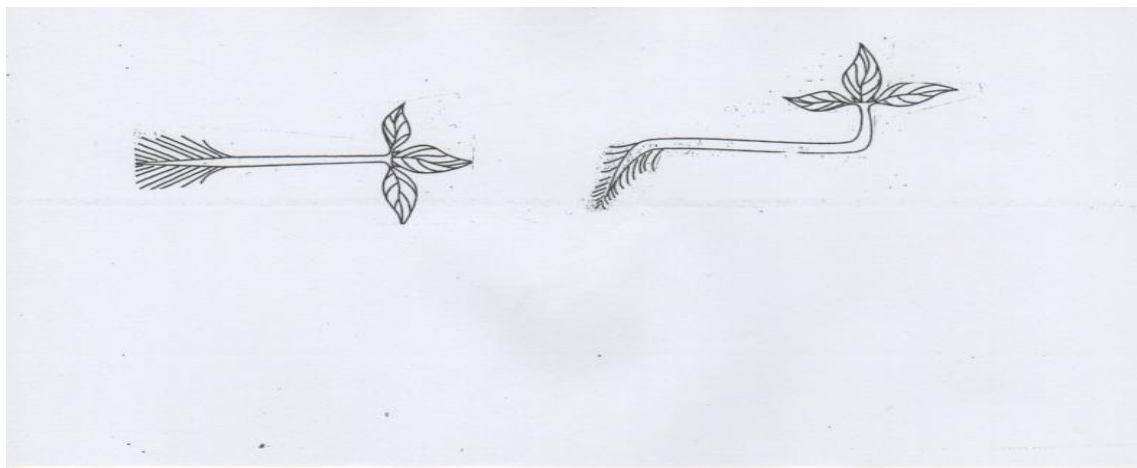
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(ii) Taxis

(1 mark)

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b) A student uprooted a seedling of Bryophyllum and left it to lie on the ground. After a few days the seedling has assumed a growth curvature shown in the diagram below.



At the start of the experiment

At the end of the experiment

(i) Account for the growth curvature observed in parts A and B

(4 marks)

.....  
.....

Part A

.....  
.....

Part B

.....  
.....

c) State **two** survival values of taxis to organisms (2 marks)

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2. A cross between a black bull and a white cow produces a calf with black and white spots.

a) Work out the possible genotypes of a calf resulting from a cross between a black bull and a white cow. (4 marks)

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

b) State the reason why the calf had black and white spots (1 mark)

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c) What is meant by the term allele? (1 mark)

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.....

d) State **two** characteristics of an individual with Down's syndrome (2 marks)

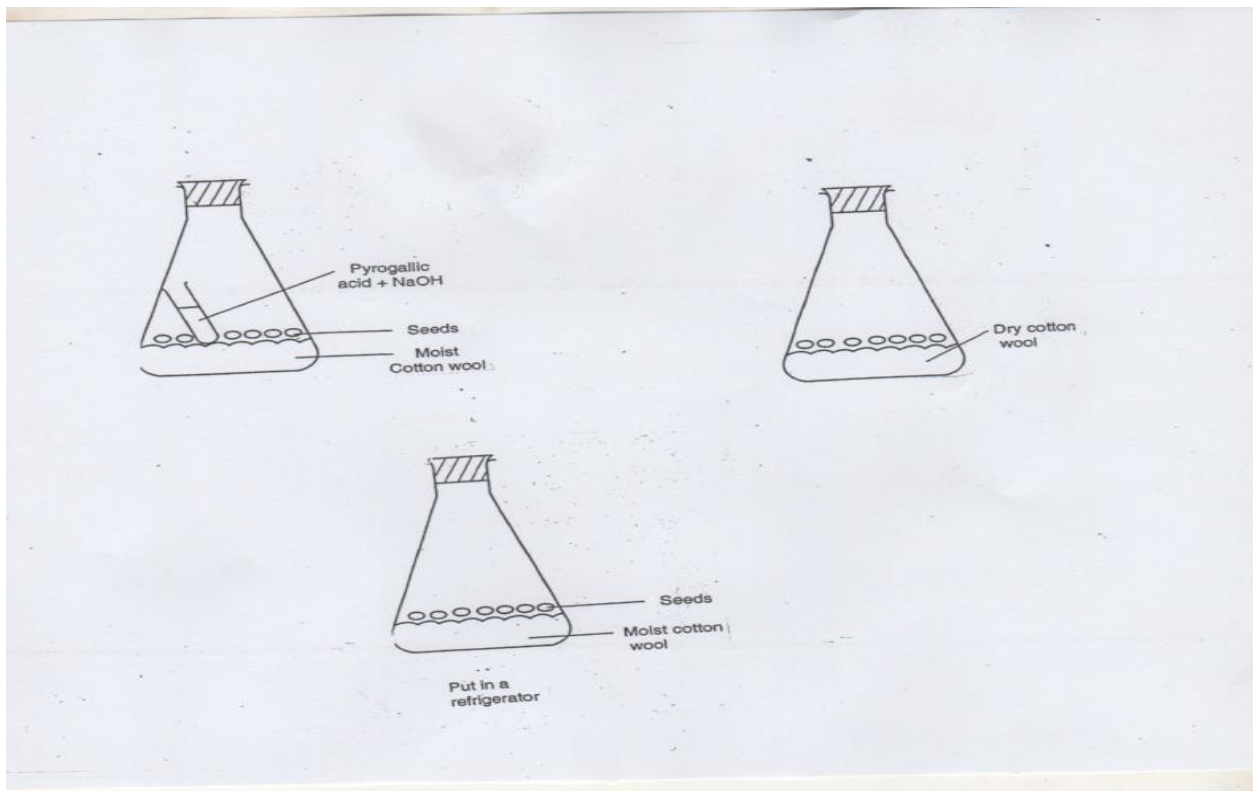
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3. An experiment was set up as shown below by a biology class.

A

B



C

a) What is the role of pyrogallic acid in sodium hydroxide in flask A? (1 mark)

.....  
.....

b) What conditions were being investigated in flasks A, B and C? (3 marks)

A .....

B .....

C .....

c) Suppose the dry cotton wool in flask B was replaced with a moist cotton and set-up left for five days, give and account for the observation made (2 marks)

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.....

d) State the inhibitory roles of gibberelic acid in plants (2 marks)

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4. a) Distinguish the following terms as used in animal nutrition

(i) Dentition and dental formula (1 mark)

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(ii) Homodont and heterodont dentition (1 mark)

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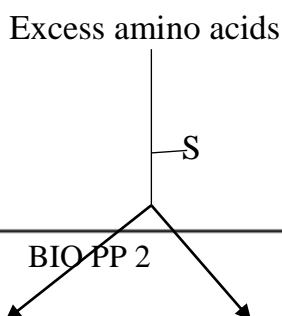
b) State **two** functions of the ileum (2 marks)

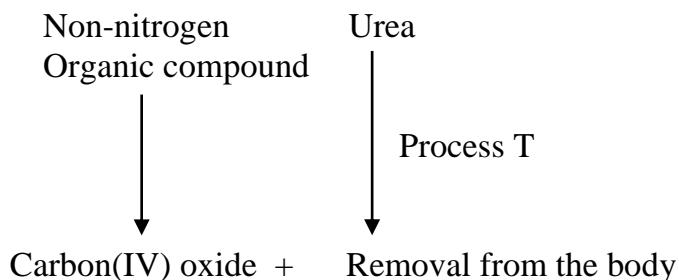
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c) Explain how the chloroplast is adapted to its function (4 marks)

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5. Proteins are present in a balanced diet. They are broken down into amino acids and excess cannot be stored in the body. Its metabolism is as shown below.





a) Describe how urea is transported to the site of removal from the body (2 marks)

.....

.....

b) Name the process Sand T, stating the organ in which each occurs (4 marks)

Process	Name	Organ
S		
T		

c) Give **four** uses of amino acids in the body (2 marks)

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**SECTION B**

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

6. In an experiment, Tradescantia plants with purple leaves were kept in the dark for about 1 hour, strips of leaves approximately 5mm by 12mm from this plants were then cut and floated with lower epidermis on experimental solution in petri dishes. The dishes were then placed in light and temperature kept at 20°C. After 5 minutes a leaf strip was removed from each experimental solution, quickly blotted dry and the percentage number of open stomata was found after counting under the microscope. The procedure was repeated with other strips from the same experimental solutions at intervals of 10 minutes. The results are as shown in the table below.









Name ..... Adm. No .....

Date .....

**231/3**  
**Biology**  
**Paper 3**  
**(Practical)**  
**Time: 1 3/4 Hours**

**MOKASA JOINT EXAMINATION**  
**Kenya Certificate of Secondary Education**  
**231/3**  
**BIOLOGY**  
**Paper 3**  
**(Practical)**  
**March/April 2015**  
**1 3/4 Hours**

- Write your name, Admission Number in the spaces provided above
- Write the date of examination in the space provided above
- Answer ALL the questions

**• FOR EXAMINER'S USE ONLY**

QUESTION	SCORE	CANDIDATES SCORE
1	13	
2	12	
3	14	
TOTAL	40	



1. You are provided with two specimens labeled T and R. Study each of the specimens carefully and use them to give accurate responses to the questions and procedures below.

(a) Take the whole of specimen T. Softly press it downwards on the petri-dish using your first finger, and then remove your finger. Observe and record what happens to the specimen.

(i) Observation (2 marks)

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(ii) Explain the observation recorded in (a) (i) above. (2 marks)

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(b) (i) Specimens T and R perform some functions in the organisms from which they were removed from. State one function which is common to both specimen T and R. (1 mark)

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(ii) Using observable features only on specimen R, describe how it is adapted to the function named in (b) (i) above. (3 marks)

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(c) Explain the main features that adapts specimen T to the function named in (b) (i) above. (4 marks)

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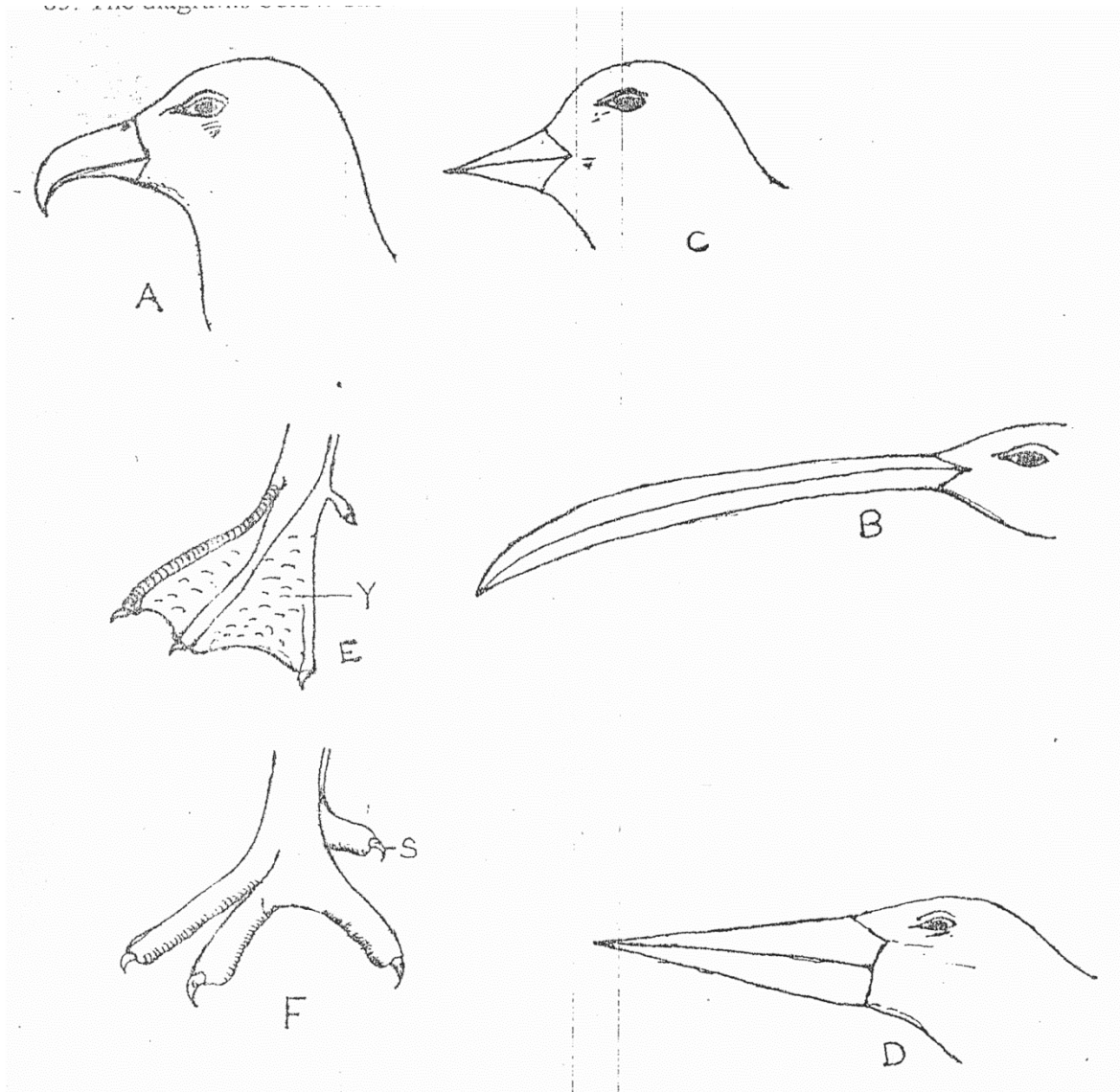
(d) Identify the group of organisms that use specimen R. (1 mark)

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2. The picture below shows series of beaks in birds.



(a) State the type of evolution that may have led to the emergence of the different beaks shown on the pictures above. (1 mark)

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(b) Name the type of evolution structure represented by the beaks shown on the pictures above. (1 mark)

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(c) Observe the pictures carefully. From your observations, what features are responsible for the different types of beaks? (3 marks)

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(d) Suggest the type of food likely eaten by birds whose beaks are shown in pictures A, B, C and D. (4 marks)

A

.....

B

.....

C

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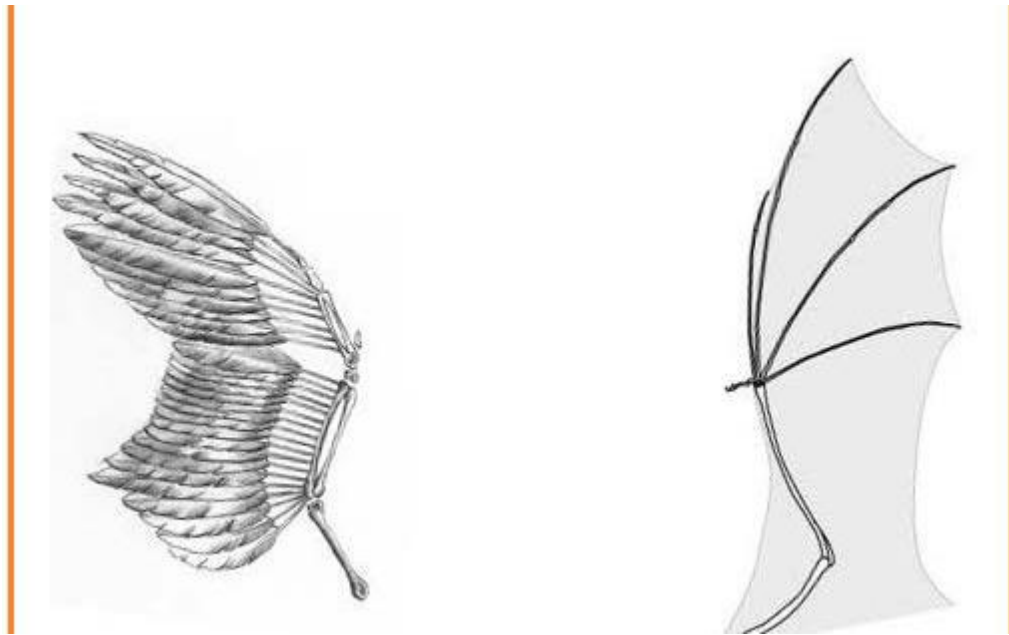
D

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(e) Briefly state how beak shown in picture A is adapted to feeding. (1 mark)

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(f) Below are pictures from two different organisms.



(i) What is the specific function of the two structures shown in the pictures?

(1 mark)

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(ii) What type of structures is represented by the two structures shown on the pictures?

(1 mark)

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3. You are provided with a specimen labeled K.

(a) (i) With a reason, identify the part of the plant represented by the specimen. (2 marks)

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(ii) Cut the specimen into two halves transversely. Observe the arrangement of seeds inside the specimen. Suggest its placentation. (1 mark)

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(b) (i) Suggest the mode of dispersal for specimen K. (1 mark)

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(ii) Give one reason for your answer in (b) (i) above. (1 mark)

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(c) (i) Specimen K in its raw state has an excretory substance in its skin. Name the excretory substances. (1 mark)

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(ii) How is the excretory substance named in (c) (i) importance to human? (2 mark)

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(d) From the remaining parts of specimen K, cut out thin strips measuring 1cm wide and 5cm long. Place two of the stripes in tap water (solution X) and the other 2 in concentrated salt solution (solution Y). Allow the set ups to stand for 30 minutes.

(i) After the 30 minutes, remove the stripes from the two solutions. Observe and record the shape of the strips from each solution. (2 marks)

Solution X

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.....  
.....

Solution Y

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

(ii) Using your fingers, feel the texture of the strips from the two solutions. (2 marks)

Texture

Solution X

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Solution Y

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(e) Explain the observations made in (d) (i) and (ii) for stripes in solution X. (3 marks)

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