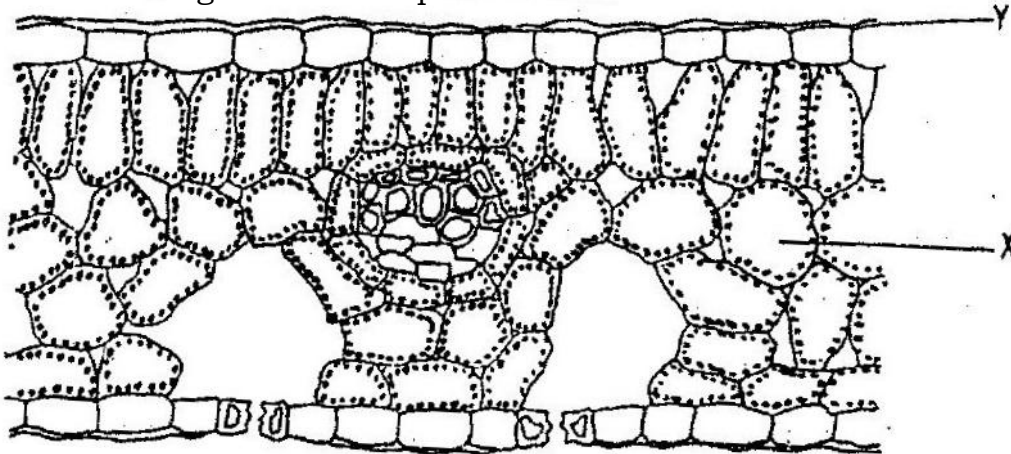


BIOLOGY PAPER 231/1 K.C.S.E 2000
QUESTIONS

1. What is the function of the following cells in the retina of human eye ?
Cones
2. Give a reason why two species in ecosystems cannot occupy the same niche.
3. State two ways in which some fungi are beneficial to humans
4. State two ways in which some fungi are beneficial to humans.
5. State the importance of osmo-regulation in organisms
6. Give a reason why lumbar vertebrae have long and broad transverse process
7. Give reason why each of the following is important in the study of evolution:
 - a) Fossils records
 - b) Comparative anatomy.
8. Why is oxygen important in the process of active transport in cells?
9. State two advantages of metamorphosis to the life of insects.
10. Explain how birds of prey are adapted to obtaining their food.

SECTION B

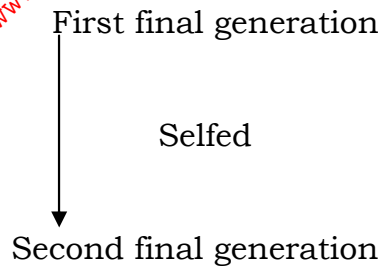
11. The diagram below represents a section of a leaf.



- (b) Name the parts labeled X, and Y
- (c) Using arrows indicate on the diagram the direction of flow of water during the transpiration stream
- (d) State two ways in which the leaf is suited to gaseous exchange

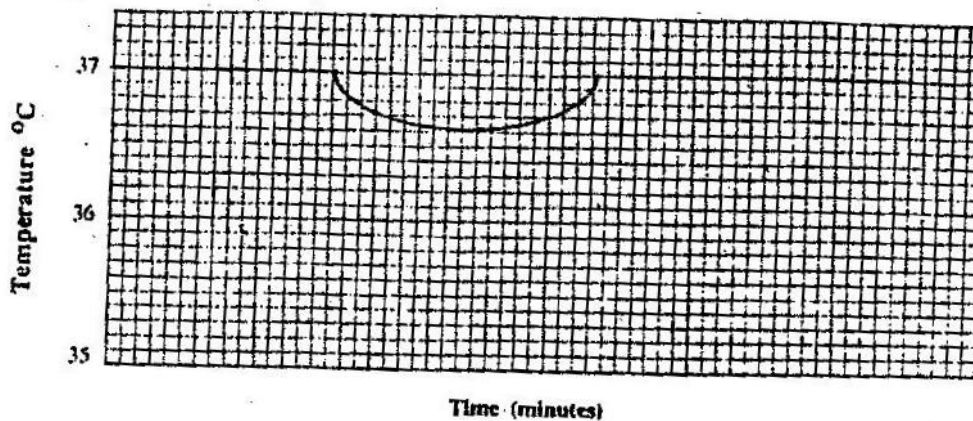
12. The chart below represents the result of successive crosses, starting with red- flowered plants and white flowered plants and in which both plants are pure breeding.

Parental genotypes: Red flowers x white flowers



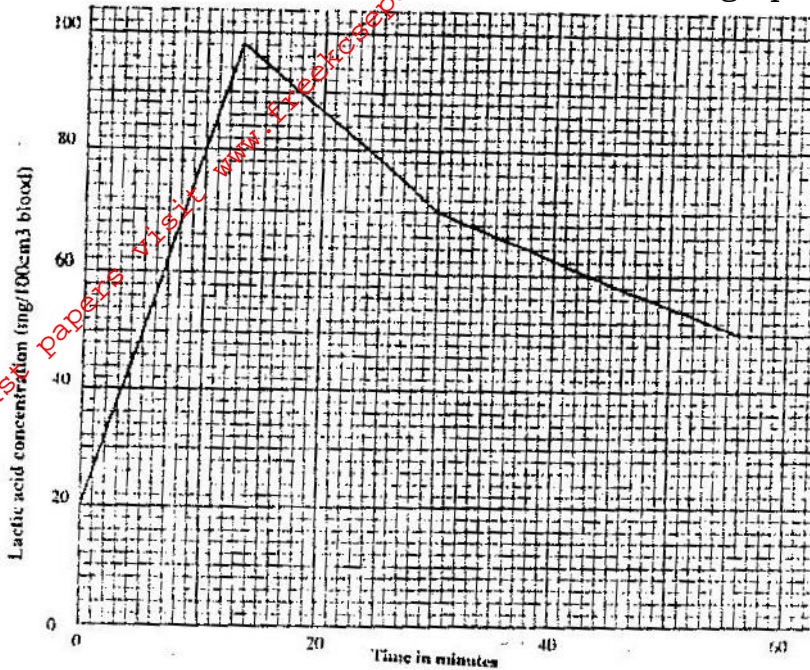
3 red flowers: 1 white flower
3: 1

- (a) What were parental genotype? Use letter R to represent the gene for red colour and r for white colour
- (b) (i) What was the colour of the flowers in the first filial generation?
(ii) Give a reason for your answer in b (i) above
- (c) If 480 red flowered plants were obtained in the second filial generation, how many F₂ plants and white flowers? Show your working.
13. The temperature of a person was taken before, during and after taking a cold bath. The results are shown in the graph below



- (a) Explain why the temperature fell during bath
- (b) What changes occurred in the skin that enabled the body temperature to return to normal?
14. (a) Name the crop infested by phytophthora infestans and the disease it causes
Crop / Disease
- (b) State four control measures against the disease

15. The concentration of the lactic acid in blood during and after an exercise was determined. The results are shown in the graph below



- (a) (i) By how much did the lactic acid increase at the end of 13 minutes?
(ii) After how many minutes was the lactic acid concentration 71mg/100cm³?
(iii) What would be the concentration of lactic acid at the 60th minute?
- (b) Give a reason for the high rate of production of lactic acid during the Exercise
- (c) Give a reason for the decrease in the concentration of lactic acid after the exercise
16. (a) What is the significance of sexual reproduction?
(b) State three advantages of asexual reproduction

17. The numbers of different types of animals supported by a square kilometer in two terrestrial ecosystems are shown in the table below

Type of ecosystem	Type of animal	Number of animals supported per sq. km
Acacia savannah	Domestic animals	
	Cattle	7
	Goat	30
	Sheep	10
Bush land	Wild games	
	Thomsons's gazelles	450
	Eland	20
	Wildebeest	60
	Domestic animals	
	Cattle	2
	Goats	15
	Sheep	5
	Wild game	
	Thomson's gazelles	200
	Eland	12
	Wildebeest	10

- (a) (i) Which domestic animal is better adapted to both ecosystems?
(ii) Give a reason why the animal named in (a) (i) above is better adapted to the two ecosystems.
- (b) Why are cattle and sheep fewer in the bush land than in the savannah?
- (c) (i) Name suitable methods that were used to estimate the population of:
Domestic animals
Wild animals
(ii) Give a reason why the method named for wild animals in (c) (i) above is suitable
- (d) state three methods which could be used to determine the diet of wild animals in an ecosystem
- (e) Name four biotic factors that could have regulated the animal population in both ecosystems
- (f) State four human activities that affect population of animals in game parks
- (g) What is the importance of national park to a nation?
18. describe the role of hormones in the human menstrual cycle
19. how are leaves of mesophytes suited to their functions

BIOLOGY PAPER 231/2 K.C.S.E 2000
PRACTICAL MARKING SCHEME

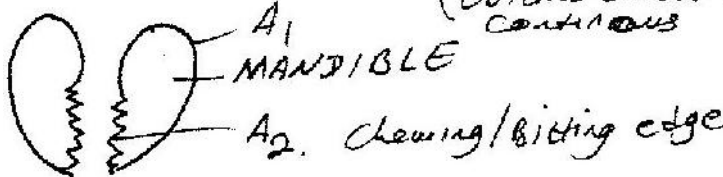
- 1 (a) You are provided with a specimen labeled D
- (i) Name the specimen to which the specimen belong Arthropoda
- (ii) State three characteristics found in the members belonging to the phylum
- presence of exoskeleton/ Ectoskeleton
 - Jointed limbs/ appendages/ legs
 - Segmented body parts

- (b) (i) Name the class to which the specimen belongs
 Insecta

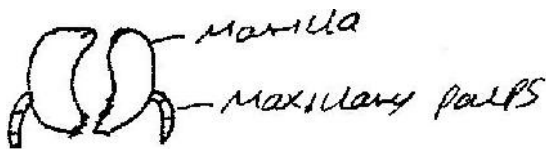
- (ii) State four characteristics found in the members of class
- Body divided into three (head, thorax, and abdomen)
 - Three pairs (six legs)
 - One pair (2 antennae)
 - Presence of spiracles/ breath through spiracles
 - Compound eyes (one pair)

- (c) Remove, draw, and label the mouth parts used for:

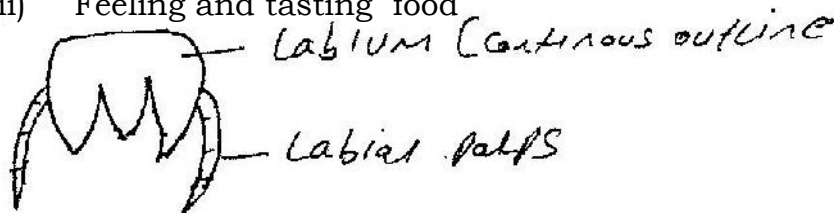
- (i) Biting and chewing food (outline should be continuous)



- (ii) Hold food



- (iii) Feeling and tasting food



- (d) Examine the wings of the specimen. State the differences between them.

Forewing/outer wing

- Hard
- Narrow/ small surface/ small
- Stiff/ rigid/ inflexible
- Opaque

Hind wing/ Inner wing

- Soft/ Membranous
- Wide/ broad/ large surface area
- Flexible/ can fold
- Translucent

2. Confidential requirements:

Specimens:

G- onion bulb (Sprouting) E- Taproot/Taproot tuber/ swollen tap root/main root/Carrot root hairs/ F- stem tuber

You are provided with specimens labelled E, F and G.

(a) With reasons state which part of plant are specimens E, F and G.

E- carrot root hairs

Reasons

- Presence of lateral roots
- Short stem. Swollen with food

F- Irish Potato

Reasons

F- Stem tuber

- Presence of lateral buds/ auxiliary/ auxiliary buds
- Presence of scale leaves
- Swollen with food

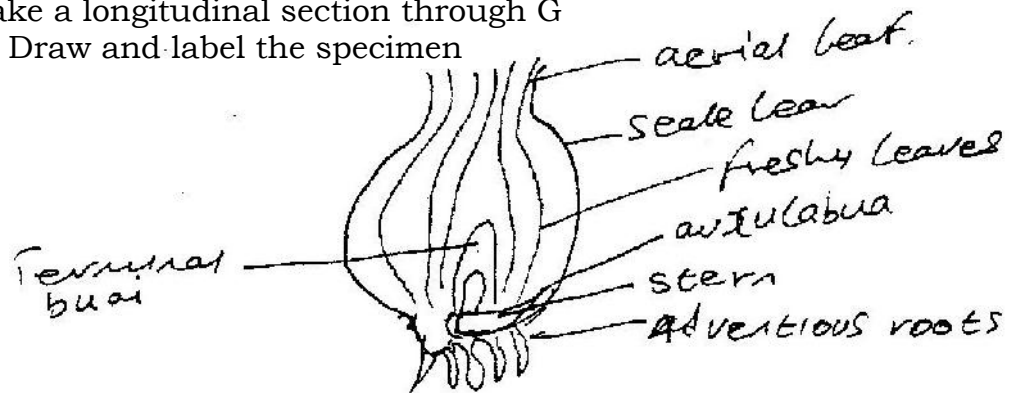
G- Bulb/ Onion bulb/ Onion plant bulb

Reasons

- Scale leaves / scaly leaves
- Short stem/ flattered stem
- Fleshy leaf bases/ leaves swollen with food.

Make a longitudinal section through G

(b) Draw and label the specimen



(c) (i) name the vitamin present in specimen E

Vitamin A retinal

(ii) What are two functions of the vitamin named in (c) (i) above.

- Protein of skin and cornea form dying
- Synthesis of Rhodopsin pigment
- Improves night vision/ vision in poor light

(d) State three differences in specimen F and G

F

- Food stored in stem
- Swollen stem
- Rudimentary/ not well Developed scaly leaves

G

- Food stored in leaves
- small short/flattened stem
- Dry papery/ well developed scale leaves
- Presence of adventitious roots

- Small/ inconspicuous scale leaves
- Absence of adventitious roots

3. You are provided with a substance labelled H. Filter the substance and collect filtrate. Filtration is expected to be complete after about 30 minutes. Using the reagents provided, test for the food substances in the residue and the filtrate. Record your procedures, observations and conclusions in the table below.

Residue

Food substance	procedure	Observations	Conclusion
starch	Add a drop of iodine	Colour of iodine/yellow/ orange/ brown/ reddish brown / no colour change	Starch absent
proteins	Add NaOH then a drop of 1% CuSO ₄ and shake	Purple violet colour	Presence of proteins
Reducing Simple sugars	Add benedict's solution and heat in warm water bath	Green colour/ yellow/ Orange/ red/ brown/ colour	Traces of reducing sugar of colour change is greenish. Reducing/ Simple sugars present

Filtrate

Food Substance	Procedure	Observations	Conclusion
Starch	Add a drop of iodine	No colour change/ colour of iodine/ yellow/ brown/ orange/ reddish brown colour	No starch present
Protein	Add NaoH then CuSO ₄ and shake	Blue colour/ light blue/ No colour change/ Colour of copper sulphate retained. Purple colouration	Absence of proteins or presence of proteins according to observations
Reducing/ simple sugars	Add Benedict's solution and	Green/ yellow/ orange / red/ brick	Greenish colouration

	heat/ place in a warm water bath	red ppt	Traces of reducing/ simple sugars
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