

**BIOLOGY PAPER 231/1 K.C.S.E 1997**

**QUESTIONS**

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

1. State the functions of the following cell organelles  
(a) Golgi apparatus  
(b) Ribosomes
2. A student caught an animal which had the following characteristics:  
Body divide into two parts  
Simple eyes  
Eight legs  
The animal belong to the class
3. What are the three end products of anaerobic respiration in plants
4. state two ways in which xylem vessels are adapted to their function
5. In an accident a victim suffered brain injury. Consequently he had loss of memory. Which part of the brain was damaged?
6. Oil can be applied on the stagnant water to control the spread of malaria.  
(a) How does this practice control the spread of malaria?  
(b) Give a reason why this practice should be discouraged

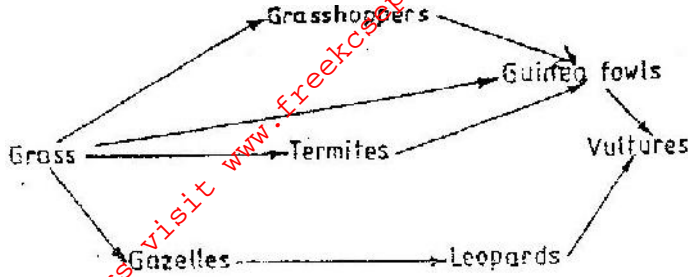
7. State three structural differences between biceps muscles of the gut.

Biceps	Gut Muscles
Striated	Unstriated
Multinucleated	Uninucleated
Long fibres	Short fibres
Cylindrical	Spindle shaped

8. A person was found to pass out large volumes of dilute urine frequently.  
Name the  
(a) Disease the person was suffering from  
(b) Hormone that was deficient
9. state three pieces of evidence that support the theory of evolution
10. Name a disease caused by lack of each of the following in human diet.  
Vitamin D  
Iodine

**SECTION B (40 MARKS)**

11. The following below represents a feeding relationship in an ecosystem



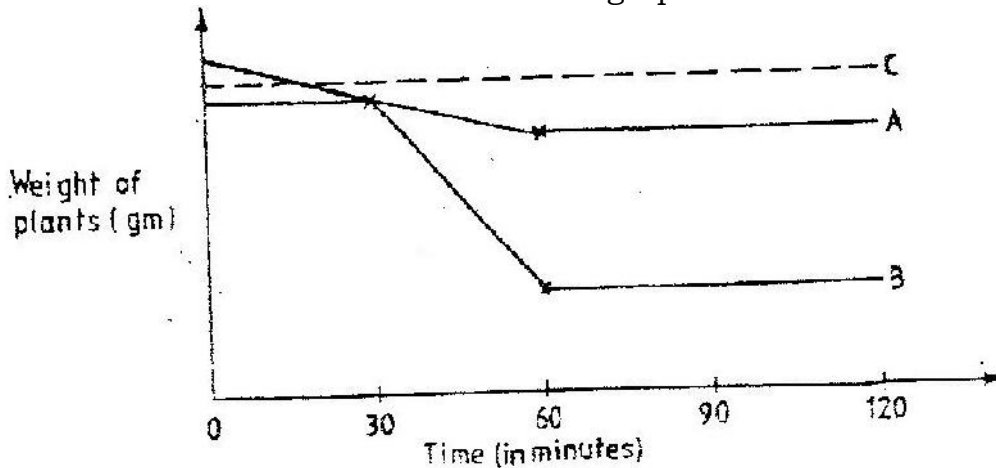
- (a) Write down the food chains in which the guinea fowls are secondary consumers
- (b) What would be the short term effects on the ecosystem if lions invaded the area?
- (c) Name the organism through which energy from the sun enters the food web.

12. A person was able to read a book clearly at arm's length but at normal reading distance.

- (a) State the defect the person suffered from?
- (b) Why was he unable to read book clearly at normal distance
- (c) How can the defect be corrected?

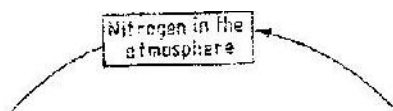
13. An experiment was carried out to determine the rate of transpiration in three plants A, B and C. Plants, A and B belonged to different species while plants B and C belonged to the same species. Plant C had all its leaves removed. The three plants were of similar size and were exposed to the same environment conditions.

The results are as shown below in the graphs below



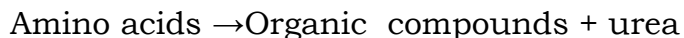
- (a) Suggest possible environment conditions under which the experiment was carried out between 30 and 60 minutes
- (b) Account for the results obtained for plant C
- (c) Suggest the habitat for plant A and B. Give reasons for your answer.  
Habitat for plant A  
Habitat for plant B

14. The diagram below represents a simplified nitrogen cycle.



- (a) Name the organisms that cause process E and J
- (b) Name the process represented by F and H.
- (c) Name the group of organism represented by G

15. The equation below represent a metabolic that occurs in the mammalian live



- (a) Name the process.
- (b) What is the importance of the process to the mammal?
- (c) What is the source of amino acids in this process
- (d) What is the difference between essential and nonessential amino acids?

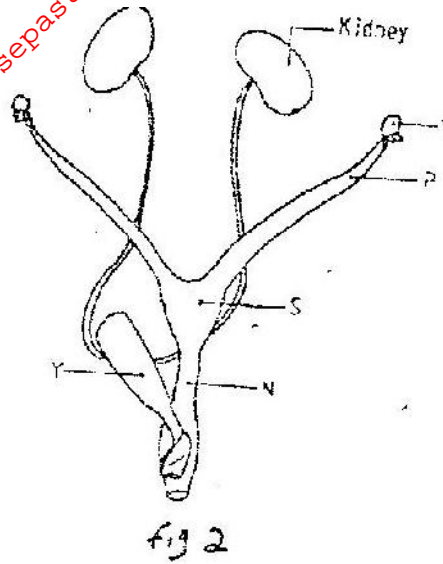
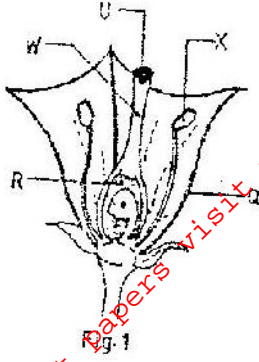
16. In a breeding experiment, plants with red flowers were crossed. The produced 123 plants with red flowers and 41 with white flowers

(a) Identify the recessive character

Give a reason

(b) What was the genotype of the parent plants that gave rise to the plants with a red and white flowers?

17. Figures 1 and 2 below represent reproductive organ of plants and an animal respectively.



- (a) Which letters in figures 1 and 2 represents the organs that produce female gametes?  
 Figure 1  
 Figure 2
- (b) What is the function of the structure labeled S?
- (c) Name the structure labeled W
- (d) Which letters in figures 1 and 2 represents the structures where fertilization takes place
- (e) Which letter in figure 1 represents the structure where male gametes are produced?

### SECTION C (40 marks)

18. An experiment was carried out to determine the growth rates of bamboo and a variety of maize plants in two adjacent plots. The average height and average dry weight of plants from the two populations were

determined over a period of twenty weeks. The data is as shown in the table below.

	Bamboo		Maize	
Age in weeks	Average height (Metres)	Average weight (Grams)	Average height (Metres)	Average weight (Grams)
2	1.3	52	0.3	20
4	4.0	182	0.5	29
6	8.2	445	0.8	57
8	12.1	682	1.2	78
10	13.9	801	1.7	172
12	14.1	957	1.9	420
14	14.3	1025	2.1	704
16	14.4	1062	2.1	895
18	14.6	1127	2.1	926
20	14.6	1229	2.1	908

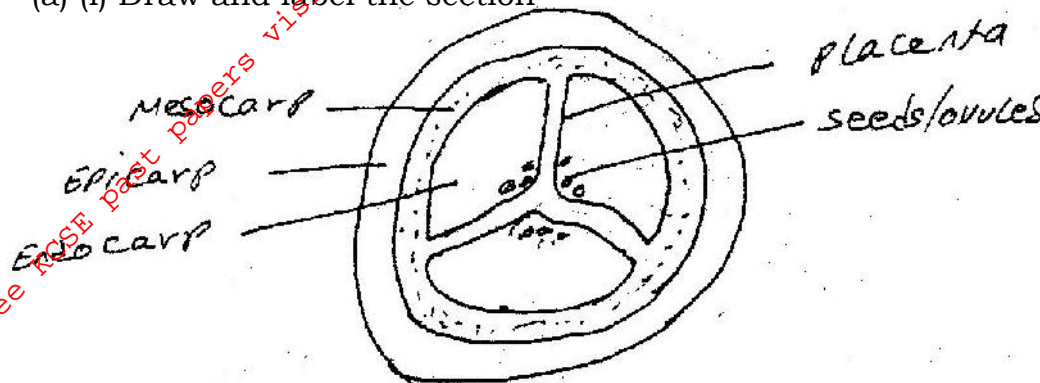
- (a) Between which two weeks did the greatest increase in weight occur in
- (b) Bamboo plants  
(i) Maize plants
- (b) (i) Which of the two types of plants had a higher productivity by the end of the experiment  
(ii) Give a reason for your answer in (b) (i) above
- (c) Between weeks 14 and 18, the average height of the maize plants remained constant while average dry weight increased.  
Explain this observation
- (d) Suggest how the change in the average dry weight bamboo and maize plants would have been at week 22 if the experiment was continued.
- (e) Why was it appropriate for this experiment to use  
(i) Dry weight instead of fresh weight  
(ii) Weight and height
- (f) Describe how the average height and weight of the plants were determined in this experiment.  
Average height  
Average dry Weight
- (g) Give a reason why secondary thickening does not occur in bamboo and maize plants
19. (a) What is parasitism?  
(b) Describe how the tapeworm is adapted to a parasitic mode of life
20. (a) What is meant by the term digestion?  
(b) Describe how the mammalian small intestine is adapted to its function

**BIOLOGY PAPER 231/2 K.C.S.E 1997  
PRACTICAL MARKING SCHEME**

**1. Confidential Requirement specimen Q- Ripe banana**

You are provided with a specimen labeled Q. Make a transverse section of the specimen.

(a) (i) Draw and label the section



(ii) Work out the magnification of your drawing

$$X \frac{1}{2} - X3$$

$$\text{Mag} = \frac{\text{Size of diagram}}{\text{Size of object}} = X \frac{1}{2} - X3$$

(b) What type of fruit is specimen Q?

Freshly/simple/berry/succulent

(c) Slice off about 2cm thick disc from the specimen. Peel it. Place piece into a beaker and mash it into 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.

ENSURE THERE IS NO LEAKAGE AND BOTH ENDS OF THE TUBING

Rinse the outside of the tubing with water. Immerse the tubing with its content in 100ml beaker containing iodine solution. Allow standing for 20 minutes.

(i) Record your observations in the table below.

	Extract inside tubing	Iodine solution Outside tubing
Before the experiment	Cream/white/cream white/pale yellow/ light yellow Rej. Yellow	Colour of iodine Yellow/brown Reddish brown/ orange
After the experiment	Blue + Black/ blue Black Rej purple	As above no colour change

(ii) Account for the results obtained in c (i) above

Iodine/ dissolved/ entered and reacted with starch concentration

Gradient

Reaction

Extra mole cannot come out- too large to diffuse out.

2. Below is a photograph of a dissected mammal. Study the photograph and answer the questions that follow



- (a) Name the structures labeled  
 S1 - Oesophagus/gullet/trachea  
 S3 - Lungs  
 S4 - Gal bladder/ liver  
 S7 - Kidney  
 S9- Ovary/uterus/womb  
 S10- Uterus/ womb  
 S12 - Caecum  
 S13- Colon/ large intestine/ileum/small intestine  
 S14- Stomach  
 S15- Liver  
 S16 - Heart  
 S20- Tongue/ mouth

- (b) (i) state the functions of the structure labeled  
 F1 - Bladder; storage of urine/holding/ keeping  
 F2- Hepatic portal vein/bile duct; transport of digested food into the liver  
 - Transport of bile juice/ salts to duodenum

- (ii) With reasons, state the sex of the dissected mammal  
 Sex- Female  
 Reasons - Ovaries/ pregnant/fallopian tubes/ uterus present.

- (c) (i) Name the dissecting tool placed at the anterior end of the mammal  
 - Forceps  
 (ii) State the use of the tool during a dissection  
 Holding tissues during dissection/ lifting/ caching/ pulling parts in place/  
 removing parts.

- (d) The actual length of the tool you have named in c(i) is 15cm. Measure the actual length of the tool in the photograph and calculate the magnification of the photograph.

Length of the tool in the photograph; 4.5 to 5 cm  
 = Length of the tool  
 Actual length of the object

$$\frac{4.5}{15} = 0.3 = \times 0.3$$

Magnification of the photograph

Length of diagram/ photo

Length of object

$$\frac{4.5 \text{ cm}}{15 \text{ cm}} = 0.3 \text{ mag}$$



3. You are provided with specimens P1, P2, P3, P4, P5, P6, P7, P8, P9 and P 10

Below is a dichotomous key, which can be used to identify specimen P1 – P9.

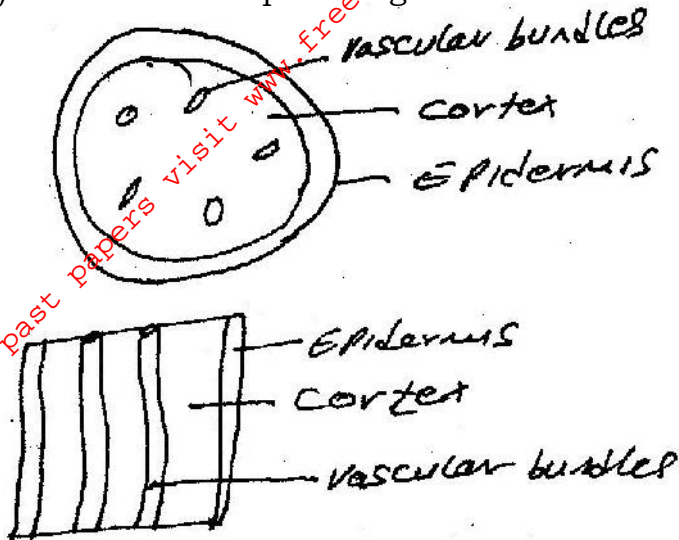
(a) Identify the specimens using the key. Indicate the steps followed to identify each specimen.

1 a; Leaf simple	go to 3
b; leaf compound	go to 2
2 a; Leaf lobbed	Oxalidaceae
b; Leaf with unlobbed leaflets	go to 8
3 a; Leaf parallel veined or with a spine	go to 4
b; leaf net veined	go to 6
4 a; leaf succulent	go to 5
b; Leaf not succulent	Graminae
5 a; Leaf with sheath	Commelinaceae
b; leaf without sheath	Agavaceae
6 a; leaf rough on the upper surface	go to 9
b; leaf surface smooth or hairy	go to 7
7 a; leaf surface smooth	Anacardiaceae
b; Leaf surface hairy	Solanaceae
8 a; leaflets margins serrated	Compositae
b; leaflets margins smooth	Mimosaceae
9 a; Leaf surface not spiny	Verbanaceae
b; Leaf surface spiny	Rosaceae

Specimen	Identity	Steps Followed
P1	Comelinaceae	1a, 3a, 4a, 5a
P2	Compositae	1 b. 2b, 5a
P 3	Anacardoceae	1a, 3b, 6b, 7a
P4	Mimosaceae	1b, 2b, 8b
P5	Solanaceae	1a, 3b, 6b, 7b
P6	Oxalidaceae	1b, 2c
P7	Agavaceae	1a, 3a, 4a, 5b
P8	Verbanaceae	1a, 3b, 6a, 9a
P9	Graminae	1a, 3a 4b

**Wrong steps, wrong identity no mark**

- (b) Using a razor blade, make a thin section of the petiole of specimen P 10.  
Stain the section methylene blue and mount on a microscope slide  
Observe using the hand lens  
(i) Make a labeled plan diagram of the section



- (ii) From your observations of the section, to which class does the specimen belong?

**Class** Dicotyledonous – **rej. Dicot and cotyledon**

**Reason** Vascular bundles arranged in a ring/ circle/ vascular bundles is on either side of pith/distinct cortex.