

**MARKING SCHEME BIOLOGY PAPER 2 (PRACTICAL)  
KCSE 2005**

**Each candidate will require the following**

A shoot of maize plant with some leaves labeled specimen X

A leafy shoot of *Bidens pilosa* labeled specimen Y

Iodine solution

Benedict's solution

Means of heating / water bath

Means of cutting / scalpel

6 test tubes

Test tube rack

Test tube holder

Water in 50ml beaker

Dropper

Means of labeling

Pestle and mortar

A hand lens

Dissecting needle / pins

A leafy twig of hibiscus plant with regular flowers labelled specimen S1

A leafy twig of bougainvillea with some mature flowers labeled specimen S2

An onion bulb with growing roots and growing aerial leaves labelled specimen p.

A shoot of *Tradescantia* with flowers labeled specimen Q

Note: onion bulbs can be made to develop roots and leaves by planting them in saw dust / sand.

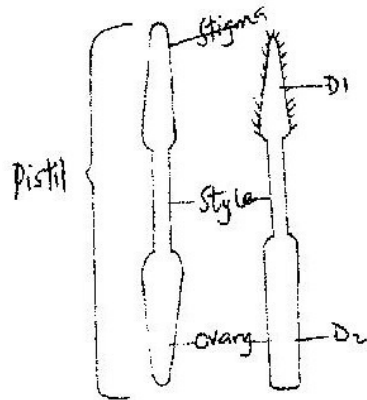
Freshly picked growing onions with roots intact can be used.

1.

<b>Specimen</b>	<b>Steps followed</b>	<b>Identity</b>
S1	1a,2a,3b,4b,6b	Malvaceae
S2	1a,2a,3b,4a,5b,8a	Nyctaginaceae
Q	1a,2b,	Commelinaceae
X	1a,2a,3a	Graminae
Y	1b,	Asteraceae

- b) i) S<sub>1</sub>- Dicotyledonous  
Q- Monocotyledonae
- ii) S<sub>1</sub> – Floral parts in threes (3, so multiples of 3/6 stamens / 6 anthers /3 petals.
- c) -Presence of large brightly coloured bracts / petals / perianth, to attract insects.  
(Reject it is brightly coloured )  
-Anthers and stigma enclosed in a tube, to be reached by insects  
- Scented to attract insects.

d)



D1 – Continuous outline

- No shading

D2 – Proportionality and accuracy

- Long stigma (feathering) stigma thinner than stigma and ovary

- Oblong ovary

Magnification =  $\frac{\text{Length of drawing / image (units)}}{\text{Length of actual specimen (units)}}$

= x (2-10)

\* No units = Ref. answer

Wrong computation = Ref. answer

2. (a) T1 – Molar tooth

Reasons

i) Presence of cusps / ridges

ii) Presence of three roots

T2 - Incisors

Reasons

i) Chisel shaped / wide (sharp) edge / wedge shaped

Ref. one root

b) Cusps /ridges any upper white part

Crown – Black part below cusps

Neck - Boundary between white and black parts

Root – white lower part divided into 3

Enamel – All over the part seen

Dentine – Upper part below the cusps

c) J – vegetation, grass, shrubs, herbs, plants / leaves

Ref. vegetative , pasture, greens, grass eaters, herbivore, herbivorous but mark reason.

Reasons

-Presence of diastema

- Absence of teeth (incisors and canines) at the front part of the upper jaw

-Presence of horny pad

-Presence of( premolars)cusps(for grinding vegetation)

K- Flesh/meat

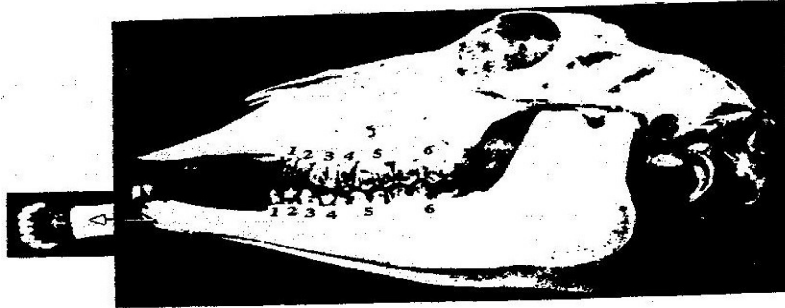
Rej; carnivores/carnivorous, flesh eater but mark reason

Reasons

Presence of (pronounced) long curved sharp pointed canines for gripping / tearing, holding/grasping prey

Ref; large

-Presence of carnassial teeth, for cutting and crushing bone



Inset – last on both sided

Photo – 2<sup>nd</sup> to the inside

e)  $J - 2 (10/3Co/1pm3/3m 3/3) = 32$

$K - 2 (13/3C1/1pm4/4m 2/3) = 42$

\*teeth types must be identified using letters

Rej; If missing

\*Demarcating lines must be present

f) J

g) Refer to diagram area below main white part.

3. P(onion bulb with leaves and roots)

a) i) Inner succulent/ juicy /flesh while outer is dry

- Inner is thicker while outer is thin / membranous / scaly

NB: Comparison must be seen otherwise deny a marks

ii) Inner swollen with food for storage and outer for protection against desiccation /mechanical injury / excessive loss of water/ microorganisms / invasion by fungi.

Rej: Storage of water alone, & prevent water loss.

5.

Extract	Procedure	Observations	Conclusion
Roots	Add iodine	No colour changed colour of iodine Brown yellow retained / persist	Starch absent
	Add benedicts solution and boil/ heat/warm/place in a hot water bath	Blue to green to orange/ brown (acc. brick red,ref.red	Reducing sugars present/simple sugars.
Bulbs	Add iodine	No colour change colour of iodine	Starch absent
	Add benedict solution and boil	Green to yellow to orange /brown	Reducing sugars present
Aerial leaves	Add iodine	No colour change	Starch absent
	Add benedicts solution and boil	Green to yellow to orange to brown	Reducing sugars present

\* Green end – conclusions must be traces of reducing sugars

\* Wrong procedures, deny observation and conclusion marks

c) Roots

- Presence of reducing sugars translocated from the bulb/aerial Leaves, for provision of energy/respiration for growth and development/respiration for growth and development/metabolic activities.
- Absence of starch because roots are not a storage organ.

ii) Bulb

- Presence of reducing sugars translocated from aerial leaves, for storage to be stored.
- Absence of starch because fleshy leaves of the bulb do not store starch (Stores Volatile oils)

Aerial leaves

- Presence of reducing sugars due to photosynthesis
- Absence of starch because the reducing sugars had not been converted into starch.