BIOLOGY PAPER 231/2 K.C.S.E 2004
PRACTICAL MARKING SCHEME.

1. You are provided with specimens labeled j1, j2, K1 and K2. Examine them
   a) With a reason, name the order to which specimens J1 and 72 and K1 and K2 belong. (4mks)
      J1 and J2 Rosales / Dicotyledonae
      Reason Net veined / Net venation / two cotyledons / reticulate / tap root system / petiole
      K1 and K2 Parallel veined /parallel venation / one cotyledon / fibrous Root system / sheath.
   b) i) Name the curved part of specimen J1
      Hypocotyl; (correct spelling) (1mk)
      ii) What is the importance of the curvature? (1mk)
      Protects plumule / shoot tip / first foliage leaves / opens space through the soil for cotyledons to pass.
   c) Explain how the curve part in J1 will straighten so that the stem will look like that of J2 (4mks)
      Exposure of curvature to light, auxius migrate to lower side/ opposite side; Faster growth of cells on lower side/ opp. Side; hence stem straighten; (Straightening tied to fasten growth)

d) Name the part that protects the plumule is specimen k1 and k2 (1mks)
   Coleoptile ; rej cover or coat.

e) i) Which of the two types of seedlings may form swelling on the roots later in its life?
   ii) What is the name of the swelling? (1mks)
   Nodules / roots nodules;
   iii) Name the organisms that would be found in the swellings.(1mk)
   Rhizobium / Renizobia / Rhizobium bacteria / nitrogen bring bacteria; rej; bacterial nodules;
   iv) Explain the relationship that exists between the named organisms and the plant.

f) i) Name the structures found on the stem just below the leaves of specimen J2 (1mk)
   Cotyledons / seed leaves
   ii) State two functions of the structures named in (f)(i) above (2mks)
   Photosynthesis; stores food; rej; provides food alone acc. Provide for germinating seedling / youth plants.

g) i) State the types of germination exhibited by specimen K1 and k2 (1mk)
   Hypogeal;
   ii) Give a reason for your answer in (g)(i) above (1mks)
   remains of fruit / grain /cotyledon underground /remains of endosperms;

h) Name the root system found in specimens J1 and J2 (1mks)
   Taproot (system)
   K2 and K2
   Fibrous root (system)

2. You are provided with specimen labeled M and N. Examine them
   a) Identify the specimens and in each case give two reasons for your answer. (6mks)

i) Specimen M Lumbar vertebra / vertebrae Rej; lumbar alone /bone
Reasons 1. Wide / large / broad centrum rej; Thick
2. Long/ broad to process; presence of metapophysis; Anapophysis; broad / wide neural spine

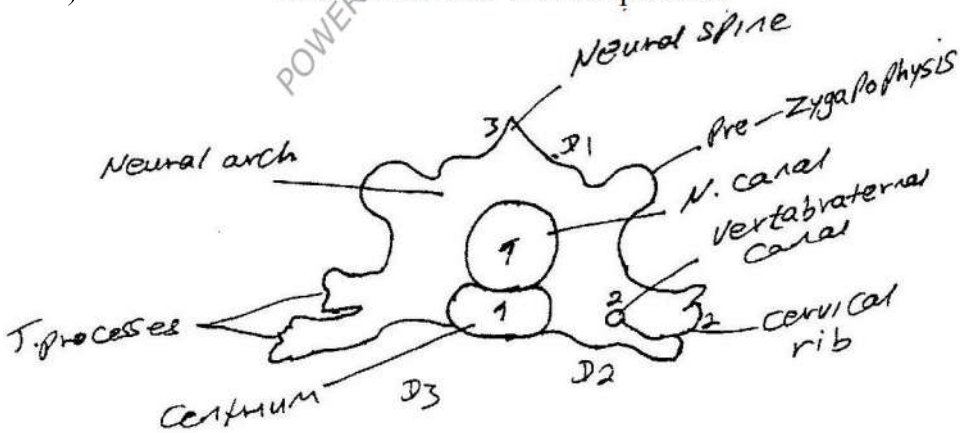
ii) Specimen N cervical vertebral / cervical bone
Ref; Cervical alone or cervical bone
Reason 1. Point / short / small neural Spain;
2. Presence of vertebraterial canals;
Winged forked / branched / divided to. Processes;
Presences of cervical ribs.

b) State four ways in which specimen N is adapted to its functions (4mks)
- Presence of neural canal for passage of spinal cord;
- Neural spine for attachment of muscles;
- Transverse protest for attachment of muscles;
- Facets for articulation with other vertebrae;
-Vertebraterial canals for passage of blood vessels & (nerves) and neural arch & centrum for protection of spinal cord
(Both indicated; first four.

c) State four differences between specimens M and N.

M	N
Canals absent	Veterbraterial canals present
Large / long / un F/B /D T.	Processes
Processes small / short / transverse	Neural spine small / narrow.
Presence of meta / anapophysis	Absence of metapophysis / anapophysis.
Cervical ribs absent	Cervical ribs present
Neural canal narrow	nueral canal wide.

d) Draw and label the anterior view of specimen.



D1 Complete outline & proportionality – Centrum smaller than Neural canal / No shading

D2 T processes should be forked / Veterbraterial columns near centrum / fairly identical.

D3 Centrum & neural spine properly drawn.

3. You are provided with a specimen labeled Q and hydrogen peroxide.

a) i) What part of plant is specimen Q? (1mk)
Stem tuber / stem;

ii) Presence of buds / presence of scale leave;
Acc. Lateral buds / Rej. Scaley leaves, swollen with food, lenticels.

b) State two roles played by specimen Q in the life cycle of plant from which it was obtained. (2mks)
Food reserve / storage organ / provide food during sprouting.
Ref. Provide food alone / Reproduction organ / parenting organ used for vegetative reproduction.(OWWTE)

c) Cut two equal cubes whose sides are about 1cm from specimen Q. Place one of the cubes into a boiling tube labeled A. Crush the other using pestle and mortar. place the crushed material in another boiling tube labeled B.
To each boiling tube add 4ml of hydrogen peroxide.

i) Record your observations. (2mks)
In A – Less / few bubbles / slow effervescence / fizzing / froth
In B – Rapid bubbling / effervescence / fizzing / froth / foam.

ii) Account for the results in (c)(i) above. (2mks)
Large surface area in B than in A, for enzymatic activity in T.T.B

iii) Write an equation for the breakdown of hydrogen peroxide. (1mk)
$2H_2O_2 \longrightarrow 2H_2O + O_2$(must be balanced)
With or without enzyme over water.
Bubbles because of enzymatic reaction.

d) Peel half of specimen Q and crush in a motar. Use the reagents provided to test for the various food substances in the extract obtained from the crushed material.

Record the procedures, observations and conclusions in the table below.(9mks)

Food substance	Procedure	Observations	Conclusion
Starch	Add a drop of iodine solution	Blue black colour (brown to blue acc.	Starch present
Reducing Sugars	Add benedicts soln & boil/heat/warm. Acc. Hot water bath.	(i) Green (Colour) (ii) Yellow Orange (colour) Rej. Brown	Traces / little reducing sugar present. Reducing sugar present.
Protein	Add NaOH, followed by $CuSO_4$	No colour change / blue / colour remain Light purple/Violet / purple	Proteins present Proteins present.