## K.C.S.E 2004 BIOLOGY 231 / 1

## QUESTIONS

## Section A (20 mks)

1.a) Name the cartilage found between the bones of the vertebral column(1mk)
b) State the function of the cartilage named in (a) above (1mk)
2. Distinguish beetween natural and acquired immunity
3. How is aerechyma tissue adapted to its function
(2mks)
4. Other thay carbon dioxide, name other products of anaerobic respiratfơn $(2 \mathrm{mks})$
5. During which phase of meiosis does crossing over occur. (2mks)
6. The ${ }^{5}$ diagram below shows the position of an image formed in a defective eye.

b) Explain how the defect named in (a) above can be corrected 2 mks )
7. State the function of the organelles:
a) Lysosomes
b) Golgi apparatus
8. Name the class in the phylum arthropoda which has the largest number of individuals?
(1mks)
9. Name two mineral elements that are necessary in the synthesis of chlorophyll. (2mks)
10. How are the xylem vessels adapted for support? (1mk)
11. Fruit formation without fertilization is called

## SECTION B ( 40 MKS)

12. Across between a red flowered plant and white flowered produced plants with pink flowers.
Using letter R to represent the gene for red colour, and W for white colour
a) What were the parental genotypes (1mks)
b) Workout a cross between F1 plants
c) Give the i) Phenotypic ratio of $\mathrm{F}_{2}$ plants (1mk)
ii) Genotypic ratio of $\mathrm{F}_{2}$ plants ( 1 mk )
d) Name a characteristic in humans, which is controlled through a mammalian heart?
13. The diagram below shows a verićal section through a mammalian heart.

a) Name the parts labeled A,B,E and F (4mks)
b) Use arrows to show the direction in which blood flows in the heart. (2mks)
c) Give a reason why the wall of chamber C is thicker than chamber D
14. a) What is the difference between Darwinian and Lamarckian theories of evolution?
(2mks)
b) What is meant by the following terms? Give an example in each case.
i) Homologous structures
ii) Example
iii) Vestigial structures

Example (6mks)
15. a) Give the differences between the following structures in wind and insect pollinated flowers.
i) Anther
ii) Pollen grains
iii) Stigma
(1mk)
b) What is the importance of cross pollination?
c) Explain how a seed is formed after an ovule is fertilized ( 4 mks )
16. a) What is diffusion
(2mks)
b) how do the following factors affect the rate of diffusion?
i) Diffusion gradient
(1mk)
ii) Surface area volume ratio (1mk)
iii) Temperature (1mk)
c) Outliner three roles of active transport in the human body (3mks)

Answer question 17. (Compulsory) in the space provided and either question 18 or 19 in the spipaces provided after question 19.
17. During germination and growth of a cereal, the dry weight of endosperm, the embryo and total dky weight were determined at two - day intervals.
The results are shown in the table below.

a) Using the same axes, draw graphs of dry weigh of endosperm, embryo and the total dry weight against time
(7mks)
b) What is the total dry weight on day 5 ?
c) Account for:
i) Decrease in dry weight of endosperm from day 0 to 10 ( 2 mks )
ii) Increase in dry weight of embryo from day 0 day $10 \quad(2 \mathrm{mks})$
iii) Decrease in total dry weight from day 0 to day 8
iv) Increase in total dry weight after day 8

Dormancy.
i) Within a seed
ii) Outside the seed
e) Give two characteristics of meristematic cells
18. How is the mammalian skin adapted to its functions?
19. Explain how a biotic factors affect plants

## BIOLOGY PAPER 231/2 K.C.S.E 2004 <br> PRACTICAL MARKING SCHEME.

1. You are provided with spegimens labeled $\mathrm{j} 1, \mathrm{j} 2, \mathrm{~K} 1$ and K2. Examine them a) With a reason, name the order to which specimens J1 and 72 and K1 and K2 belong. $5^{\text {e }}$
( 4 mks )
J1 and J2 Rosales / Dicotyledonae
Reason Net veined / Net venation / two cotyledons / reticulate /
$\Delta{ }^{\wedge}$ tap root system / petiole
K1 and K2 Parallel veined / parallel venation / one cotyledon / fibrous Root system / sheath.
b) $\times 1$ ) Name the curved part of specimen J

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
Cotyledons / seed leaves
ii) State two functions of the structures named in (f)(i) above ( 2 mks ) Photosynthesis; stores food; rej; provides food alone acc. Provide for germinating seedling / youth plants.
g) i) State the types of germination exhibited by specimen K 1 and $\mathrm{k} 2(1 \mathrm{mk})$ 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.
( 6 mks )
i) Specimen M Lumbari vertebra / vertebrae Rej; lumbar alone /bone Reasons 1. Wide / large / broad centrum rej; Thick 2. $\% \mathrm{ng} /$ broad to process; presence of metapophysis; $4 x^{2}$ Anapophysis; broad / wide neural spine
ii) Specimen N cervical vertebral / cervical bone

Ref; Cervical alone or cervical bone Ręăson 1. Point / short / small neural Spain; 2. Presence of vertebraterial canals; Winged forked / branched / divided to. Processes; Presences of cervical ribs.
b) $x$ State four ways in which specimen $N$ is adapted to its functions ( 4 mks ) - 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
Canals absent
Large / long / un F/B /D T.
Processes small / short / transverse
Presence of meta / anapophysis
Cervical ribs absent
Neural canal narrow

Veterbraterial canals present Processes
Neural spine small / narrow.
Absence of metapophysis / anapophysis.

Cervical ribs present 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 specimên labeled $Q$ and hydrogen peroxide.
a) i) What part of plant is specimen Q ?
(1mk)
Stem tuber / stem;
ii) Presence of buds $\mathcal{A}$ 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.
( 2 mks )
Food reserve $\geqslant /$ storage organ / provide food during sprouting.
Ref. Provid, food alone / Reproduction organ / parenting organ used for vegetative reproduction.(OWWTE)
c) Cutatwo equal cubes whose sides are about 1 cm 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 4 ml 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) $2 \mathrm{H}_{2} \mathrm{O}_{2} \longrightarrow 2 \mathrm{H}_{2} \mathrm{O}+\mathrm{O}_{2}$ (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 <br> substance | Procedure | Observations | Conclusion |
| :--- | :--- | :--- | :--- |
| Starch | Add a drop of <br> iodine solution | Blue black <br> colour (brown to <br> blue acc. | Starch present |
| Reducing <br> Sugars | Add benedicts <br>  <br> boil/heat/warm. <br> Acc. Hot water <br> bath. | (i) Green <br> (Colour) <br> (ii) Yellow <br> Orange (colour) <br> Rej. Brown | Traces / little <br> reducing sugar <br> present. <br> Reducing sugar <br> present. |
| Protein | Add NaOH, <br> followed by <br> CuSO4 | No colour <br> change / blue / <br> colour remain <br> Light <br> purple/Violet / <br> purple | Proteins <br> present <br> Proteins <br> present. |



