BIOLOGY PAPER 231/ 1 K.C.S.E 2002
MARKING SCHEME

1. Cephalothorax; prosona
2. a) Rhizobium Nitrogen fixing bacteria
   b) Symbiosis / mutualism
3. a) Substances that activate enzymes
   b) Metallic ions e.g. iron / mg / Zn / Cu /(accept correct iron forms)Fe 2+, Mg2+, Ca2+, Mn2+, Co2+ , Kl, mo2+, (Reject wrong charges).
4. Endosperm material was being oxidized / hydrolyzed / converted into new cytoplasm new material for growth / food used for growth.
5. High yielding / hybrid vigor / heterosis; resistance to decrease early maturity. Resistance to drought / salinity.
6. Oxyhaemoglobin acc. HbO2 / HbO
7. Cattle are mainly grazers while others are browser.
8. a) Ball and socket
   b) Hinge
9. Stomata, lenticels: (reject cuticle)
10. Converted into fatty acids and stored beneath skin (adipose tissue)
11. Y CHROMOSOME
    Tuft and hair sprouting from pinna / baldness; hairy pinna;

    X CHROMOSOME
    Colour blindness / haemophilia.
12. a) A A photosynthesis
       B Decomposition / decay
       C Respiration
    b) X Bacterial
       Y Fungi
    c) Regulate the CO2 in the atmosphere.
13. a) Meiosis
    b) Ovary
    c) parent must be the 2n top; any 'n' is a gamete
    d) Non – dysfunctions
    e) increased yields / highbred Vigor, Resistance decreases Resistance to drought.

14. (a) Emergence of present fauna and flora/ new life Term/ species/ organisms from pre-existing forms gradually over a long period of time.

    (b) Standing upright/ erect posture. Higher intellectual capacity/ higher brain/bigger capacity; communication through language speech.

    (c) Divergent basic structural form is modified to serve different functions; e.g. vertebrate forelimbs, break structure in birds/ feet in birds' convergent different structures are modified to pass or similar functions e.g. wings and birds and insects/ eye of human and octopus, vertebrates for humans e.g. squeal, legs of vertebrae and insects .

15. (a) Genus
(b) Ileum/ colon/ duodenum/ intestines/ of humans or intestines of pig
(c) Lack of elaborate elementary canal (simple guts) can tolerate raw corn
Thick cuticle pellicle, reject the outer covering lays many eggs
Mouthparts for sucking partly digested food

16. (a) R. Sieve pore
S- cytoplasmic strand, cytoplasmic filaments rej. Proto plasmic strand)
Cell labeled T
(b) Translocation (L is tied with structures)
(c) Thickened and lignified.

17. (a) Bulbils/ suckers, Aerial tubers
(b) Plant with desired qualities is able to grow on an established root system which lack desired qualities
(c) Early maturity/ short life span
Good qualities of parents are retained
Independent of fertilization/ pollinated dispersal
Large areas covered in a short time have large store of food

18. (a) – For exchanged axis award maximum 3 marks for points x identity
The scale must however be correct. For graphs on separate axis mark both and award the highest mark.

(a) Axis = 2
(b) Scale = 1
(c) (plotting) = 1
(d) curves) = 1

(b) X = 120 + -3)
Y = 140 + -3

(c) Person X is capable of regulating glucose while person y is likely to be diabetic.
X – Insulin

(d) X insulin released, excess glucose is converted into glycogen (in liver) must be mentioned if insulin is not mentioned
Y Insulin not released, thus the decline is due to glucose being released in urine.

(e) A.T.P / Adenosine triphosphate

(f) Deaminated; resulting in formation of ammonia
Ammonia combines with CO_2 to form urea (and H_20); Urea is passed out in Urine carbohydrate group is oxidized/ stored as glycogen

19. - Indole acetic acid/IAA/ Auxins

- Promote cell division tropic responses, (accept cell division in cambium)
- Promote formation of absecission layers/ bring abrupt leaf – fall
- Promote fruit formation (parthenocarpy)
- Promotes cell differentiation (of vascular tissue)
- Causes apical dominance/ inhabit growth and development of lateral buds
- Promote growth of adventitious roots (on stems)
- IAA + cytokine induce formation of callus tissue (during healing of wounds)
  N.B if this point for cytokines it should be marked

GIBBECETINS (accept GA3)

- Promotes cell division / cell elongation in dwarf varieties
- Parthenocapy/ initiating formation of IAA/ setting of fruits after fertilization
- Formation of side branches (of stems) and dormancy (in buds); inhibit growth of adventitious roots.
- Activates (hydrolytic) enzymes during germination/ promotes germination of seeds/ breaks seed dormancy.
- Affects leaf expansion and shapes / retard leaf absecission

CYTOKININS' Accept any correct example kinetin 8 zeatin

- Breaks dormancy (in some species); promotes flowering in some species
- Promotes cell division (in presence of IAA)
- Stabilizes proteins and chlorophyll
- Promotes root formation
- Low concentration encourages leaf senescence/ high concentration protein increased cell enlargement
- Promotes flowering (in some species)

Ethylene / Ethene / C2114 (reject ethane)

- Stimulate lateral bud development
- Ripening of bananas/ fruits
- Induces thickening of stem/ inhabits stem elongation
- Promotes germination of certain seeds/ acc promotes flowering in pineapples
- Causes abscission pf leaves/ fruits/ leaf fall abscisic acid / ABA
- High concentration of ABA stomata closure (by interfering with uptake of potassium ions
- Inhibits germination/ growth of embryo/ cause seed dormancy
- Causes abscission of leaves/ fruits / leaf fall
- Inhibit elongation growth, inhibit sprouting of bud/ induces dormancy in buds (accept Dormin causes/ dormancy in buds/ seeds

Traumatin

- Heal wounds by callus tissue formation

Florigens

- Promote flowering

1. (a) **Hydrostatic**
    - Exoskeleton
    - Endoskeleton

(b) Cervical vertabrae

Vertebraterial canals for passage of (vertebral) artery; atlas has (broad) surfaces for articulation with condylyses of skulls to permit nodding

- Axis has adenoid process/ protein Centrum to permit rotary/ turning act as a pivot for atlas/ skull/ movement of atlas/ Branched / forked/ short/ broad transverse processes, for attachment of (neck) muscles; ace zygopophysis, for articulation between vertebrae (acc. Vertebraterical canals and zygopophogen if shown on a diagram of the vertebrae
- Has a short reduce neural spine, for attachment of (neck) muscles, has wide / larger neural canal; for passage of spinal cord/ alternatively has wide neural for protection of spinal cord.

Lumbar

- Broad/ long/ neural spine for attachment of (powerful back) muscles long/ large/ well development/ transport processes for attachment of muscles (that maintain posture and flex the muscles)
- Has metamorphosis and hypothesis for muscle attachment large/ thick centrums for support
- Prezygapophysis/ post/ zygapophysis for articulation between vertebrae (acc. Anapophysis for hypopyses)

<u>Sacral Vertebrae</u>

- Anterior vertebrae has a well developed transverse process, which are fused to the pelvis girdle/ articulate with pelvic girdle
- Vertebrae fused, for strength transmit weight of the stationary animal to the rest of the body.
- Sacrum has a broad base/ short neural spine; for attachment of (back)