

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. squal, 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_2O); 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 abscission layers/ bring abrupt leaf – fall
 - Promote fruit formation (parthenocarpy)
 - Promotes cell differentiation (of vascular tissue)
 - Causes apical dominance/ inhibit 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

GIBBERELLINS (accept GA₃)

- Promotes cell division / cell elongation in dwarf varieties
- Parthenocarpy/ 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 abscission

CYTOKININS' Accept any correct example kinetin & 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 / C₂H₄ (reject ethane)

- Stimulate lateral bud development
- Ripening of bananas/ fruits
- Induces thickening of stem/ inhibits stem elongation
- Promotes germination of certain seeds/ acc promotes flowering in pineapples
- Causes abscission of 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)

Traumatins

- Heal wounds by callus tissue formation

Florigens

- Promote flowering

1. (a) **Hydrostatic**

- Exoskeleton
- Endoskeleton

(b) **Cervical vertebrae**

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

- Axis has dens process/ dens 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; zygapophysis, for articulation between vertebrae (acc. Vertebral canals and zygapophysis if shown on a diagram of the vertebrae)
- Has a short 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 hypophysis for muscle attachment large/ thick centra for support
- Zygapophysis/ post/ zygapophysis for articulation between vertebrae (acc. Anapophysis for hypophyses)

Sacral Vertebrae

- Anterior vertebrae has a well developed transverse process, which are fused to the pelvic 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)