BIOLOGY PAPER 231/1 K.C.S.E 2000
MARKING SCHEME

1. *(a) Cones*
   Discrimination of colours/ details/ accurate/ vision colour perception/ sensitivity to high intensity/ bright
   (b) Rods
   Dim light vision/ low light intensity

2. *Due to stiff competition of resources leading to elimination/ exclusion of one species; acc. Currently named example food*
3. *Presence of Rhizoids*
   -Lack of vascular tissue/ absence of both xylem and phloem
   -Body parts not differentiated/ not organized into roots, stem and leaves.
4. *– Brewing industries; baking*
   - Manufacture of medicine/ antibiotics
   - Food e.g. mushrooms yeast also provides vitamin B, and B2
5. *– Maintenance of constant levels of water/ salt/ ions/ osmotic pressure/ for optimum conditions of metabolism/ cellular functions*
6. *– Attachment of powerful back muscles that maintain posture flex the vertical column/ support viscera/ abdominal organs*
7. *(a) Fossils records*
   Gives evidence of types of plants/ animals/ organism that exist at a certain geological age. Long ago
   Gives evidence of morphological/ anatomical. Structure/ changes that have occurred over a long period of time.
   (b) Comparative anatomy.
   Gives evidence of relationship among organisms
   Gives evidence of common ancestry of a group of organisms; e.g. structural/ functional relationship among organization
8. *Oxygen is required for respiration that produces energy necessary for active transport e.g. oxidation of food for respiration*
9. *The adult and larvae exploit different food/ don't compete for food/ pupa can survive adverse conditions/ pupa being a non- feeding state enables organisms to go through adverse conditions*
10. *– Curved/ sharp/ hooked strong beaks fro killing / tearing/ ripping off flesh from bones*
    - *Curved/ strong/ sharp claws for grabbing/ holding prey*

SECTION B

11. *(a) X– Spongy mesopyll (cell) layer*
    (b) Y – Cuticle
    (c) Broad/ flat leaf (lamina) to provide large surface area or absorption of gases
    Thickness: allow gases to pass though fast
    Presence of stomata for efficient diffusion of gases
    Presence of air spaces for easy defuses

12. (a) RR and rr

(b) (i) red

(ii) complete dominant; i.e Rd dominant/ white recessive

(c) Ratio of filial generation: 3: 1

(I.e. in every 4 flowers 3 are red 1 is white

Therefore 480 red flowers means ¾ of the total number

Total number of flowers $\frac{480 \times 4}{3} = 640$

So ¼ of 640 flowers are white in F_2 *plants*

¼ x 640 = 160 flowers

13. (a) Heat loss by conduction/ convection from the blood vessels
The body skin to the cold water, the cooler blood leaving skin enters general circulation cooling the whole body.

(b) Vasoconstriction; thus less blood flowing to the skin reducing heat loss.
Sweating eases heat produced through metabolism
Accept shivering producing heat

14. (a) Crop
Potatoes / tomato
Disease
Tomato/potato bright/ Acc. Tomato rot

(b) Use of fungicides
Eradication of infected crop/ uprooting/ burning of infected plants
Use biological control
Use of disease resistant varieties
Crop rotating

*15. (a) (i) 78/78 mg/ 100*cm^3
(ii) 8.5^{th} *and* 29.5^{th} */ 8min 30 sec and 29 min 30 sec*
(iii) 47 mg/100cc; Acc. 47

(b) - The demand for oxygen is more than the supply
- leading to anaerobic respiration. Acc. Lactic acid converted to glucose/Glycogen

(c) Lactic acid is oxidized (to form CO_2 *and* H_2O*)*
Acc. Lactic acid is converted to glucose/ glycogen

16. (a) Genetic variation/ hybrid/ crossbreed

(b) favorable characteristics of parent remained
Exploit parents favorable conditions
Acc. New plants adapts parental favorable conditions
Short life cycle/ early maturity/ faster reproduction
Large store of food supply
Independent of two parental/ organisms reproduces without another fertilization/ pollination

17. (a) (i) Goat
(ii) It is a grazer and a browser
(b) Insufficient grass in bush/ aren't adapted to eating twigs/ not browsers/ are grazers
(c) (i) Domestic animals - total counts
Wild animals – total counts; aerial counts/ quadrat/ Belt transect/ capture/ recapture
(ii) Analyzing gut counts, studying dentition/ breaks/ claws/ parts

(d) Observation
Examine droppings
Dissecting a sample of animals/ study structure/ nature of digestive System/ size of caecum/ length of intestine/ chamber
(e) Irrigation
Competition; diseases
Predation; human activity/ man accept any correct
Parasitism
(f) Poaching, cropping/ culling/ licensed spot hunting
(g) Pollution; translocation
Burning trees, charcoal- deforestation

18. Inferior lobe of pituitary gland secretes F.S.H which causes grafian follicle develops in the ovary. It also stimulates ovary tissue/ ovary/ follicle walls secret estrogen which repairs, heals uterine wall, oestrogen stimulates inferior lobe of pituitary gland produce L.H. for ovulation. It also causes grafian follicle change into corpus interim L.H stimulates corpus luteum secret progesterone which causes proliferation of the uterine walls; in preparation of implantation; oestrogen/ progesterone inhibits the production of F.S.H (by anterior lobe of pituitary) thus no more follicle develop; and oestrogen production reduces; 14 days later progesterone level rises inhibits production of L.H from anterior lobe of pituitary gland produce L.H for ovulation. It also causes grafian follicle change into corpus interim L.M stimulates corpus luteum secret progesterone which causes proliferation of the uterine walls in preparation of implantation; oestrogen/ progesterone inhibits the production of F.S.H (by anterior lobe of pituitary) thus no more follicle develop; and oestrogen production reduces; 14 days later progesterone level rises inhibits production of L.H from anterior lobe of pituitary gland/ The corpus luteum stops secreting progesterone, and menstruation occur when the level of progesterone drops; (anterior lobe of pituitary starts secreting F.S.H again.

19. Broad/ wide/ flat lamina provides large surface area for absorption of (O) and sunlight, thin to ensure short distance of CO_2 reach photosynthesis/ palisade cells; presence of stomata guard cells for efficient diffusion of O_2 gaseous exchange / H_2O vapour transpiration/ CO_2 into the leaf transparent cuticle epidermal cells; for light penetration into palisade cell which contains chloroplast next to upper epidermis; these receives maximum light for photosynthesis. Chloroplasts have chlorophyll, which traps light energy.

Leaves have vein, xylem and phloem to transport products of photosynthesis to other part of the plant.
Air spaces on spongy mesopyll, easily circulates gases/ CO_2 diffuse into palisade cells.
Mosaic arrangements of leaves; enable leaves to trap sunlight.