BIOLOGY PAPER 1

(231 / 1)

MARKING SCHEME

1. At anaphase 1 ; (1 mk)

2. Plants lack specialized excretory organs /waste products diffuse out or accumulate in certain plant parts (esp. leaves and fruits) which fall off while animals have highly developed excretory organs (e.g. mammalian kidney) which remove wastes as soon as they are formed ; (1mk)

3.Herbacious plants have parenchyma tissues ; when the tissues are turgid , they provide mechanical support ; (2 mks)

4. a) B – Gill rakers ; protect the delicate gill lamellae from damage by solid particles ; (2 mks)

b) Ensures that as blood gets progessively oxygenated ,it meets water that is progressively richer in oxygen ; therefore there is continous diffusion of oxygen from water into the blood ; blood that leaves the gills has almost the same concentration of oxygen as the water that enters the gills ; (2 mks)

5. a) 1) Nucleotide ; (1 mk)

2) A 5- carbon sugar (Deoxyribose) ;

Phosphate group ;

Organic nitrogenous base ; (3 mks)

b) Down's syndrome

Klinefelter's syndrome

Turner's syndrome

Mark the first (1 mk)

6.Their walls are made up of an endothelium only which allows part of blood to move into the intercellular space ;

Are numerous thus creating a large surface area for exchange of materials ;

Have narrow lumens that maintain high blood pressure ;

Have sphincter muscles at the arteriole end which enables regulation of blood flow ; (1 mk each total 4 mks)

7. Stimulate cell division ,elongation and differentiation ;

- Responsible for tropisms ;
- Stimulates growth of adventitious roots ;
- Stimulates parthenorcarpy ;
- Stimulates apical dominance ;
- Callus tissue formation / wound healing ;
- In presence of cytokinins it initiates cell division at the cambium ; (3 mks)

8.a) Mitochondria ; (1 mk)

b) Chloroplasts ; (1 mk)

9. Tick population has different strains ; some strains have a gene that makes them neutralize the effects of the acaricide ; this gives them a selective advantage which enables them to survive ; reproduce and transmit the gene to their offspring ; over time the population of this resistant strain has increased and spread across the Kenyan farmlands ; (4 mks) O.W.T.T.E.

10. a) A basal metabolic rate is the minimum amount of energy that an organism requires at rest to maintain life processes. ; (1 mk)

b)

Aerobic Respiration	Photosynthesis
Takes place in both plant and animal cells	Takes place only in plant cells with chlorophyll ;
Continues both in presence and absence of light	Takes place only in presence of light ;
Uses oxygen	Releases oxygen ;
Releases carbon (iv) oxide and water	Uses carbon (iv) oxide and water ;
Takes place in mitochondria	Takes place in chloroplast ;
Leads to breakdown of complex organic food molecules into simple inorganic compounds	Leads to synthesis of complex organic molecules from simple inorganic compounds ;
Releases energy	Stores energy in chemical bonds of complex organic molecules ;

11.Boiling / chlorinating domestic water ;

Proper disposal of human waste ; (2 mks)

12. a) The insects that carry out pollination are attracted by the smell from the flowers , this may lead to pollination. (1 mk)

b) No; it is a passive process where particles move along a diffusion gradient (1 mk)

(b) tied to (a)

13. Ciliary muscles relax ;

- Ligaments become taut ;
- Lens decrease curvature /lens becomes thinner ;
- Radial muscles of iris contract ,circular muscles relax ;
- Pupil size enlarges ; (4 mks)

14. a) X – oestrogen ; (1 mk)

Y – progesterone ; (1 mk)

b) Repair and healing of endometrium ;

Stimulates pituitary glands to secret LH ; (2 mks)

c) FSH causes development of Graafian follicles ;

Stimulates the cells on the wall of the Graafian follicle to secret oestrogen (2 mks)

d) Triggers ovulation; (1 mk)

e) 12^{th} to 16^{th} day after the onset of menstruation ; (1 mk)

15. a) Arthropoda ; rej. If A is small. (1 mk)

b) Have jointed appendages ;

Have exoskeleton made of chitin ;

Have segmented body ; (3 mks)

(b) tied to (a)

c) Crustaceans have two pairs of antennae while arachnids have none ; (1 mk)

16. a) Field of view diameter = 4 mm

Number of cells found = 16

Cell size = $\frac{\text{Diameter of field of view}}{\text{Number of cells}}$;

$= \frac{(4 \times 1000)}{16 \text{ cells}}$ micrometers ;

=250 micrometers ; (3 marks)

b) $\frac{150 \times 100}{450}$; = 33 cells ; (2 marks)

17. a) Inner thick wall and outer thin wall which result into unequal expansion causing opening and closing of stomata ;

Presence of many chloroplasts for photosynthesis ;

Curved / bean shape ;

(first 2) (2 marks)

b) Permits escape / loss of water vapour from the leaf by transpiration ; (1 mark)

18. a) The shoot will have curved upwards while roots will have curved downwards ; gravity causes auxins to accumulate on the lower side of the root and the shoot ; in shoots higher concentration of auxins stimulated more elongation of cells on the lower side causing an upward curvature ; in roots higher concentration of auxins on lower side causes inhibition of cell elongation , resulting in downward curvature ; (4 marks)

b) Both the root and shoot continued growing horizontally ; the rotating klinostat prevents accumulation of auxins on one side ; the uniform distribution of auxins bring about uniform growth on all sides of both the shoot and the root ;

O.W.T.T.E (3 Marks)

19. a) Platelets / thrombocytes ; (1 mk)

b) Calcium ion / Ca^{2+} ; (1 mk)

c) Fibrin ; (1 mk)

20. (i) Inhibits metamorphosis ; (1 mk)

(ii) Prothoracic gland ; (1 mk)

21. Ornithology (1 mk)

22. Epigeal germination occurs when cotyledons come above the ground, while hypogeal germination occurs when the cotyledons remain below the ground.

(2 mks)

23. A baby gets antibodies made by the mother's immune system from breast milk. A baby may also be given artificially prepared antibodies through injection.

Naturally acquired through previous injection and recovery from a disease. (First 2) (2 mks)

24. Residual capacity- amount of air that remains in the lungs after maximum expiration.

Vital capacity – total amount of air that can be exhaled after taking the deepest possible breath (= 4500 cubic cm).

25. pooter (1 mk)

Sweepnet (1 mk)