

**34.4 BIOLOGY (231)**

**34.4.1 Biology Paper 1 (231/1)**

**231/1**

**BIOLOGY**

**Paper 1**

**MARKING SCHEME**

**Oct./Nov. 2005**

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**  
**Kenya Certificate of Secondary Education**

**BIOLOGY**  
**Paper 1**

**SAMPLE MARKING SCHEME**

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### SECTION A: (20 MARKS)

1. Posture balance; 1 mark
2. (a) X is chloroplast; 1 mark  
Y is vacuole/sap vacuole; 1 mark  
(b) obtain optimum/maximum light intensity 1 mark
3. (PHELOEM) - Translocates food to different parts of the plant; 1 mark  
(XYLEM) - Transports water and mineral salts to the leaves for photosynthesis 1 mark  
- Support and positions the leave (lamina) for photosynthesis; protein synthesis/lipids synthesis; 1 mark
4. (a) Organic evolution is the emergence of present forms of organisms gradually from pre-existing ones (some of which no longer exist); 1 mark  
(b) Continental drift is the drifting apart of the continents from one land mass;
5. Arachnida; 1 mark
6. Lactic acid; 1 mark
7. Absorption of water (from soil); 1 mark  
Movement of water from cell to cell; 1 mark  
Mechanical support due to turgidity; 1 mark
8. Immature embryo; 1 mark  
impermeable seed coat; 1 mark  
Growth inhibitors; 1 mark
9. It does not easily dissociate; thereby reducing the capacity of haemoglobin to transport oxygen; 2 marks
10. *Entamoeba histolytica*/Entamoeba 1 mark

### SECTION B: (40 marks)

11. (a) W - (thoracic) Vertebra; 3 marks  
Y - Sternum/sternabra(e)  
Z - Intercostal muscle;(external/intercostals muscle
- (b) External intercostals muscles (Z) contract raising ribs/ribcage upwards and outwards;  
Thoracic cavity increases in volume;  
Thus the pressure in the cavity is reduced and air is forced into the lungs; 3 marks  
a & b = (6 marks)

12. (a) 3.15:1; 1 mark
- (b)(i) Parents Rr X rr:
- Gametes
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- Offsprings Rr Rr rr rr; 4 marks
- (ii) 1 : 1; Rr : rr = 1 : 1  
1 : 1 1 mark
- (c) Alternative forms of a gene controlling a particular characteristic; 1 mark  
(Total 7 marks)
13. (a) E - Malpighian layer;  
F - Nerve ending;  
G - Erector muscle 3 marks
- (b) - (Sweat) from H evaporates leading to cooling of the body;  
- Removal of excretory products; 2 marks
- (Sebum) from I make hair water repellant/waterproof;  
makes skin soft and supple;  
(Has antibiotic/antiseptic/properties that kill bacteria);  
Kills bacterial; Any 2 marks  
(Total 7 marks)
14. (a) (Rate of) transpiration 1 mark
- (b)(i) - Cut shoot under water; 1 mark  
- Apply petroleum jelly to cork-glass connection; 1 mark  
- Open reservoir tap;
- (ii) - To ensure no air enters leafy shoot; 1 mark  
- To ensure the apparatus is airtight; 1 mark  
- To remove air bubbles from tubes; 1 mark
- (c) - Temperature;  
- Wind;  
- Humidity;  
- Light (intensity) Atmospheric pressure/Air pressure Any three = 3 marks
15. (a)(i) Conditions where other floral are positioned above the ovary; 1 mark
- (ii) Male flower/stamens only/male parts only; 1 mark
- (b) - Large anthers loosely attached to the filaments;  
- To be easily shaken in the wind; 2 marks  
- Small/smooth light pollen grains;  
- To be easily carried by wind; 2 marks  
(Total 6 marks)

16. (a) Bacteria;  
Fungi; 2 marks
- (b)(i) Pasteurization/boiling/ultraheat treatment;  
Food is heated and cooled rapidly to kill micro-organisms;
- (ii) Refridgeration/low freezing;  
Extreme cold – low freezing temperatures render the  
micro-organisms inactive; 2 marks
- (iii) Canning/too high temperature/tinning/bottling;  
Food heated under pressure to kill micro-organisms and sealed in a vacuum;
- (iv) Chemical preservatives/pickling;  
Kill/stop them from multiplying;
- (v) Drying;
- (vi) Tyndylization;
- Any 2 marks  
(Total 6 marks)

### SECTION C (40 mark)

17. (a) Photosynthesis; 1 mark
- (b) Carnivorous; 1 mark
- (c) Aquatic; Terrestrial; 2 marks
- (d) algae → Zooplanktons → Small fish → Bird J → Large Bird; 1 mark
- (e) (i) More snails (for bird M);  
(ii) Hence increase in population of bird M;  
(iii) Green plants reduce; as they are eaten by more snails;  
(iv) Population of large birds may remain constant/decreased  
/or increased. 3 marks
- (f) Energy is lost through respiration; egestion; excretion 3 marks
- (g)(i) Bacteria;  
Fungi; 2 marks
- (ii) Decomposition; 1 mark
- (h)(i) Pollution; farming; fishing;  
Deforestation; poaching;  
Introduction of new species;
- (ii) Farming causes eutrophication Any 3 = 3 marks

Pollutants would kill the organisms;  
 Introduction of new species lead to competition/predation;  
 Poaching reduce population of organisms;  
 Deforestation causes soil erosion/nesting/perching sites/ food sources destroyed.

Any 3 = 3 marks

18. Gaseous exchange takes place in spongy mesophyll; During the day air diffuses into large air spaces of spongy mesophyll; through stomata; The carbon dioxide in the air diffuses into photosynthetic cells; in solution form; During photosynthesis  $\text{CO}_2$  is used; while oxygen is produced some of the oxygen is used in respiration; while the rest of oxygen diffuses out of leaf; through stomata; During the night, air diffuses into air spaces; (of spongy mesophyll); The air dissolves into film of moisture; The oxygen in the air diffuses into cells; and is used in respiration; during which carbon dioxide is produced; the carbon dioxide diffuses out of leaf; through stomata; due to diffusion gradient; At night carbon dioxide accumulates in the leaf since photosynthesis does not take place;

Some gaseous exchange also takes place through cuticle; Gaseous exchange occurs through epidermis; (of young leaves and stems). Epidermis of the root carries out gaseous exchange with air in the soil; some plants have breathing roots through which gaseous exchange occurs; Gaseous exchange occurs through lenticels (found on older stems); The cork cells at a lenticel are loosely packed; Gaseous exchange takes place between cork and atmosphere within the loosely packed cells;

(Max. 20 marks)

20. **Sclerotic layer** is made up of collagen fibres; it maintains shape of eyeball; **Cornea** is transparent curved; thus refracts light rays; **Choroids** is (a layer of tissue with) black pigment; prevents internal reflection of light in the eye; contains blood vessels; that supply oxygen/nutrients; **Retina** has rods/cones for colour vision/low light vision; **Yellow spot** has a high concentration of cones; for colour vision; **Blind spot** has no cones and rods; place where optic nerve leave the eye; **optic nerve** has (sensory) nerve fibres; for transmission of impulses to brain (for interpretation); **lens** is made up of elastic; transparent materials; adjust to focus on far or near objects; **Ciliary body** is made up of muscle fibre; which contract and relax to change shape of lens; **Suspensory ligaments** hold the lens in position/attach it to ciliary body; **Iris** is the coloured part of the eye; it has radial and circular muscles; which control size of pupil; **Pupil** is the small hole at the centre of the iris; through which light passes into the eye; **Aqueous humour** is a fluid; through which oxygen/nutrients pass to cornea and lens; maintains shape of eyeball; refracts light rays; **Vitreous humour** is a fluid which maintains shape of eye; refracts light rays.

(Max 20 marks)