KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

NAIROBI HIGH SCHOOL
BIOLOGY
PAPER 2
MARKING SCHEME

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NAIROBI SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016

231/2 – PAPER 2

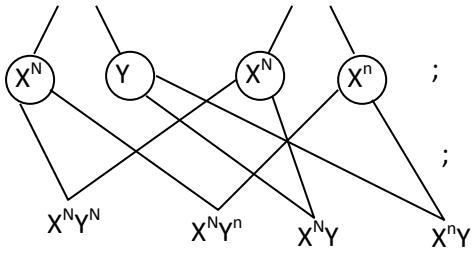
BIOLOGY

MARKING SCHEME

1. (a) B – Sap vacuole/cell vacuole/vacuole; (3mks)
   C – Tonoplast;
   D – Chloroplast;
   (b) Cellulose; (1mk)
   (c) Active transport. (1mk
   (d) The cell sap is hypertonic to distilled water; hence water molecules move into the cell by osmosis; making it swell and eventually burst/get haemolysed; (3mks)

2. (a) I - X^NY; (1mk)
   2 X^NX^n; (1mk)

   (b) X^NY; X X^NX^n ; Parental genotype



   ; Gametes

   ;

   ; Offspring's (4mks)

   (c) A – Non-disjunction;
   B – Translocation; 3mks max (2mks)
   C – Inversion;

3. (a) (i) Structural similarity.
   - Both show the pentadactyl limb structure; (1mk)
   (ii) Adaptational difference.
   - Human arm has five digits separated into four fingers and an opposable thump for grasping;
   - The bat wing has five digits which are long and spread apart to support a large membranous wing for flight; (2mks)
   (b) Different shapes and sizes of beaks in birds;
   Different feet structure in birds; (2mks)
   (c) Chemical evolution explains the origin of life as having occurred when simple chemical compounds reacted to form the simplest life forms; organic evolution is the progressive development of complex organisms from simple pre-existing life forms over a long period of time; (2mks)
   (d) Palaeontology; (1mk)
4. (a) Pituitary gland; (1mk)
   (b) II - Testosterone;
   III - Follicle stimulating hormone;
   V - Luteinising hormone;
   VI - Progesterone; (4mks)
   (c) Sterility/lack of spermatogenesis; failure of secondary sexual characteristics; (2mks)
   (d) Inhibit production of FSH/inhibit production of LH; (1mk)
5 (a) Ascaris; (1mk)
   (b) Intestines of humans/Pig Acc. large intestine/duodenum. (1mk)

(c) Adaptations:
- Has two hosts to ensure survival;
- Lays numerous eggs to increase chances of survival;
- Has thick cuticle which protects it against digestive enzymes of the host;
- Eggs have a protective shell to survive harsh environmental conditions;
- Has tissues tolerant to low oxygen/can survive under low oxygen concentration;
- Produce anti-enzymes to counteract the effect of the host's enzymes;
- Has a muscular pharynx through which it sucks digested food from the host's intestine; Any three (3mks)

(d) Prevention
- Proper sewage disposal/proper use of toilet facilities;
- Maintain proper personal hygiene/washing hands after visiting the toilet;
- Boiling/treating drinking water;
- Proper cleaning of vegetables and fruits; Any three (3mks)

6. (a) Labeling of axis;;
- Scale ; (1mk)
- Curves;; (2mks)
- Plotting points;; (2mks)

(b) 24ºC;

(c) Sweat production increases with increase in temperature; because high temperatures increase the vaporation rate, hence more sweat is converted to water vapour; This uses latent heat of vapourisation from the body causing cooling; (3mks)

(d) An increase in temperature decreases the amount of urine produced;
This is due to increased sweating which raises the osmotic pressure of blood;
A lot of water is reabsorbed into blood in the kidney tubules resulting in the production of little, concentrated urine; (3mks)

(e) Hair - When hot, the erector pili muscle relax; the hair lies that on the skin surface; to reduce insulation and encourage heat loss;
OR - When cold, the erector pili muscles contract; causing hairs to stand; and trap a layer of warm air which insulated the body; (3mks)

Blood verses - When cold blood vessel; constrict (vasoconstriction); Less blood flows near skin surface; reducing heat loss by radiation and convection;
OR - When hot, blood vessels dilate (vasodilatation); more blood flows on the skin surface; increasing heat loss by radiation and convection thus cooling the body; (3mks)

Sweat glands - When hot, sweat is released; it evaporates, taking latent heat of vapourisation from the body; hence cooling it;
OR - When cold, sweat glands release less sweat; there is less evaporation; and hence less heat loss; Total (9mks) max (6mks)

7. - It is muscular/has cardiac muscles; which are myogenic (does not need nervous stimulation) to pump blood;
- It is supplies by vagus and sympathetic nerves; which controls the rate of heart beat; (depending on body's physiological requirements)
- It has tricuspid valves and bicuspid valves; (between atrium and ventricles) which prevent back flow of the blood into the right and left ventricles respectively.
- Present of valve tendons attached to the walls of ventricles and to the atrium ventricular walls; to prevent atria-ventricular valves from due to changes in the pressure in the ventricles;
- Heart is supplied by coronary artery; which supplies food and oxygen to the cardiac

muscle for their pumping action; the coronary vein; in heart removes metabolic wastes;
- The heart is enclosed by the pericardium membrane; that secretes a fluid which lubricates it (reducing friction on the walls as it bumps);
- The heart is divided into two by the atria-ventricular septum; that prevent mixing of oxygenated blood and deoxygenated blood;
- The left ventricles has a thick muscular wall; to pump blood at higher pressure to the distant body issues;
- The outer part of the pericardium has a fatty layer; which act as a shock absorber; keeps the heart in position.
- The Sino Atrial Node (S.A.N) the pacemaker region); which initiate the wave of contraction leading into contraction and relaxation of muscles; the arterial-ventricular node; in the heart spreads out waves of contraction throughout the heart creating the heart beat;

8. - Water exists as a thin film in the soil between soil particles; The concentration of cell sap is greater than that of the surrounding solution in the soil; Thus drawing water molecules across the cell wall and cell membrane into the root hair cells; by osmosis; water drawn into the root hair cell dilutes the cell sap/makes it less concentrated than that in the adjacent cell; water moves into the cortex cells (of the root); across the endodermis by active transport; into the xylem vessels of the root); then conducted up into the xylem (vessels) of the stem; into xylem of leaves; water is pushed/rises up the stem by root pressure; (in the xylem vessels) water rises by capillarity; cohesion; and adhesion forces; water moves as a continuous uninterrupted water column in the xylem vessels up the tree to the leaves.
- As water vaporizes from the spongy mesophyll cells; their cell sap becomes more concentrated than that of the adjacent cells; This increases the osmotic pressure of the spongy mesophyll cells; As a result water flows into the cells from other surrounding cells; which in turn takes in water from xylem vessels within the leaf veins; This creates a pull/sunction force/transpiration pull; that pulls a stream of water from xylem vessels in the stem and roots; The transpiration pull maintains a continuous column of water from the roots into the leaves (transpiration stream);