SCHIOOL BASED FORM FOUR EXAMINATION JULY/AUG 2017
Biology 231/2
Marking Scheme

1. a) - Toi investigate positive phototropism; Rej positive phototrophism/ phototropic.

b)i) – Undirectional light/ illumination cause auxin from the shoot tip to move/ shift to the dark side of the stem; causing faster elongation on that side and hence a growth curvature towards the light;

ii) To rotate the plant allowing equal exposure to light hence equal distribution of auxin;

c)i) Etiolatio;

ii) The shoots grow tall in an effort to obtain light for photosynthesis;

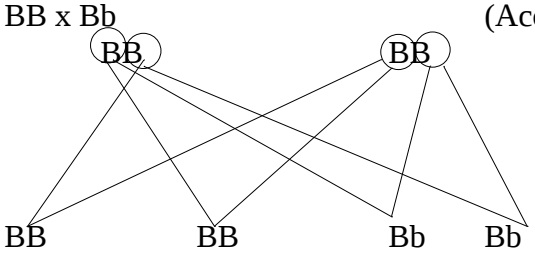
d)

Conditioned reflex action	Simple reflex action
- Dependent on past experience - Response involve secondary motor component (replaces primary motor component)	- Does not require experience - Response involve 3 neuronesi.e sensory, motor and relay (primary motor component is the same always.

2.a) An alternative form of a gene controlling same characteristics/ trait;

b)i) Gene for black colour is dominant over gene for brown colour/ brown colour gene is recessive over gene for black colour;

ii) BB x Bb (Acc. Punnet square)



F2 genotypic ratio 1BB: 1Bb Rej 1 : 1

iii) Downs syndrome; klinefetter's syndrome;
Turner's syndrome;

3.a) Capture – recapture method;

b) Population $= \frac{\text{First capture x second capture}}{\text{Marked recapture}}$

$= \frac{FC \times SC}{MR} = \frac{432 \times 620;}{95}$

= 2252 birds;

c) The marking does not get erased before carrying out the second capture;
- The marking does not affect the organisms behavior;
- The organisms mix freely between the first and second capture;
- There are no immigration or emigration of the organisms during the time of study;
- There are no deaths during the period of study;
- The second capture is a random capture;

Max 2 (mark the first two)

d) Quadrant ;
Line transect;
Belt transect;

4.a) During fasting no glucose comes from the alimentary canal/ ileum making the glucose in vessel 1 low; while vessel 3 obtain glucose derived from hydrolysis/ breakdown of stored glycogen in the liver and transport through it; (O.W.E.T.T.E)

b) Vessel 3 hepatic vein;

c) It has capillaries at both ends;

d) Glucose; Amino acids; vitamins; mineral salts/ ions;

e) The liver regulates the level of nutrients entering the general blood circulation in a way they are maintained relatively constant after the meal and during fasting;

5.i) Hydrolysis;

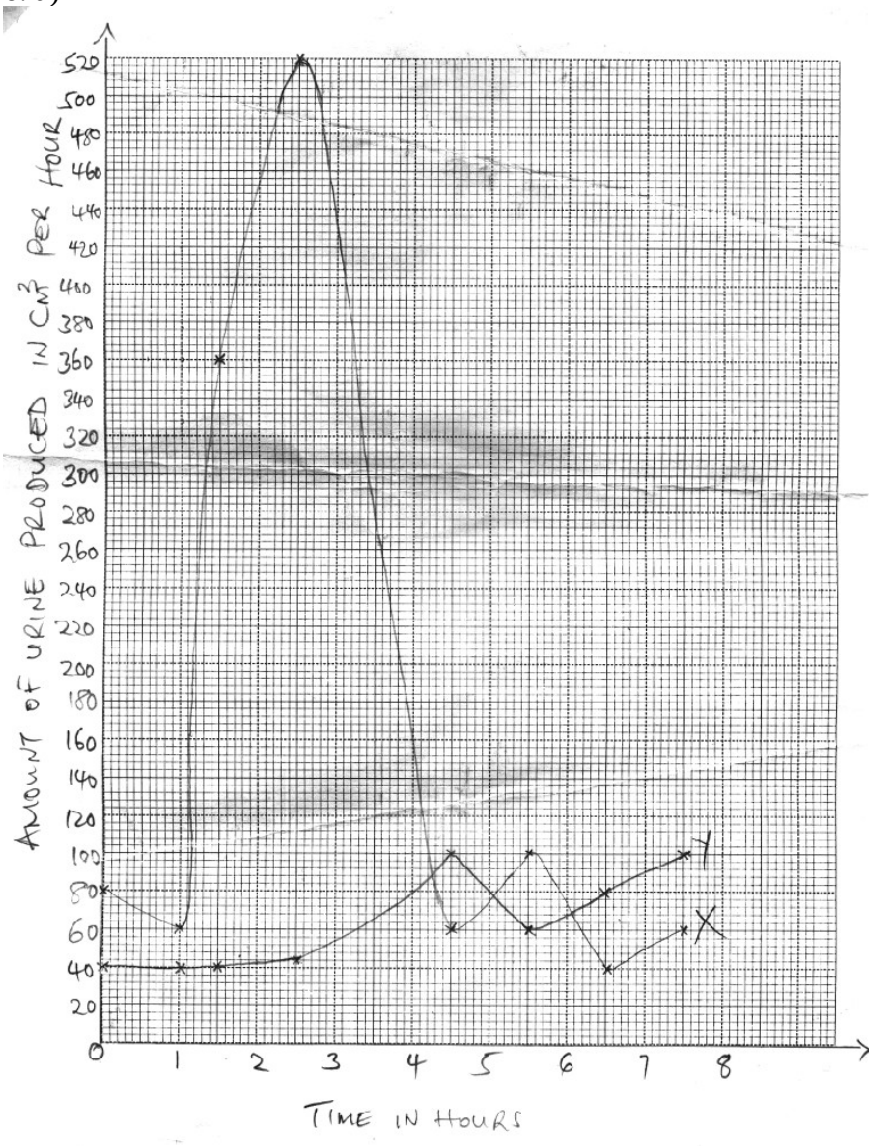
ii) Ileum;

iii) Sucrose;

iv) Sucrase;

b) - Occurs in the grana;
- Chlorophyll traps sunlight energy;
Part of which breaks water molecules into hydrogen and oxygen/ photolysis; and the rest converted into ATP;

6. a)



1) Axes X – 1mk
Y – 1mk A – 2mks
2) Scale X – 1mk
Y – 1mk S – 2mks
3) Plotting X - 1 mk P – 1mk
Y - 1 mk C – 1mk
4) Curves X – ½ mk I – 1mk
Y – ½ mk Total 8 mks
5) Identity X – ½ mk
Y – ½ mk
Total 7 mks

b) i) $440cm^3 \pm 5$; (must be shown on the graph)

ii) $\frac{440 - 60}{1}$; = $380cm^3$ per hour;

c) When osmotic pressure of blood is low due to dilution by water intake; rate of urine production increases;

d) Rate in X is higher in the first hour than in Y; because intake of water lowers concentration of blood; excess is lost in urine. The amount reduces drastically, becomes as low as in Y; because excess water has been eliminated in urine and osmotic pressure of blood is normal as in X.

e) Concentration of 0.9% sodium chloride is isotonic to that of blood plasma;

f) Antidiuretic hormone;
Aldosterone;

g) Kidney failure;
Kidney failure;

7. a) Position of scrotal sac outside the abdominal cavity provide cooler/ lower temperature for sperm formation/ spermatogenesis; sperm formation/ spermatogenesis; has seminiferous tubules which are highly coiled to increase surface are for sperm formation; between seminiferous tubules there are interstitial cells which produces androgens; seminiferous tubules unite to form epididymis which get a temporary store of sperms; presence of seminal vesticle which secretes an alkaline fluid which nourishes sperms. Prostrate glands secretes alkaline fluid which neutralizes the vaginal fluids; and also activates sperms;
Cowper's gland secretes an alkaline fluid that neutralizes acidity along the urethra;
Penis which projects from the body with spongy tissue which become engorged with blood; during erection to enable it penetrate through the vaginal during copulation; to deposit sperms in the female reproductive tract;

b)i) Comperative anatomy is the study organisms structures;
- Some organisms have structures with same embryonic origin but become modified to perform different functions (Homologous structures); structural modification of similar structures to perform different functions leads to adaptive radiation; i.e formation of different species.
- Some organisms have analogous structures with different embryonic origin but are modified to perform similar function; Analogous structures leads to convergent evolution;
- Some organisms have vestigial structures; (e.g wings in kiwi)

ii) Similar structures in cells in different organisms signifies a common ancestral origin;
Overall differences of the cells occurs due to evolution;

iii) Some organisms have similar embryo in certain stages in their development; which indicates a common ancestry.

8. Mitochondria;
- Has a double membrane the outer and the inner surrounding it; the inner membrane is folded to form cristae which increases surface area for attachment of respiratory enzymes;
Golgi apparatus;
- These are stacks of membrane bound sac like structures which transport glycoproteins;
- They also packs glycoproteins;
Lysosomes;

- Are spherical shaped organelles bounded by a single membrane they contain lytic enzymes which destroy old and worn out organelles;

Endoplasmic reticulum;

- Are membranes bond cavities in the cytoplasm;
- Smooth endoplasmic reticulum that transports lipids and steroids;
- Rough endospermic reticulum has ribosomes on its surface and transport proteins;

Centrioles

- Rod shaped located outside the nuclear membrane; for formation of cilia and flagella;

Cytoplasm;

- It is a fluid medium whose chemical reactions occur; contains organelles and inclusion e.g glycogen granules; cell membrane
- Cell membrane encloses all cell organelles; has phospholipid layer between two protein layers, with pores which selectively allows substances to pass in and out/ semi permeable.

Nucleus;

- Has double membrane around it; with pores to allow substances in and out;
- Has nucleoplasma which contain nucleous/ chromatid which controls all cells activities; nucleolus manufactures ribosomes and centrioles;

Ribosomes;

- Are spherical in shape and suspended in cytoplasm and attached on endoplasmic reticulum; synthesis proteins;