

**SCHOOL BASED FORM FOUR EXAMINATION JULY/AUG 2017**

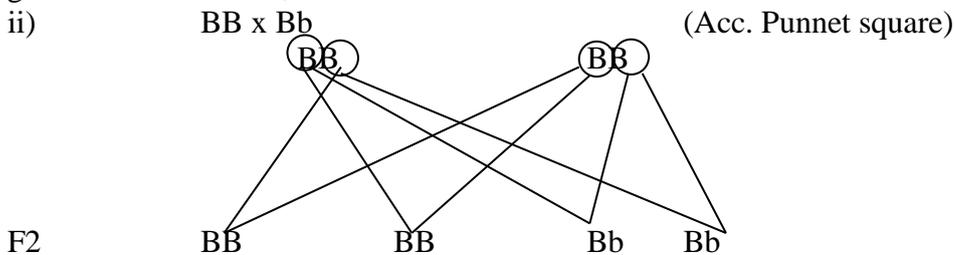
**Biology 231/2**

**Marking Scheme**

1. a) - To 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 neurones.i.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;



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

- iii) Down's syndrome; klinefetter's syndrome;  
 Turner's syndrome;

3.a) Capture – recapture method;

b) Population =  $\frac{\text{First capture} \times \text{second capture}}{\text{Marked recapture}}$   
 =  $\frac{FC \times SC}{MR} = \frac{432 \times 620}{95}$   
 = 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;

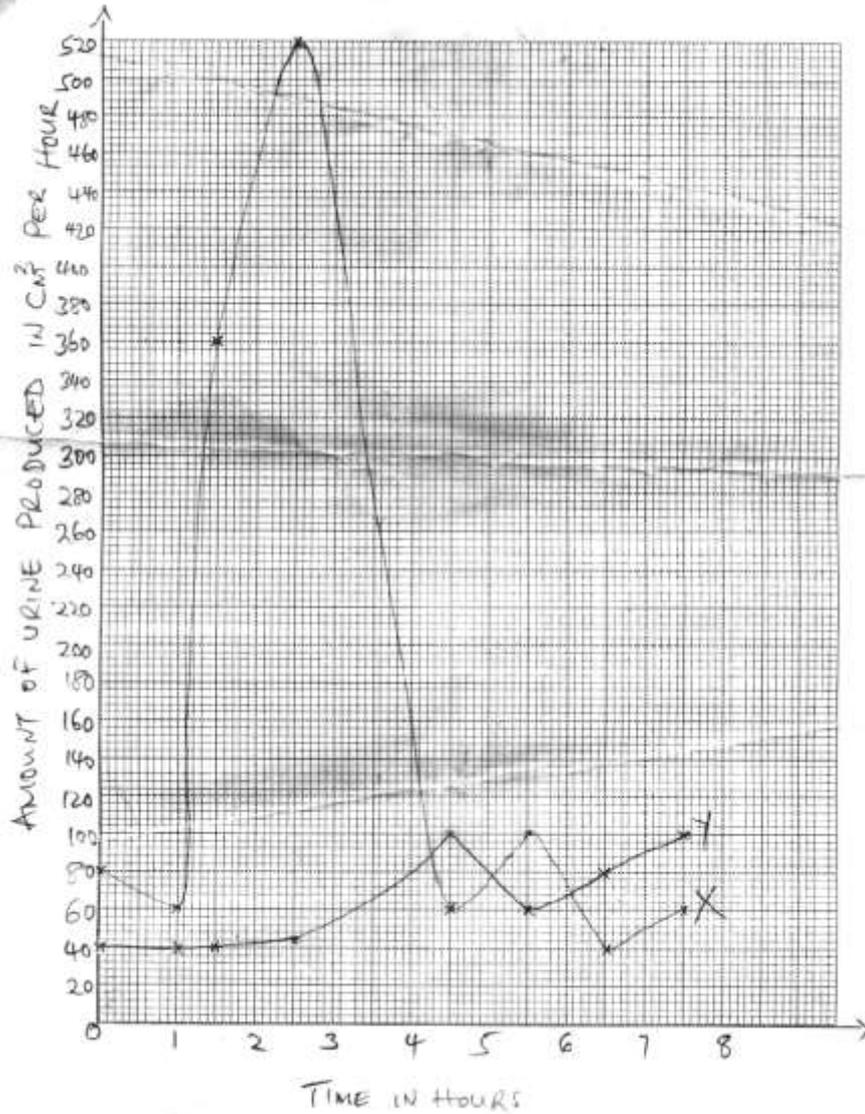
iv) Sucrase;

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		A – 2mks
	Y – 1mk		
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		<u>I – 1mk</u>
	Y – ½ mk	Total	8 mks
5) Identity	X – ½ mk		
	Y – ½ mk		
	Total		7 mks

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

ii)  $\frac{440 - 60}{1} = 380\text{cm}^3$  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 area 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 vesicle which secretes an alkaline fluid which nourishes sperms. Prostate 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) Comparative 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 bound cavities in the cytoplasm;

- Smooth endoplasmic reticulum that transports lipids and steroids;

- Rough endoplasmic 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

with - Cell membrane encloses all cell organelles; has phospholipid layer between two protein layers, 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 nucleoplasm which contain nucleolus/ 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;