FORM FOUR CLUSTER KCSE MODEL1

BIOLOGY PAPER 2 ANSWER

SECTION A (40 Marks)

Answer all the questions in this section

1. (a) Plantae; Rej plant;

   (b) Provides energy for photolysis of water molecules/split water molecules; into hydrogen ions/atoms and oxygen;

   (c) (i) Chloroplast;

   (ii)- Contain chlorophyll (pigment) to trap light energy;

   -Has grana which increase surface area for accommodation of a large number of chlorophyll molecules for photosynthesis:

   -Has stoma which contain enzymes that catalyse the rate of photosynthesis;

   (d)Oxygen

   –Used in respiration/ oxidation of food

   -Some released to the atmosphere.

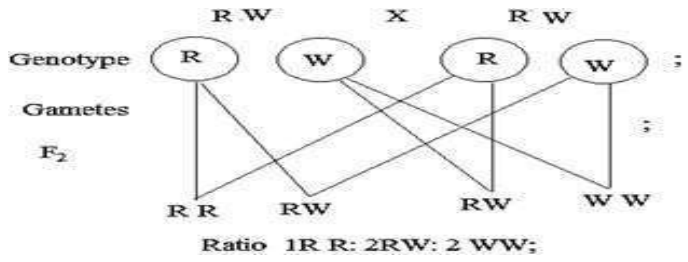
   -Glucose -Used in respiration;

   -Converted into sucrose/starch for storage;

   -Formation of structures in plants such as cellulose cell wall.

   - Amino acids-used for growth and development. (any 2)

2. (a)



   (b)(i)Increased performance/superior/great productivity/beneficial characteristics in the offspring; than either of their parents;

   (ii)-Resistance to pests/disease/adverse weather conditions;

   -Increased yields;

   -Early maturity;

3. (a) Q-vein; R-Artery;

   (bPresence of valves

(c) Smooth muscles;

(d) Accumulation of fatty materials/cholesterol on the inner walls of coronary arteries; causing a decrease in the diameter of the lumen and formation of clots;

(e) In a single circulatory system blood passes only once through the heart in one complete circuit,while in double circulatory system the blood passes twice through the heart to complete one circuit. (in the body)

4. (a)(i)Stimulates the development of the Graafian follicle in the ovary;

-Stimulates tissues of the ovary to produce oestrogen;

(ii)-Stimulates production of spermatozoa/spermatogenesis by the semiferous tubules;

-Causes development of secondary sexual characteristics in males;

(b)-Heterostyly;

-Protandry/protogyny/Dichogamy;

-Dioecious;

acc correct feature for wind pollination

-Self incompatibility/self-sterility;

-Presence of structures/substances to attract pollinators; (any 2)

(c)Causes mixing of genetic materials to cause variations; that enable organisms to exploit new environments/resist diseases/high yields;

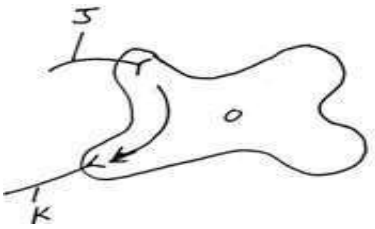
(d)(i) Q -Polar nuclei; Reject nucleus

(ii) R –(Diploid)zygote;

5. (a) Simple reflex actions;

(b) J-Sensory Neurone; K-Motor Neurone;

(c)



(d) The impulse causes the biceps muscles to contract, while the triceps muscles to relax; this pulls the ulna and radius upwards withdrawing the lower arm from the pin;
(e) Tactic Response Tropic Response

- Responses are temporary/

-Responses are permanent/ involves locomotary responses; involves growth responses;

-Involves fast responses;

-Are slow responses;

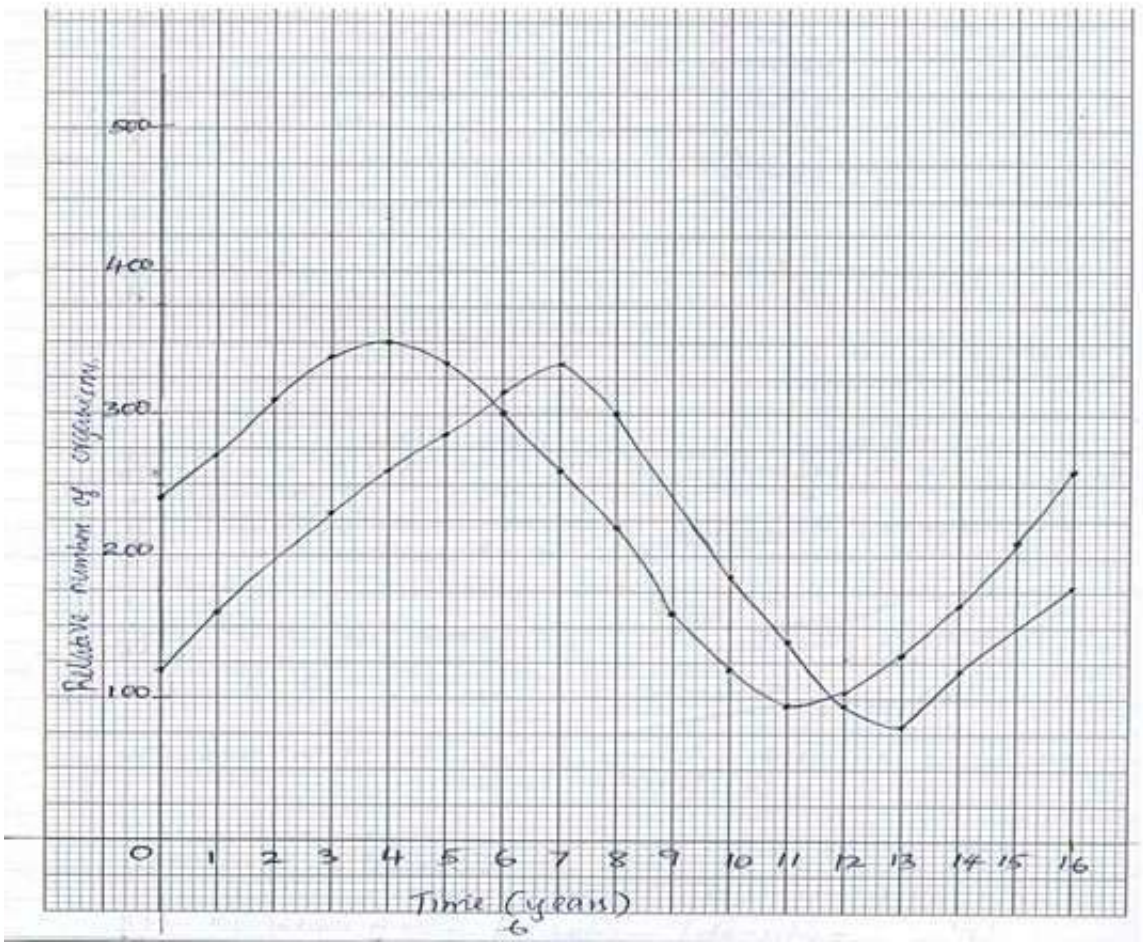
-Not influenced by growth hormones

-Involves influence of growth hormones; (any 2)

SECTION B (40 Marks)

Answer question 6 (compulsory) and either question 7 or 8

6.



Scale 1x2=2 mks

Axes 1x2=2mks

Plotting 1x2=2mks

Identification ½x2=1mks Curve ½x2=1mks Total 8 mks

(b) (i) Wolves population increased steadily; due to the availability of food;

(ii) Population of hares increases up to the fourth year; since the relative number of reproducing

Population remains constant in the 4th year since the number of deaths equals the number

reproducing;

Population decreases (after 4th year) due to increased predation;

(c)

$5.9 \pm 0.1\ yrs \quad and \quad 11.9 \pm 0.1\ yrs$

(d) Population of hares would decreases rapidly; due to increased predation;

(e) -Migration/immigration/emigration

-Diseases/parasites;

-Human activities/poaching/pollution/deforestation;

7. (a) Light intensity

-in bright light; stomata open; exposing air spaces in the leaf to the atmosphere;

High temperature

-High temperature; increases the rate of evaporation from the leaf/stem; thus more water vapour leaves cells due to increased diffusion gradient;

Wind

- In a windy day; air around the leaf/stem is carried away reducing water vapour around the leaf/stem; increasing diffusion gradient between the leaf/stem air spaces and atmosphere;

Low humidity

-In low humidity/when the atmosphere is less saturated with water vapour; more water vapour will move from the leaf/stem air spaces into the atmosphere due to increased diffusion gradient;

Atmospheric pressure

-Low atmospheric pressure; increases diffusion gradient between atmosphere and leaf/stem/increases rate of evaporation;

Water

-Availability of water; causes turgidity of guard cells hence stomata open; (Increasing rate of transpiration)

(b) Describe the process of secondary thickening in flowering plants. (10mks)

- Occurs in permanent tissues brought about by meristematic cells of the cambium; located between the xylem and the phloem;

- The first step involves linking the cambium cells through radial cell division to form a continuous cambium ring;

- The cambium cell divide tangentially to form secondary xylem on the inside and secondary phloem on the outside;

- Between the vascular bundles, secondary parenchyma is formed whic h increase the girth of medullary rays;

- Much more xylem is formed than phloem resulting in phloem being pushed outwards;

- Radial division of cambium keeps pace with the increasing circumference;

- This addition of cells results in stretching the epidermal cells causing the epidermis to rapture;

- A new band of cambium is formed by the outer cortex cells, to replace the protective epidermis;

- These cells are the cork cambium;

- The cork cambium divides to produce new cells of secondary cortex on the inner side and cork cells on the outer side;

- The cork cells form the bark (which is impermeable to water and respiratory gases);
- At a certain point the cork are loose mass of cells called lenticel which allows gaseous exchange;

- During the season when there is ample water (spring or rainy season) large vessels are formed;

- Towards the dry period narrower vessels with thicker walls are formed;

- This results in a series of concentric annual rings which can be used as a method of estimating the age of the tree;

Total 16 marks Maximum 10 marks

8. (a)Describe the homeostatic functions of the mammalian skin. (16mks)

Blood vessels:

-When temperature is lowered below normal;

-Blood vessels (acc arterioles) in the skin constrict;

-Blood is diverted to a shunt system;

-Less blood flows to the skin/less heat is lost; When body temperature is raised above normal;

-Blood vessels (acc arterioles) in the skin dilate;

-More blood flows to the skin;

-More heat is lost by convection/radiation; Erector pilli muscle When body temperature is lowered below normal:

-Erector pili muscle contract; hair stands erect;

-More air is trapped; air is a bad conductor; and insulates the body against heat loss;

-When body temperature is raised above normal erector-pilli muscles relax; hair lies on the skin; less air is trapped; more heat is lost; Sweat glands:

-When body temperature is lowered below normal less fluids are absorbed by sweat glands/less sweating; less vapourisation of water;

-When body temperature is raised above normal sweat glands are more stimulated/more sweat is produced; water in sweat evaporates acc.

-Sweat evaporates and takes up heat from the body; body is cooled/body temperature is lowered;

(b) (Pancreases produces) insulin; stimulates the liver/liver cells; to convert excess glucose; into glycogen/fats/stimulates oxidative breakdown of excess glucose to release energy;