FORM FOUR CLUSTER KCSE MODEL8

BIOLOGY PAPER 2 ANSWER

SECTION A (40 Marks)

Answer ALL questions in this section

1. (a) B- Centriole / centrosome;

C- Bivalent/homologous chromosomes;

E – Chromatid;

(b) i) metaphase 1;

ii) Anaphase 2;

(c) 3 – 1-5-2-4;

(d) -Gamete formation for sexual reproduction;

- Independent assortment to b ring about genetic variation;

- Maintain number of chromosomes constant from generation to another; (mark 1x2)

2. (a) $Grass \rightarrow Grasshopper \rightarrow Fowl \rightarrow cat \rightarrow python$ √

(b) Hyena and leopards would compete for Goat; reducing Goat population; but grass would increase;

(c) Python√ because it will accumulate the substances that cause pollution from feeding on many other organisms;√

(d) As energy is transferred from one trophic level to the next, energy is lost (90%) thro ugh respiration; not all organisms in one trophic level are consumed by those of succeeding level hence fewer organisms can be supported.

3. **Define the following terms as used in animal nutrition**.

i. Dentition (1 mark)

-Description of type, arrangement and specialization of teeth in the saw of a mammal.

ii. Homodont and heterodont dentition. (2 marks)

Homodont -Same teeth type in the jaw

b) State two functions of ileum (2 marks)

-Site for digestion of food.

-Site for absorption of digested food.

c) Explain the importance of the following in the process of photosynthesis; (2 marks)

i. Chlorophyll -Traps light for use during photosynthesis.

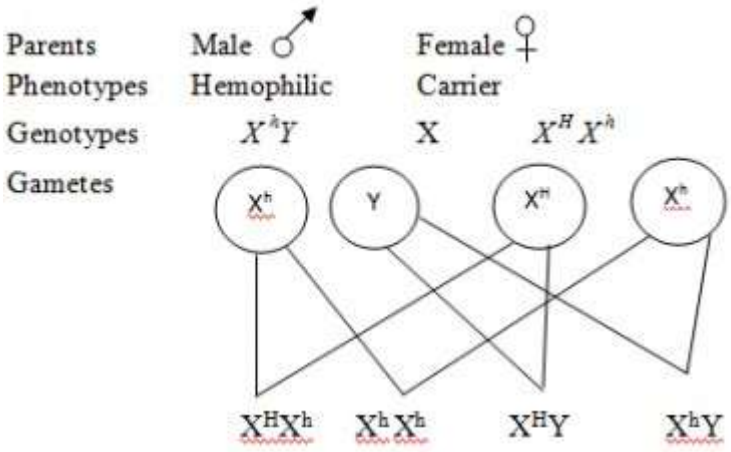
ii. Light. Source of energy for the light stage (photosynthesis)

d) State one use of Potassium in (K+) ion in the body. (1 mark)

-Transmission of nerve impulse

4. (a) Father: X^hY ; Mother X^HX^h

b) i)



Note
Rj if;
i) Gametes are incomplete
ii) Fussion lines enter gametes.
iii)

ii) State the genotype of Jane (1 mark)

X^hX^h

c) What is polyploidy (1 mark)

Condition where an organism has an extra set of chromosomes.

5. a)

B -Sap vacuole/cell vacuole/vacuole;

C -Tonoplast;

D -Chloroplast;

b) Cellulose;

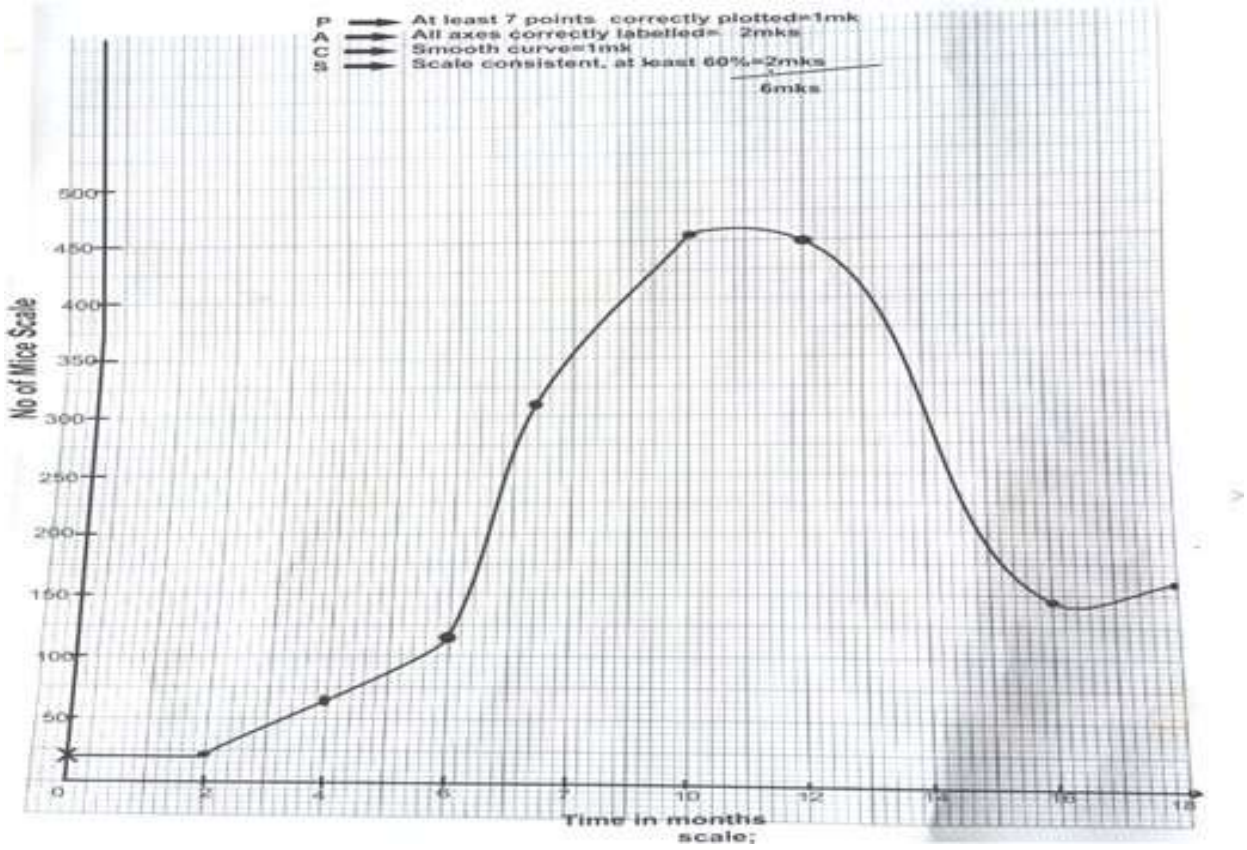
c) Active transport

d) H2O is less concentrated than RBC; water molecules enter the cell by osmosis; the cell enlarges and bursts because it lacks the rigid cellulose cell wall;

SECTION B (40 Marks)

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

6.



b) i) Population constant/no change in population; mice still maturing/have not given birth; (2mks)

ii) Slow population growth; few mice have reached sexual maturity. (2 marks)

iii) Rapid/gradual/faster rate of population growth/exponential; -Many mice sexually matured/reproducing/enough food/space/no competition/Birth rate higher than death rate; acc no diseases (2marks)
iv) Population decline; Competition (is high) food is limiting/space limiting/accumulation of toxic wastes/diseases (outbreak) death rate higher than birth rate; Rej; lack of food. (2marks)

c) i) 6 and 8;

ii) 310-115=195 mice per month;

$$\frac{370-115}{8-6};(125-130);$$

d) Population would increase rapidly. (When numbers are mentioned award between (5-15) or (165-175) (1mark)

e) -Food

-Space/cage size

-Water (firsttwo)

7. (a) External intercostal muscles contract; Internal intercostal muscles relax; Ribcage moves upwards and outwards; Diaphragm muscles contract such that the diaphragm flattens; volume of

thoracic cavity increases; while pressure decreases; Air is drawn in through the nostrils; making the lungs to inflate; Oxygen diffuses in the moisture; and then diffuses across the alveoli into the blood; (10mks)

(b) In the presence of sunlight; photosynthesis takes place in the guard cells; glucose therefore increases in the cytoplasm of the guard cells; High glucose concentration increases solute concentration in the guard cells; osmotic pressure in the guard cell increases; This makes the guard cells to draw water by osmosis; from the adjacent cells; This increases turgidity of guard cells; and because the inner walls of guard cells are more thick than the outward; results in the opening of the stomata; √ (10mks)

8. Fossil record;

These are remains of ancient organism preserved in natural occurring materials for many years; the show morphological changes of group of related organisms over a long period of time; e.g. the human skull;

Geographical distribution;

The theory of continental drift supports that one time, the present continent formed one large landmass; which later broke up and its parts drifted away from each other due to the continental drifting; animals with common ancestry became isolated and evolved into different species; egg camels of South America resemble those in Africa; long tailed monkeys in Amazon resemble short tailed monkeys in Africa, the big cats in Africa resemble a lot to those in other continents;

Comparative embryology;

Studies of the development of embryos in different vertebrates like fish, mammals, birds amphibians; show that they are morphologically similar during their early stages of development pointing to the fact that there is a common ancestor e.g. all the embryos have gill slits in early stages;

Comparative anatomy;

When comparing the form and structures of different organisms some group show basic structural similarities; this suggest that the organisms have a common ancestral origin; examples include Homologous structures that have evolved to perform different functions with specific examples as the forelimb/pentadactly limb of bats modified for flight while in other mammals for swimming(whales),manipulating and gripping (man)walking in herbivores; Analogous structure modified to perform same functions of wings of insects and wings in birds both for flying ;Vestigial organs which are structures that have been reduced in size or have ceased to function during the course of evolution e.g. Appendix in man, vestigial tail in man reduced pelvic girdle of whale, girdles in snakes among others;

Cell biology;

Cells of higher organisms have similar structures and functions; what supports the facts that all living organisms had a common ancestry e.g. all cells have nucleic acids; ATP and many organelles alike including comparative serology that is based on the nucleic acids;