**KENYA NATIONAL EXAMINATION COUNCIL**

# KCSE 2009

**BIOLOGY**

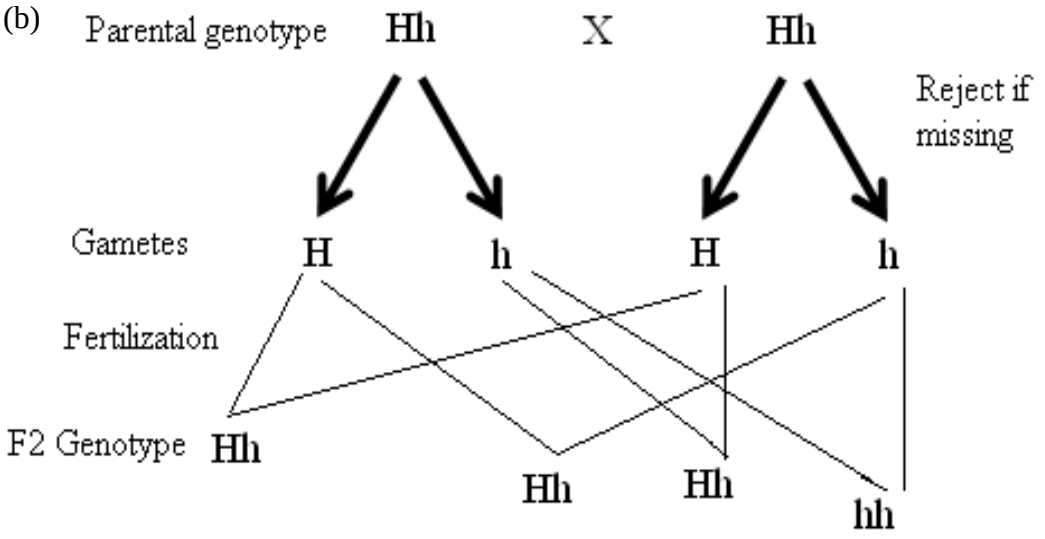
**PAPER 2**

**MARKING SCHEME**

1. (a) (i) HH; and hh;

(ii) Hh

(b)




(c) The RJ if namation on the left is wrong if give the gene for purple colour is dominant/ gene for white colour is recessive;

2. (a) Herbivorous Rej Herbivore Acc Herbivory

(b) Tooth J is narrow/ sharp/ chisel like while tooth L is broad/ ridged

Accept: J has one root while L has 2/3/4 roots

**Functional**

Tooth J is used for cutting while tooth L is used for grinding

(Acc cutting for biting)

(c)

(i) Diastema

(ii) For manipulation of blood by tongue

(d) Calcium phosphate; Rj calcium/ phosphorous/ phosphate

3. (a)

(i) Using a living organism to regulate/control/ reduce/ check the population of another organism

(ii) Lady bird (beetle) used to control Aphids in coffee

- Cats used to control rats in the store/ snakes
- Wasps used to control coffee mealy bugs

(b) enrichment of water bodies with nitrates/ phosphates/ sulphates

Acc. $NO^{-}_{3}$ (aq) $NH4^{+}$; due to discharge of sewage/ domestic effluent kitchen water containing water detergents/ run off water fertilizer; leading rapid growth of aquatic plants/ phytoplankton's

*( accept: nutrients phosphates)*

(ii) ( Proliferation of plants) block light from reaching plants underneath which will not photosynthesize the plants die and decompose leading to lack/ depletion of O2; animals also die/ suffocate.

(c) Nitrogen IV oxide/ sulphur iv oxide. Accept nitrogen dioxide sulphur dioxide

4. (a)

(i) Circular muscles of the Iris contract (C/C) while radial muscles relax (R/R) reducing the size of the pupil; hence less light enters the eye.

(ii) The retina is protected from damage

(b) Choroid has a dense network of blood capillary from which nutrients diffuse out to supply the eye.

(c) The blind spot has no photoreceptors/ rods & cones. Hence no impulses are generated to be transmitted to the brain (for interpretation)

5. (a)

Root hairs/ roots absorb water by osmosis; cells of plants become turgid; leaves become firm/ spread out plant becomes firm/ upright

(b)

(i) Collencyma

(ii) Xylem/ tracheid/ vessels/ schlerencyma

(c) - Steering

- Balance

- Braking, changing direction

- Prevent fish from pitching/ up & down movement

6. (b) $33^0$C and 51.5 ( $\pm$ $0.5^0$C)

32.5 - 33.5 and 51.0 – 52.0

(c)

(i) As temperature is increased rate of reaction is increased/ more products are formed (per unit time) because enzymes become more active

(ii) As temperatures increases rate of reaction decreases less products are formed (unit per time) because enzymes become denatured by high temperatures.

(b) Increase in enzyme concentration and substance concentration

Rj. Increasing number of enzymes

Acc. Increasing number of enzyme

(e)

(i) Pepsin, remain/ chymosin

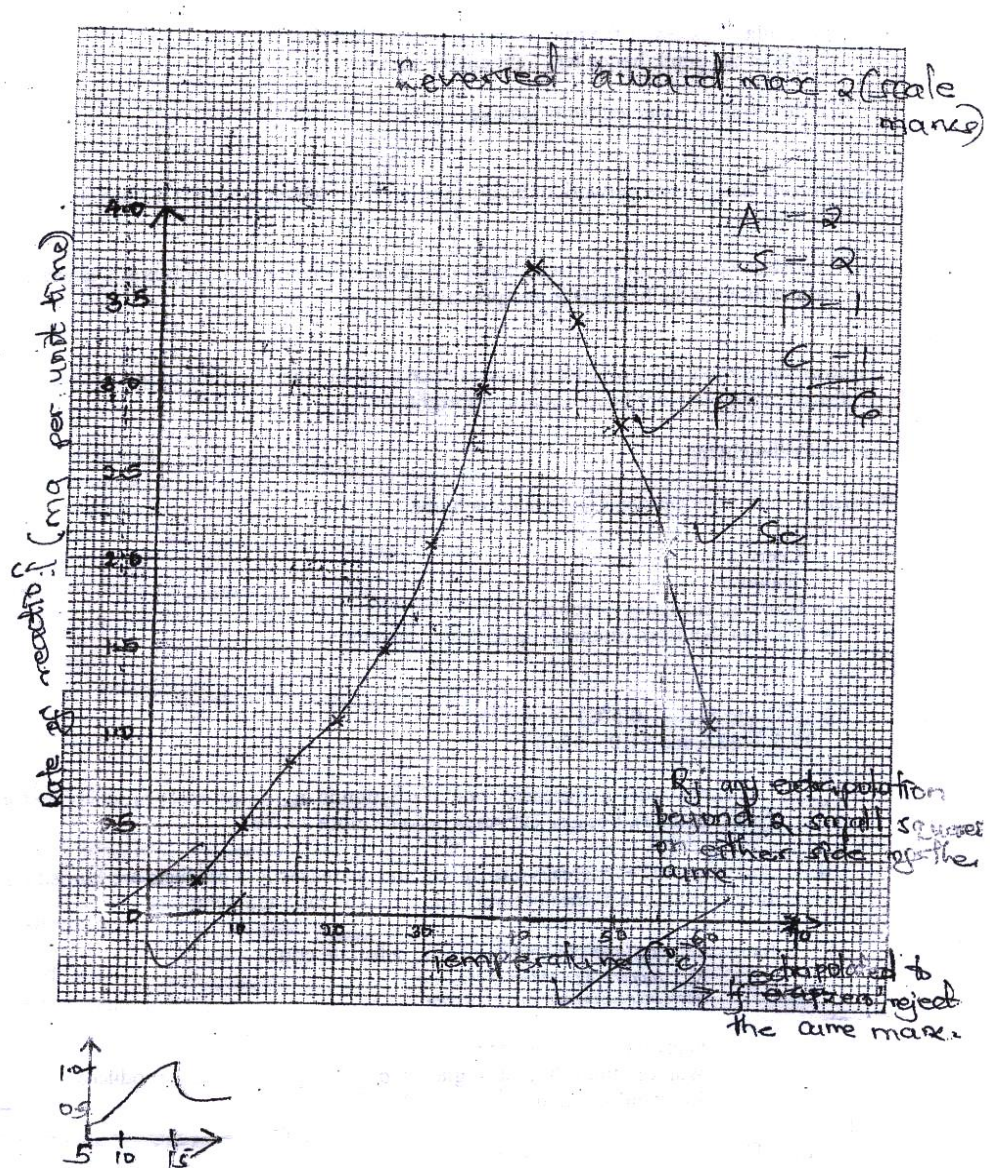
(ii) Wall of stomach/ gastric gland/ oxyntic/ pariental/ cell produced Hydrochloric

(f)

(i) Duodenum

(ii) Bile juice/ SANS any correct salt e.g. $NaHCO_3$

Acc: Bile


reversed award max 2 (scale marks)
A – 2
S – 2
P – 1
C – 1
6
P
Sc
Rate of reaction (cm³ per unit time)
Temperature (°C)
By any extrapolation beyond a small square on either side of the curve
extrapolated to
If extrapolated reject the curve max.


1.0
0.5
5
10
15

7. **Insect pollination / Entomorphilous flowers**

- are scented to attract insects have stick stigma for pollen grains to stick on. Are brightly coloured to attract insects.
- Have nectarines to secrete nectar; nectar attracts insects
- Have nectar guides to guide the insects to the nectarines
- Stigma/ anthers are located inside the flower / tubular a funnel shaped corolla to increase chances of contact by insects
- Sticky/ spiny/ spiky pollen grains which stick on the body of insects and on stigma

- Large/ conspicuous flowers to be easily seen by the insects/ attract
- Anthers firmly attached to filament for insect to brush against
- Have landing platform to ensure contact with anther and stigma
- Mimiory to attract (male) insects/ flowers mimic female insects which attract
- Anthers firmly attached to filament for insect to brush against
- Have landing platform to ensure contact with anther and stigma
- Mimiory to attract (male) insects/ flowers mimic female insects which attract male insects for mating e.g. orchids. ( 13 mks)

**WIND POLLINATED/ ANEM ORPHILOUS FLOWERS**

- Anthers/ stigma hang outside the flowers to increase chances of pollination; style/ filament is long to expose stigma/ anthers
- stigma is hairy/ feathery/ branched to increase surface are over which pollen grains land/ to trap pollen grains;
- Pollen grains are smooth/ dry/ light/ small to be easily carried by wind; large amount of pollen grains to increase chances of pollination
- Anthers are loosely attached to filaments to enable them sway easily to release pollen grains; pollen grains may have structures which contain air to increase buoy any 3 flowers have long stalks holding them out in the wind

( 8 mks)

8. **Regulation of blood glucose**

The normal amount of glucose in the blood is 90 mg/ $1000m^3$ increase in blood sugar level is detected by cell of the (batacelss) pancreases, which secrete insulin; insulin stimulates the liver to convert excess glucose to glucogen. Further excess glucose is converted to fats. Excess glucose is also oxidized to energy ( carbon iv) oxide & water/ respiration.

Decrease in blood sugar level below the normal level is detected by the ( alphacells) by the pancreases. Which secretes glucogen that stimulates the liver, to convert glucogen to glucose, fats/ amino acids are converted to glucose, and there is reduced oxidation of glucose until the normal level of blood sugar is attained.

Deamination / excess amino acids are deaminated (removal) of amino acid group, the amino group is converted to ammonia which combines with carbon (iv) oxide to form urea that is excreted through the kidney, urea is excreted through the skin as sweat.

( 4 mks)

Detoxification/ poisonous substances are converted to less harmful compounds.

( 1 mk)

Thermoregulation/ maintenance of body temperature heat is generated ( in the liver) by chemicals activities, the heat is distributed ( 3 mks)

$NH_2 + H \rightarrow NH_3$

$2HH_3 + Co_2 \rightarrow Co\ (NH_2)_2 + H_2O$

Ammonia urea