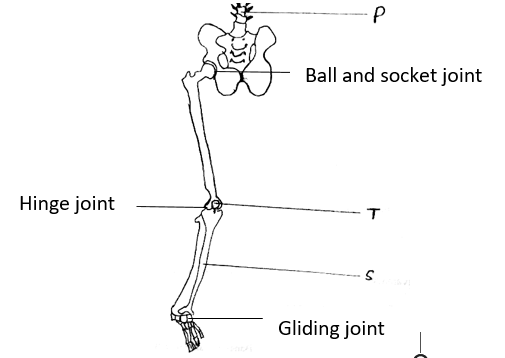
1. a) Appendicular;

b)



Gliding joint

c) S – Tibia

T – Patella

P – Lumbar verterae

d) – vertebrae

- Pelvis

1. G - Gene for Purple

g – Gene for white

1. Parental phenotype purple grains purple grains

Parental Genotype GG X Gg ;

G

G

g

G

Gametes ;

;

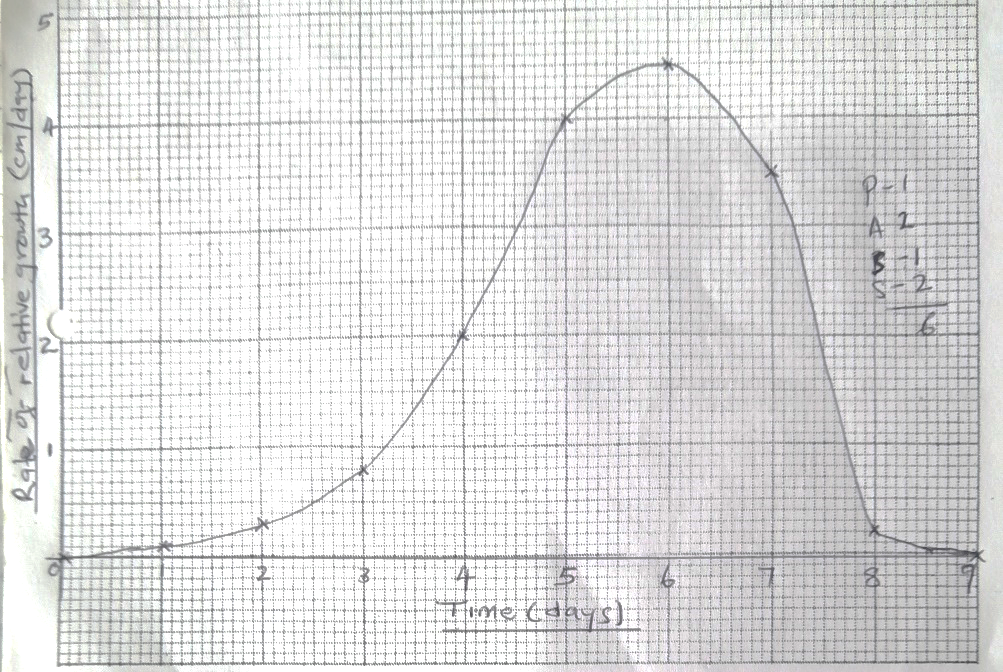
F1 GG Gg GG Gg ;

1. All purple colored grained maize plants.
2. Deliberate modification of characteristics of an organism by manipulating the DNA / Gene, by transferring genes from one organism to another;
3. Phenotypic ratio; 3 smooth seed coat : 1 wrinkled seed coat

Seeds with wrinkled coats = ¼ X 14640;

= 3660;

6a



b) -Supports the leaf in position to trap light for photosynthesis;

- Contains xylem tissue to transport water and dissolved mineral salts to the leaf for

photosynthesis, and phloem to transport synthesized food to the rest parts of a plant;

c) – Dense cytoplasm;

-Thin cell wall;

- Numerous mitochondria;

-Very small / No sap vacuole;

di) 2-5 There is a fast growth rate; because the leaf is very young; and cells are actively dividing and

elongating;

ii) 6-8 There is reducing rate or relative growth; of the petiole. This is because the cells if the

petiole/leaf are no longer dividing and elongating; instead the cells are becoming differentiated;

iii) 8-9 Growth ceases; /very little growth because all cells are differentiated; and has formed

permanent tissues;

e) Primary growth takes place at shoot tip and root tip leading to increase in length due to activity of

apical meristems;

Secondary growth leads to increase in girth in stems due to activity of lateral meristems / vascular

cambium;

7.The flowers have the following features:

**Insect pollination / Entomophilous flowers**

* Are scented to attract insects
* Have small sticky, stigma that occur inside the flower for pollen grains to stick on it.
* Have nectaries to secrate nectar; nectar acts as a bait to attract insects
* Have nectar guides to guide the insects to the nectaries.
* Have special shaped corolla to provide landing platform i.e. tubular or funnel sheped corolla to increase chance of contact by insects.
* Large / heavy and rough / sticky / spiny / spiky pollen grains which stick on the body of insects on stigma.
* Large; conspicuous flowers with brightly colored petal, bracts or inflorescence to attract insects.
* Anthers are small and firmly attached to filament to ensure insect brush against the anthers as they crawl into the flower hence collect as many pollen grains.
* Stigmas are small, sticky and occur inside the flower, so that pollen grain from insect body can stick onto it.
* Another’s are situated inside the flower to ensure that they are into contact with the insects.
* Mimicry to attract insects / flowers mimic female insects which attract male insects for mating e.g orchids.

N/B- 1 mark per point

-**Max 10mks**

**Wind pollinated / Anemophilous flowers**

* Anthers and stigma hang outside the flowers to increase chances of pollination; style / filament is long to expose stigma / anthers.
* Stigma is hairy / feathery / branched / long 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.
* Flowers are small with inconspicuous petals, bracts or inflorescence.
* Flowers not scented and lack nectar.
* Anthers are large and loosely attached to flexible filaments to enable them sway easily to release pollen grains. This ensures that pollen grains released readily when wind blows.
* Pollen grains may have structures which contain air to increase buoyancy, flowers have long stalks holding them out in the wind.

**Max 10mks**

1. a) Temperature; PH value; co-factors; enzyme and co-enzymes; enzyme concentration; substrate concertation; metabolic poison / inhibitors; **Max 6mks**

b) **- Temperature**- increase in temperature increases rate of enzymatic activity; up to an optimum where enzymes work at best hence maximum / highest rate of reaction;

low temperature makes the enzymes less active; high temperatures above 400c denatures enzymes; enzymatic activity reduces and eventually stops;

**- PH** – Enzymes work best at optimum PH; extreme PH denatures enzymes;

Some enzymes act best in acidic or basic medium while others work best at neutral pH; Optimum PH should be maintained.

* **Enzyme concentration** – Increase in concentration increases enzymatic activity as there is more active sites; to combine with substrate hence an increase in reaction;
* **Co-enzymes** – activates enzymes; increasing rate of activity;
* **Substrate concentration** – increase in substrate concentration increases enzymatic activity; up to certain level where enzymes become a limiting factor;
* I**nhibitors** – They compete with substrate for active sites or combines permanently with active sites of enzymes; They slow down or stop the rate of reaction;

**Max 14mks**