

# KAPSABET BOYS TRIAL 1 2025 MARKING SCHEME

## BIOLOGY PAPER 2 MS

1. a) X –chromosomes

b) i) Man -  $\text{?}^H \text{?}$


Woman  $\text{?}^H \text{?}^h$

ii)

Normal

Normal



	$\text{?}^H$	$\text{?}^h$
$\text{?}^H$	$\text{?}^H \text{?}^H$	$\text{?}^H \text{?}^h$
Y	$\text{?}^H \text{?}$	$\text{?}^h \text{?}$

F1 Offspring/progeny

iii) Males only inherit a single X-Chromosome from their mother's gamete cells

2. a) i) Root/dicot root/Dicotyledonous root reject monocot root.

ii) It contain lignin deposits/it is lignified to provide support.

b)i) Active transport; reject osmosis

ii) – Presence of root hairs

iii) Contain lignin deposits /lignified to provide support.

- Contain a large sap vacuole that has high concentration of soluble to raise its osmotic pressure to that become hypertonic thereby facilitating water uptake by osmosis from the soil.
- Thin walled for rapid movement of water and mineral salts into the cell.
- Thin & flexible to penetrate between soil particles to reach the water table.
- Numerous mitochondria to generate enough energy helped for certain uptake of mineral ion from the soil.

c) Cellulose; pectin

3. a) i) Species A

ii) Rate of multiplication or growth in A is faster than of species B.

b)i) 1-3 yrs – less competition, few or no predators, more suitable environmental conditions such as food, space, resource were not limiting hence population increased exponentially or rapidly.

- ii) 3-7 yrs –shortage of resources like food or space /limiting birth rate equals death rate; population became constant. Environmental resistance has set in.
- c) Species A would decrease since they are preyed upon, species B would increase because there is less competition with species A and hence more resources available.
- 4. a) Diffusion** (1mk)
- b) i) The suspension in visking tubing turned blue black; while in the beaker /iodine colour retained its colour (2mks)
- ii) The iodine molecules are smaller in size hence could diffuse into visking tubing into suspension: starch molecules are large in size, remains in visking tubing, no effect to iodine solution. (2mks)
- c) Oxygen concentration; change in PH, glucose concentration; temperature  
(any 3 =3x1=3mks)
- 5. a) i) Prevent entry of gases of respiratory gases.** (1mk)
- ii) To ensure soil microbes do not interfere with gas volumes in glass bottle. (1mk)
- iii) – To consume oxygen released from photosynthesizing plant.
- To release carbon (IV) oxide from it respiration for photosynthesis by plant (2mks)
- b) i) Small animal would die. (1mk)
- ii) Lack oxygen gas for respiration (1mk)
- c) i) Cell membrane
- ii) Gill filament
- 6. a) - Axis – 1**
- Scale – 1
- Plotting – 2
- S/Curve – 2
- Labelling - 1
- b) i) 0-1 hour concentration is constant or low or below normal levels in blood. No digested foods/glucose from the intestines hence no absorption of digested material.
- ii) 1-2 hours – Sharp increase- in concentration of glucose in blood; more absorption of glucose after digestion of the food.
- iii) 2-4 hours Glucose concentration decreasing less glucose being absorbed; more glucose being converted to glycogen in the liver cells. Some used for tissue respiration), because all the food has been digested.
- iv) 5-7 hours concentration of glucose stabilizes digestion has been completed hence no more absorption and excess has been converted to glycogen or respired.
- c) The concentration of glucose in the iliac vein is lower than in the hepatic portal vein; glucose in hepatic portal vein is not regulated by the liver. Glucose that leaves the liver to iliac vein is regulated.
- d) Proteins take longer to digest.
- 7. a) During the day/in presence of sunlight; guard cells, synthesize glucose /sugar from the photosynthesis process; the synthesized sugar accumulates in the guard cells, increasing**

their osmotic pressure (makes them hypertonic to the adjacent cells of the epidermis).By osmosis, guard cells draw in water and bulge outwards opening, the stoma.

During the night / in absence of sunlight; guard cells are unable to carry out photosynthesis hence sugar is converted into starch; starch lowers the osmotic pressure of the guard cell, hence they lose water by osmosis to the neighbouring epidermal cells become flaccid hence closing the stomata. (Max =10mks)

- b) When blood sugar rises above normal; the hypothalamus stimulates the pancreatic cells to secrete insulin hormone which travels through the blood stream to the liver where it stimulates the liver cells to;
- Convert excess glucose/sugar into glycogen
  - Increase oxidation of sugar /glucose into energy carbon (IV) oxide and water.
  - Convert excess glucose/sugar into fats for storage in adipose tissues.
  - Inhibits conversion of glycogen into sugar.

When blood sugar/glucose drops below normal; the hypothalamus stimulates the pancreatic cells to secrete hormone glucagon which travels through the blood stream to the liver; where it stimulates the liver cells, to;

- Convert stored glycogen into sugar/glucose
- Decrease the oxidation of sugar/glucose
- Convert stored fats into sugar/glucose

Blood glucose is then restored back to normal levels.

(MAX=10mks)

**8. a) Adaptation of xerophyte in living in their habitats.**

- Leaves modified to needle like structures reducing surface area for transpiration.
- Leaf surface coated with a relatively thick and waxy cuticle.
- Have few stomata located on lower leaf surface
- Xerophytes have their stomata sunken, trapping air around stomata to reduce rate of transpiration.
- Reversed stomatal rhythm to reduce water loss.
- Xerophytes have flattened shoots and succulent tissue for water storage
- Xerophytes have deep and extensive root system for absorbing water from a light shower.
- Some Xerophytes have a short life cycle.
- Some xerophytes produce latex which reduces rate of transpiration and also are distasteful to herbivores.
- Xerophytes shed their leaves at the onset of droughts to reduce water loss.
- Some have long tap roots to draw water from deep sub-stratum
- Fold their leaves to reduce transpiration.

**b) Adaptation of hydrophytes to its habitat.**

- Have broad leaves to increase surface area for transpiration.
- Have numerous and large sized stomata
- Flowers are held above water to enhance pollination.
- Their roots lack root hairs to minimize absorption of water.
- Have large aerenchyma tissues which give them buoyancy.
- Have reduced root system as they are supported by water.
- Have poorly developed xylem vessel.