

# MARKING SCHEME

## THE ROYAL EXAM SERIES

Kenya Certificate of Secondary Education

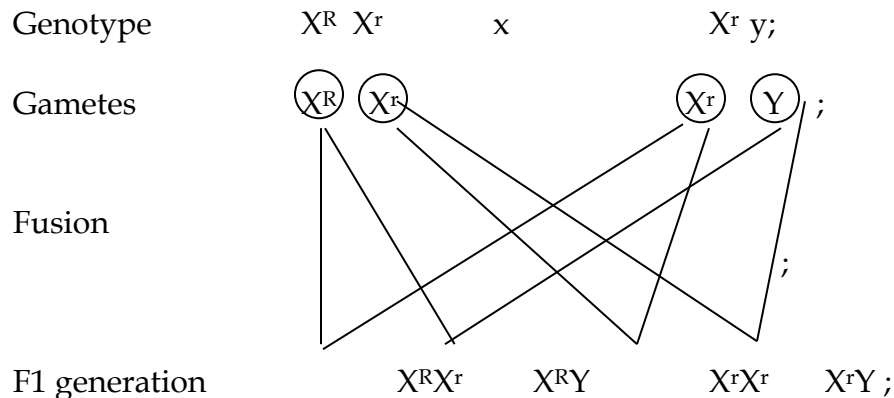


### 231/2 — BIOLOGY — Paper 2

1. (a) W – Sebaceous gland;  
X – Erector pili muscles; (2mks)
  
- (b) Y – Produces melanin which protects the body against U.V light/ determines the skin colour;  
Z – Secretes sweat which evaporates to bring about cooling or  
Sweat also removes excretory products/excess salts/water (2mks)
  
- (c) Vasoconstriction; hence less blood flows to the skin surface; reducing heat loss; no sweating; heat produced through metabolisms/shivering; is retained in the body;

6 marks max 4 mks

2. (a) (i)  $X^R X^r$  and  $X^r Y$ ; (1mk)  
Both must be present
- (ii) Phenotype; Red eyed female White eyed male



(4mks)

- (iii) Crossing over;  
- Mutations; (1mk)  
Any one – 1mk
- (iv) Down's syndrome; klinefelters syndrome; turners syndrome; (2 mks) first 2  
– 2mks

3. (a) Aquatic; (1mk)

(b) (i) Phytoplankton's; (1mk)

(ii) Hawks; (1mk)

hawks (c) (i) Phytoplankton's → zooplanktons → frogs → snakes →

Reject if arrow is not indicated

(ii) Snakes would decrease (due to less food)

Zooplanktons would increase (due to less predator) 3mks

(d) Oil clogs fish gills;

- Oil cuts off dissolved oxygen in water leading to suffocation

Any one 1 mark

(e) Domestic effluents;

Sewage;

Silting;

Industrial effluents;

Agrochemicals;

Any one 1 mark

4. (a) To find out whether energy/heat is released in anaerobic respiration/fermentation; 1mk

To investigate the gas produced during fermentation/anaerobic respiration; (1mk)

(b) (i) (Significant) rise in temperature; colour of bicarbonate indicator turns yellow; 2mks (ii) Yeast will respire aerobically releasing energy/and carbon (iv) oxide gas that turn indicator

yellow; 1mk

(iii) Expel/drive out oxygen; 1mk

5. (a) Osmosis; (1mk)

(b) - Sugar solution is hypertonic to the cell sap of pawpaw;

- These cells lose water to sugar solution by osmosis;

- These cells thus become more concentrated/hypertonic to the water in the beaker;

- The cells then gain water by osmosis from the beaker;

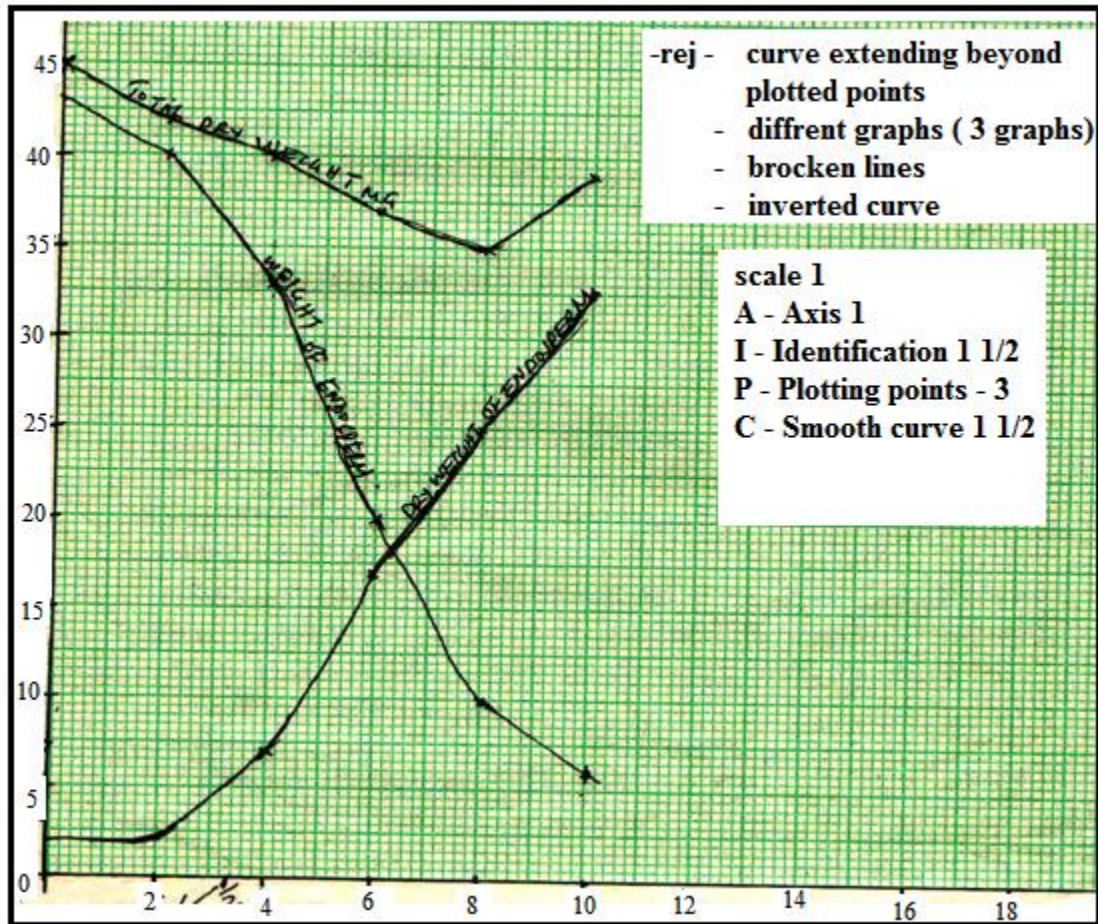
- Causing a rise in level of the sugar solution; (max 4mks)

(c) (i) The sugar solution level will not rise/remain the same/no change;(1mk)

(ii) Boiling kills cells; making them osmotically inactive; (2mks)

(c) Use glucose solution without yeast cells/killed yeast cells; (1mk)

6. a) Graph



b) Total dry weight 38.5mg; acc  $\pm 0.5$

c)

i. Hydrolysis of starch into simple sugars/ glucose which are translocated to the embryo;

Oxidation/respiration of( simple sugars) to the embryo;

CO<sub>2</sub>/energy/heat; acc water vapor

ii. New cells/tissues materials are synthesized (from proteins);bring about growth of embryo

iii. The rate of respiration is faster than that of synthesis of materials for growth;

iv. First leaf carried out photosynthesis; (leading to growth

d)

i.

- ✓ Presence of abscisic acid; (ABA)
- ✓ Presence of germination inhibitors;
- ✓ Embryo not fully developed/immature embryo;
  
- ✓ Absence of hormones/enzymes that stimulate germination;  
Acc inactivity of hormones/enzymes inhibitors;
- ✓ Impermeable seed coat;  
Acc for germination hormones such as cytokines, gibberellins;
- ii. Unsuitable temperatures/lack of suitable/unfavorable temperatures; absence of light; lack of O<sub>2</sub> Rej lack of air  
Lack of water
- e)
  - Dense cytoplasm; thin cell walls
  - Absence of vacuoles (cell sap);
  
- 7. (a) Fertilization is the fusion of the male and female nuclei in the embryo sac; this is preceded by the process of pollination which involves transfer of pollen grains from the anther to the stigma;  
Stigma secretes sticky substance; which causes adherence of pollen grains; and stimulates germination of pollen tube; pollen tube grows down the style deriving nutrients from the style tissues; the tube nucleus follows behind; generative nucleus divides mitotically to form two male nuclei; in the ovule the pollen tube penetrates the embryo sac and the tube nucleus disintegrates; one of the male nuclei gets in and fuses with the egg cell nucleus; to form a diploid zygote; the other male nuclei fuses with polar nucleus; to form a triploid primary endosperm nucleus; hence double fertilization in flowering plants;
  
- (b) Corolla/stamens/style wither/dry and fall off;  
Calyx persists;  
Ovule develops into a seed;  
Zygote forms an embryo;  
Primary endosperm tissues develops into an endosperm;  
Ovary forms a fruit;
  
- 8. (a) External intercostals muscles contract; internal intercostals muscle relax, this movement pulls the Rib cage move outwards; and upwards;  
Diaphragm muscles contract, which causes the Diaphragm to flatten;  
volume in thorax cavity increases; pressure reduces.  
Atmospheric air enters the lungs; inflate (correct sequence to be followed)
- (b) Guard cells have chloroplast which photosynthesis in the presence of light, to form sugar, the osmotic pressure of guard cell increases; water move from neighbouring cells into guard cells being thicker than outer walls. Causes the outer wall to stretch more resulting guard cells budging outwards.