**BIOLOGY PAPER 2**

**MARKING SCHEME**

XRXR

XrY

X

XR

Y

Xr

XR

XRY

XRXr

XRY

XRXr

1. Possible to get a large sample size as female produce large number of offspring at a time.

 The flies have many contrasting observable characteristics.

They are easily bred in the laboratory with minimum requirements.

They have a short generation time hence many generations can be studies in a short period.

Their offspring can be crossed with their parents at will.

The flies are safe to handle because they do not transmit human diseases.

 **Mark 1st two**

c) Males have only one X chromosome; the corresponding allele is absent on the Y chromosome;

2. a) More black moths were eaten (by predators); because they were not camouflaged;

 **Accept the converse**

 b) More black moth caught than speckled moths;

 c) This is whereby nature selects those organisms that are well adapted to the prevailing environmental conditions enabling then to survive to reproductive maturity; those that are poorly adapted die young leaving no offspring and their characteristics are eventually eliminated from the population;

d) (Frequent exposure to chloroquine caused the) plasmodium to mutate; developing a gene that offers resistance to chloroquine; the mutant plasmodium survives and pass the gene for resistance to their offspring; hence a population of plasmodium that are resistance arose;

3. a) A- plumule

 B- Epicotyl

b) store food for germination

c) C/ Hypocotyl

d) i) cytokinins

 ii) Ethene/ ethylene

e) Activate enzymes;

medium of transport;

hydrolyze the stored food;

medium of reaction;

soften the seed coat for radicle and plumule to emerge;

 **any 1st two**

4. a) Aldosterone;

 b) Adrenal (glands);

 c) loop of henle;

 Colon;

 d) Negative feedback;

 e) i) Diabetes insipidus;

 ii) Antidiuretic hormone;

 f) to provide optimum temperature for enzymatic reactions hence optimum rate of metabolic reactions/ organism remains active throughout;

Enables organisms occupy a wide range of habitats;

 **Mark any one**

5. a) X- guard cell; rej. Guard cells

 Y- Epidermal cell; rej. Epidermal cells

 b) stoma open;

 c) chloroplast in the guard cells carry out photosynthesis producing sugar/glucose; sugar accumulates in the sap vacuole of guard cells increasing the osmotic pressure; water is drawn into the guard cells from surrounding epidermal cells by osmosis; the guard cells become turgid, bulge outwards and stoma opens;

6. a)

**Axis-2 mks**

**Scale -2 mks**

**Plotting -1 mk**

**Curve -1mk**

 b) to supply more oxygen and glucose to the muscle tissues; to increase energy production; for muscular contraction; faster transport of carbon (IV) oxide to excretory organs to be excreted;

 c) 135-96 2 = 29.5

 =30 beats per minute ; **rej. 29.5 beats as the final answer**

d) (during the exercise muscles respire anaerobically producing) lactic acid which accumulates in the tissues. Heart rate remains high to supply more oxygen; to oxidize lactic acid to carbon (IV) oxide, energy and water/ transport lactic acid to the liver;

e) Fever/ high temperature;

 emotions/ anxiety/fear/ adrenaline;

f) sympathetic nerve;

g) blood from the heart is pumped into arteries under high pressure;

 They have narrow lumen that maintain the high pressure of blood;

7. a)

Epidermis; secretes the cuticle; protects inner tissues from mechanical damage/entry of micro-organisms;

Cuticle; reduces excessive loss of water; protects the inner tissues from mechanical damage/ prevents entry of micro-organisms; it is transparent to allow light to penetrate through into the photosynthetic cells;

Guard cells; have chloroplasts hence carry out photosynthesis; control opening and closing of the stomata;

Palisade cells; spongy mesophyll cells; are photosynthetic cells;

Xylem; transports water and mineral salts from the roots to the leaf cells; phloem; transports manufactured food from the leaves to the rest of the plant;

 **Total 17 mks max 15 mks**

b) have reduced number of stomata hence low rates of transpiration; small stomatal opening to reduce transpiration; some plants have sunken stomata; where water vapour accumulates in the pit reducing the diffusion gradient; hence lower rate of transpiration. Some plants have reversed stomatal rhythm; to prevent excessive water loss by transpiration; some plants have stomata that show midday closure; to prevent excessive water loss; **total 7mks max 5mks**

8. a)

Good qualities from the parents are retained in the offspring without any variation;

The plants mature faster than those produced by sexual means;

The plant depends on its own activity to reproduce;

The new plants are able to obtain nourishment from their parent plants, hence are able to survive temporarily under unsuitable conditions;

There is no wastage of large number of offspring as it does not result in indiscrimate and widespread distribution of new plants;

It makes it possible for plants that do not have the capacity for sexual reproduction to reproduce asexually; **total 6mks max 5mks**

b) The pituitary gland secrete a number of reproductive hormones which carry out various reproductive functions

follicle stimulating hormone; secreted just after menstruation; to stimulate the development of graafian follicle; it also stimulates the ovarian tissues to secrete oestrogen; which controls development of female secondary sexual characteristics; causes healing and repair of the endometrium; and stimulates pituitary gland to secrete luteinizing hormone; luteinizing hormone (LH); stimulates maturation of graafian follicle; causing ovulation; LH also stimulates the corpus luteum to start secreting progesterone;

Prolactin; stimulates secretion of milk; (by the secretory cells of the mammary gland)

Oxytocin; stimulates contraction of uterine muscles during labour; to facilitate birth; it also stimulates milk let-down; **total 17mks max 15 mks**

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