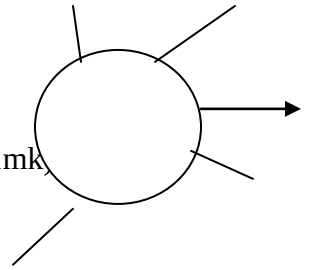
BIOLOGY FORM 4 PAPER 2 MARKING SCHEME

Q1.



A (1mk)

level D → Level C → Level B → Level

SUN

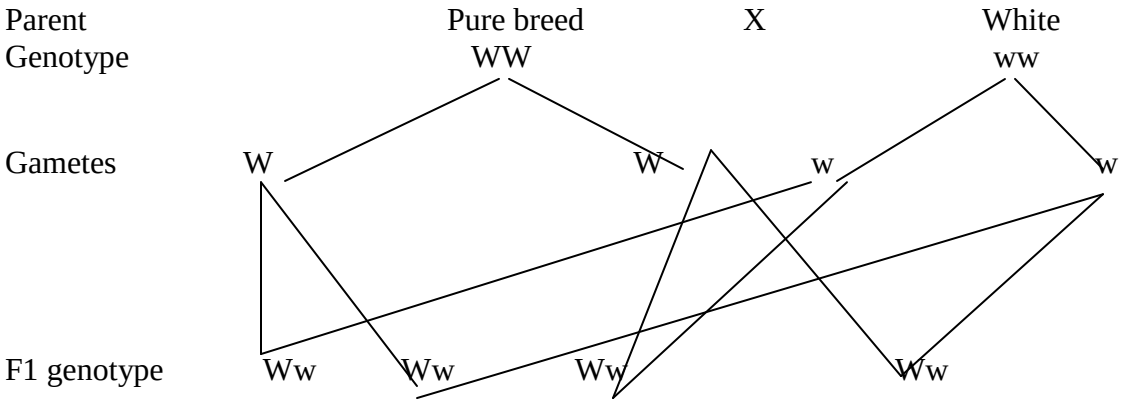
(**All must be correct)**

(b) B-secondary consumers; D-producers (2mks)

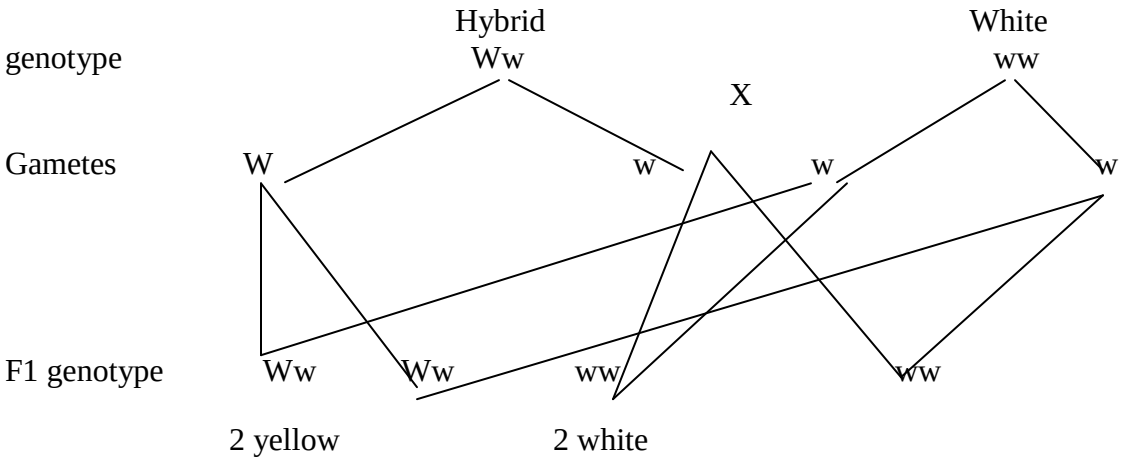
(c) Amount of energy decrease along the path (from D to A); some energy is lost through respiration unconverted materials and uneaten individuals. (2mks)

(d) Number of individuals in level B decrease leading to decrease at level A due to starvation/less energy available; number of individuals in level D would increase due to decrease of herbivores/grazers. (2mks)

Q2. (a)Back cross with white maize (ww)



NB all yellowNB:Gametes should be circled individually. (2mks)



Mixture of yellow and white (2mks)

(b) Male sex chromosome XY female XX.

Sperm / Ova	X	Y
X	XX Girl	XY Boy
X	XX Girl	XY Boy

50% boys, 50% girls/equal chances (2mks)

Q3. (a) Environmental temperature lower than body temperature more heat was being generated to maintain body temperature. (2mks)

(b) The lizard is poikilothermic, enzymes were inactive at low temperature, their activity increased as temperature increased because enzymes were activated.(2mks)

(c)) (i) vasodilation, sweating, hair lie flat on skin (first two) (2mks)

(ii)Aestivation, migration to shade, burrowing, sand bathing, (any one correct)(1mk)

Q4. (a) To demonstrate osmosis in non -living tissue (1mk)

(b) Level of sucrose rose in thistle funnel, water drawn into funnel by osmosis,since sucrose solution was hypertonic to/more concentrated than distilled water. (2mks)

(c) (i) Sucrose solution level would rise in funnel.(1mk)

(ii) No observable change/sucrose level remained the same.(1mk)

(d) (i) Cell membrane in arrow root destroyed hence no osmosis (1mk)

(ii) Cell sap/dissolve sugars and salts in vacuole.(1mk)

Q5 (a) Cellulose (1mk)

(b) (i) Store sugar/salts/food; create osmotic gradient for osmosis; cause cell turgidity(2mks)

(ii) Rate of photosynthesis would reduce/inadequate food produced.(1mk)

(c) Cell wall; chloroplast(2mks)

Q6.(a) (i) to show energy is released in anaerobic respiration; to show carbon(IV) ; oxide is produced in anaerobic respiration. (2mks)

(ii) Increase in temperature since energy is released colour of indicator; changed to yellow due to acidity/carbon. (IV)oxide released changed indicator to yellow. (1mk)

(b) (i) Expel dissolved oxygen; (1mk)

(ii) Prevent entry of air/oxygen into glucose solution.(1mk)

(c) use glucose solution without yeast/used killed yeast cells.(1mk)

(d) Ethanol production in breweries, breads production in bakeries.(1mk)

Q7.

(i) Labeling axis (2mks)

Scale (2mks)

Curve (1mk)

Plotting (1mk)

(ii) 205cm^3 oxygen /ghr $^{-1}$ $^{-}$ $^{+}$ 5 evidence from gragh (2mkS)

(b) (i) RAT $\frac{\text{food eaten}}{\text{Body weight}}$ X 100% $\frac{0.098}{0.1}$ X100 =98% (2mks)

(ii)Elephant $\frac{40}{800}$ X 100 =5% (2mks)

(C)Rat eat more food per unit body weight than elephant; Rat has larger surface area to volume ratio; therefore tend t0 lose more heat per unit body weight; oxidize more food/faster to maintain body temperature(4mks)

(d**) Elephant**: least surface area to volume ratio; lose water very slowly since some tissues are far from body surface; metabolic rate very slow; hence little water lost through sweating per unit body weight(2mks)

(e)Reptile poikilothermic/depend on environmental temperature; mammal homiothermic/oxidize food to maintain body temperature (2mks)

8(a) (i) Transpiration is the process by which plants lose water to the atmosphere in form of water vapour

(ii)Translocation is the process by which soluble products of photosynthesis/simple sugars are transported from leaves ;to other parts of the plants through phloem

(b)**Temperature**: high temperature increases water evaporation from mesophyll cell; increase capacity of atmosphere to hold more water due to faster movement of molecules/ low temperatures reduces the rate of water evaporation; air capacity to hold more water hence low transpiration rate

Humidity:high humidity lower the saturation deficit /reduce ability of atmosphere to hold more water;hence low transpiration rate/low humidity offering great saturat

ion deficit;hence high rate of transpiration

Light intensity:at low light intensity stomata close; reduce surface area over which water is lost/low transpiration rate/stomata open at high light intensity;surface area hence increases transpiration rate

Wind/air current:fast air movement /strong air current sweep away saturated air around plant;increasing transpiration rate ;still air/weak air currents make water accumulate around the plant lowering transpiration rate

Size of stomata/number of stomata/leaf area:large/many stomata/leaves/large area; increase transpiration rate/few leaves/small/few stomata reduce surface area; hence low transpiration rate

Atmospheric pressure: low atmospheric pressure increase water evaporation; hence high rate of transpiration/high atmospheric pressure reduce water evaporation; hence low rate of transpiration [3marks] award only once in each condition/low or high. {max 16marks}