BIOLOGY PAPER 2

ANSWERS

KCSE 2010

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28.4.2 Biology Paper 2 (231/2)

1. (a) Respiration; (1 mark)

   (b) (i) Increase/rise in thermometer reading/temperature; (1 mark)

   (ii) Carbohydrates/starch/glucose in germinating seeds is broken down/oxidised to get energy; some of the energy is released as heat;
   (which increases temperature reading). (2 marks

   (c) To kill bacteria/fungi/microorganisms; that would cause decay/decomposition/respiration of the beans; (2 marks)

   (d) To conserve heat/prevent heat loss to surroundings; (1 mark)

   (e) Use similar set-up but with dead and disinfected beans seeds/ use dead disinfected bean seeds/use dry bean seeds; (1 Mark)

2. (a) P Tissue fluid/intercellular/interstitial fluid/space; (1 Mark)
   Q Venule; (1 Mark)

   (b) (i) Glucose, oxygen; (1 Mark)

   (ii) Carbon (iv) Oxide, water; (1 Mark)

(c) Blood entering arteriole has a high pressure; the pressure forces water and small solute molecules in blood to go through capillary wall forming tissue fluids; nutrients/oxygen mc into the tissue cells by diffusion; (3 marks)

(d) Red Blood cells/proteins/platelets; (1 Mark)

3. (a) (i) Primary consumers; (1 Mark)

(ii) Primary/secondary consumers; (any one) (1 Mark)

(b) Green plants → Caterpillars → Lizards;
Decaying leaves →Caterpillars → small insects → Lizards; (2 Marks)

(c) (i) Hawks; (1 Mark)

(ii) At each trophic level energy is lost as heat in respiration; and during decompositio lost in defecation/faeces/ waste products or metabolism/excretion; some parts of organism not eaten e.g feathers;

any 33 marks

4. (a) X Pupil;
Y Circular muscles; (2 Marks)

(b) (i) Dull/dim light/low light intensity; (1 Mark)

(ii) Circular muscles (in iris) relax; while radial muscles contract; the pupil becomes bigger; allowing more light to enter the eye; (4 marks)

(iii) Allows one to visualize objects/see under dim light;

(1 Mark)

(a) F_1 (Selfed) ;

Parental genotype GH X GH

Gametes

;

F_2

GG GH GH HH;

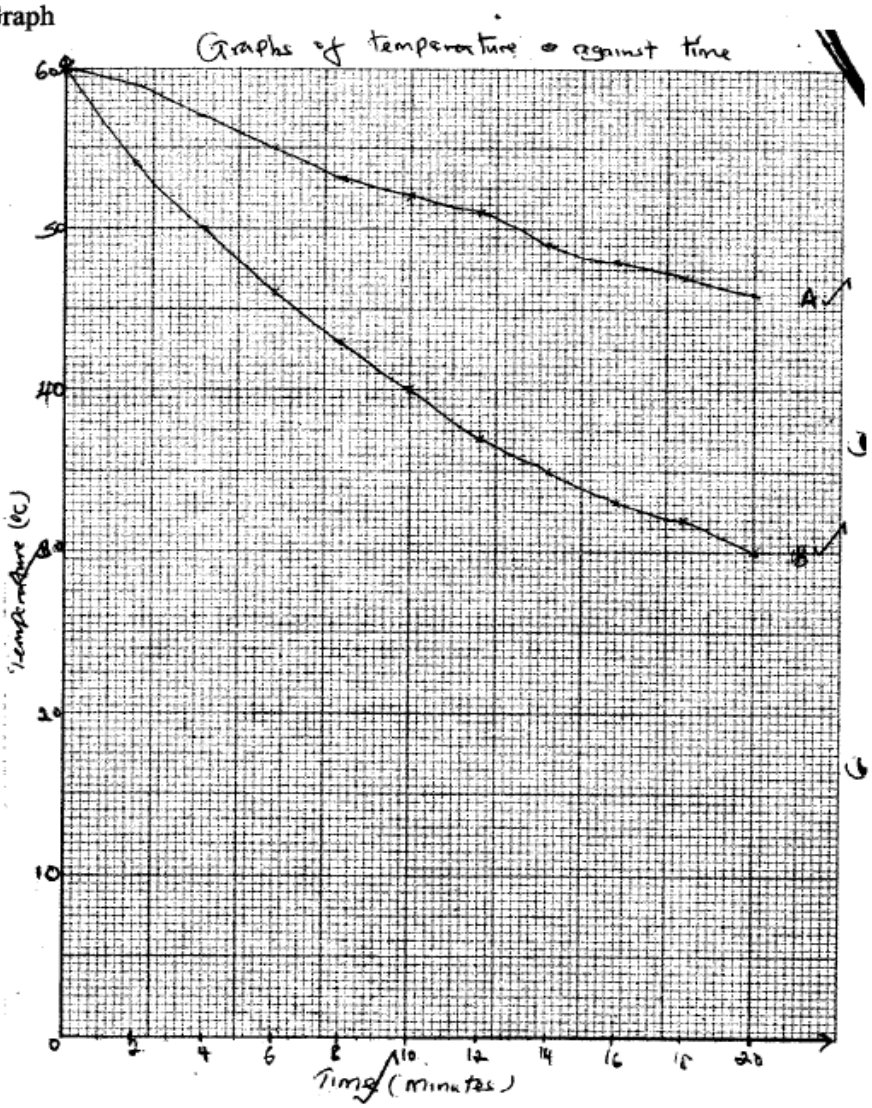
Genotypic ration 1GG:2GH:1HH; = 1:2:1 ; (5 Marks

(b) 1Black:2 black and white:1 white; = 1:2:1 ; (1 Mark)

(c) (i) Codominance; (1 Mark)

(ii) Blood group inheritance; Acc. blood groups
Acc. sickle cell trait (1 Mark)

5. (a) Graph



Title
Suitable Scale cover ¾ page (2 Marks)
Axes (1 Mark)
Plotting (1 Mark)
Smooth curves (2 Marks)
Identification

(b) (i) A: $56 - 48.5 = 7.5^{\circ}C$

$\frac{7.5^{\circ}C}{10 \text{ Minutes}}$; $=0.75^{\circ}C$ Per Minute; ±0.05 (2 Marks)

B: $48 - 34 - 14^{\circ}C$

$\frac{14^{\circ}C}{10 \text{ Minutes}}$; $=1.4^{\circ}C$ Per Minute; ±0.05 (2 Marks)

(ii) B has a larger surface area to volume ratio; making it to lose heat to the surrounding faster; (the converse is true) (2 Marks)

(iii) A rat has larger surface area to volume ratio compared to an elephant; making the rat to lose heat at a faster rate than an elephant; (2 Marks)

(c) (i) Insulation/insulate against heat loss; (to surrounding); (1 Mark)

(ii) Subcutaneous fat layer / adipose tissue;
Fur / hair; (2 Marks)

(d) Are active always; (even under very cold conditions)
Are able to escape from predators/search for mates/food; (because they are active always)
Can survive in a wide variety of habitats: (both cold and hot) WTTE

6. Pollen grains land onto the stigma; and adhere to it as a result of the stigma cells secreting a sticky substance; It absorbs nutrients; and germinates forming a pollen tube; The pollen tube grows down the style to the ovary; deriving nourishment from surrounding tissues; The pollen tube has tube nucleus at the tip; and generative nucleus immediately behind it; As the tube grows downwards into the ovary the generative nucleus divides mitotically; to give rise to two nuclei; which represent the male gametes; The pollen tube penetrates the ovule/embryo sac through the micropyle/chalazza; After the pollen tube enters the embryo sac, the tube/vegetative nucleus breaks down; leaving a clear passage for the entry of the male nuclei; which enter the embryo sac; where one fuses with the egg cell nucleus; to form a diploid zygote; which develops into an embryo; The other male nucleus fuses with the two polar nuclei; to form a triploid nucleus /primary endosperm nucleus; Which becomes endosperm; This type of fertilization is called double fertilization;

(22 Marks)
Max. 20 Marks

7. Movement of fish in water is by swimming; It involves forward movement and control of the body position in water; Scales overlapping backwards/mucus/streamlined body shape reduces resistance/friction to enhance forward movement; Forward movement (propulsion) is caused by the tail; The tail is (almost half the length of the body of the fish) to enable it create enough force (to enable the fish to push forward); Propulsion is achieved when the tail pushes sideways against the water; Sideways movements is brought about by muscles arranged in segmented blocks/myotomes on both sides of vertebral column; The muscles contract alternately causing the vertebral column to swing sideways; When muscle blocks on the right relax and those on the left contract; the body bends to the left side; When the muscles of the left relax and those on the right contract; the body bends to the right; The fish uses its fins to control the position of its body in water; During forward movement paired fins/pectoral and pelvic fins lie flat on the body surface to reduce resistance/friction; To change direction the fish uses the paired fins; Paired fins are also used by fish to change its level in water/control/prevent pitching; The fish spreads out the pectoral and pelvic fins at 90° to the body; to enable it to brake; Fish can also use the swim bladder to change its level in water; When the bladder fills up with air the fish becomes lighter/more buoyant; making it to rise in water; When the air leaves the bladder the fish becomes heavier; making it to sink deeper in the water; water currents may cause the sideways swaying of the body of the fish/ yawing; Dorsal and ventral fins prevent rolling/yawing;

(25 Marks
Max. 20 Mark