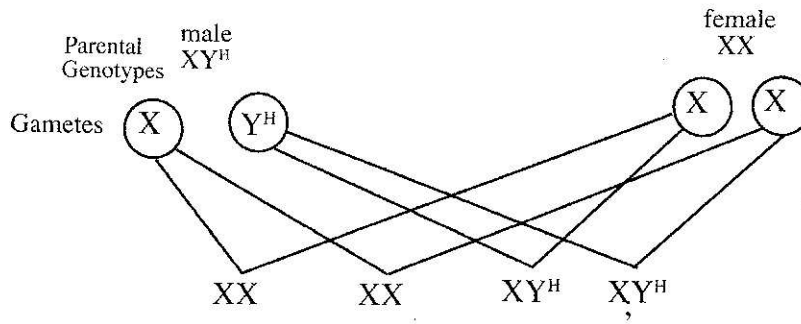


KCSE 2011**9.2 Biology Paper 2 (231/2)**

1. (i) - Testing a leaf for the presence of starch;
 (ii) - A - kill the leaf/break down cells/stop enzymatic activity;
 B - Removal of chlorophyll;
 C - Soften leaf/makes leaf less brittle;
 (iii) Iodine solution;
 (iv) Areas where starch is present stain blue/blue black;

Total(6 marks)

2. (a)



- (b) (i) Probability of girls having hairy ears is zero 'O' ; (4 marks)
 (ii) The gene for hairy ears is on the Y chromosomes which girls do not inherit from their father; (2 marks)
- (c) Haemophilia; Colour blindness; (2 marks)
- (d) Vertebrate embryos have similar morphological features; which suggest a common ancestry; (2 marks)
- Total (10 marks)

3. (a) (i) Bordetella pertussis;
 (ii) Streptococcus pneumoniae;
 (iii) Mycoplasma pneumoniae; (2 marks)

- (b) Inhaled oxygen dissolves in moisture in the alveolus; since the oxygen concentration in blood is lower; than in the alveolus, oxygen diffuses; through the alveolus epithelium, the capillary wall into the plasma; and finally into the red blood cells. (4 marks)
- (c) Pneumatophores - grow into the air above mud/water; their lenticel for gaseous exchange; (2 marks)
- Total (8 marks)

4. (a) (i) P - is cerebral hemisphere/cerebrum;
 R - medulla oblongata; (2 marks)
- (ii) Muscular co-ordination; maintaining body posture; manual /motor dexterity; (first two) (2 marks)
- (b) (i) Follicle stimulation hormone; luteinizing hormone; oxytocin; prolactin; (first two) (2 marks)

- (ii) FSH - stimulates secretion of oestrogen; stimulates development of the Graafian follicle;
 LH - Brings about ovulation; causes development of corpus luteum;
 Oxytocin - causes contraction of uterus; causes expulsion of milk from mammary glands;
 Prolactin - stimulates milk production/secretion; (2 marks)

Total (8 marks)

5. (a) (i) Anthers; Ovary; (2 marks)
 (ii) Anthers are below the stigma to minimise self pollination;
 - petals are large/conspicuous, for insects to land on/ to attract insects encouraging cross pollination;
 - presence of interstitial cells that secrete androgens. (2 marks)

- (b) (i) L is hanging outside the body to ensure optimal temperature for sperm production; it has many, long and coiled seminiferous tubules to increase the surface area for production/storage of sperms; (2 marks)

- (ii) K produces an alkaline fluid that neutralizes acid in the vagina; this fluid contain nutrients for the sperms; and also activates sperms; (2 marks)

Total (8 marks)

6. (a) (i) See graph. (7 marks)
 (ii) 42 hours; (1 mark)
 (iii) Graph M at 50 hrs is 1220 ± 20 .
 Graph N at 50 hrs is 540 ± 20
 $1220 - 540 = 680 \pm 4$; (2 marks)
 (iv) Population growth stops;
 High temperatures kill the microorganisms/denature enzymes; (2 marks)
 (v) 46 hours to 59 hours death rate of the microorganisms is higher, than their population growth rate; due to exhaustion of nutrients; and accumulation of toxic wastes; (3 marks)

- (b) When the osmotic pressure of the blood increases beyond the normal level the hypothalamus detects this and stimulates the pituitary gland; to secrete more ADH; hormone which make kidney tubules more permeable to water; and more water is re-absorbed into the blood; reducing the osmotic pressure to the normal level.; (accept the reverse description) (5 marks)

Total (20 marks)

7. (a) Plants in arid, semi-arid and desert habitats have leaves covered with thick/waxy cuticles; that are waterproof/impermeable to water; allowing for reduced rate of transpiration; Sunken stomata; in some desert/semi arid areas plants have water vapour accumulating in the pits; reducing rate of transpiration (as the moisture in the pit is not carried away by wind.) Most plants have few or no stomata on the upper surface of the leaf; the fewer the stomata the less the water lost from the plant. Some plants have small stomata/stomatal size decrease when guard cells are flaccid; thus reducing transpiration rate. Plants with small/folding leaves; expose less surface area; hence reduce the rate of transpiration. Leaves with shinny surfaces; reflect light resulting in reduced leaf temperatures; thus reducing the rate of transpiration. Some plants have leaves covered with hairs/scales; which trap a layer of moisture; on the leaf surface reducing rate of transpiration.

Mesophyte have a thin layer of cuticle; to facilitate high transpiration rate; broad leaves exposing large area to transpiration;

Many stomata on both leaf surfaces provide many apertures to enhance transpiration.
(13 marks)

- (b) Erector pili muscle relax; and hair lie flat; trapping less air; thus reducing insulation; Blood capillaries under the skin vasodilate; and more blood is brought under the skin; increasing heat loss; sweat glands release more sweat to the skin surface; the sweat take away heat from the body when it evaporates;
(9 marks)
(7 maximum)

8. (a) The exoskeleton is made of chitin; chitin is not evenly distributed; hence it allows for movement; exoskeleton is secreted by the epidermal cells; when still soft it allows for growth of the insect; when in contact with the air it hardens limiting growth; It is shed regularly; thus regulating the growth of insects. It also supports the internal structures; Because it is hard; it protects; internal organs from mechanical damage. It is water proof; preventing water loss/dessication; of the insect. It also provides a surface for attachment of muscles;
(13 marks)

- (b) Light rays from a near object are more diverged and need to bend more; in order to be focused properly on the retina; ciliary muscles contract; suspensory ligaments attached to the ciliary muscles relax; the lens becomes thicker; increasing its curvature/becomes more convex; light from the object is refracted more; in order to be focused/more sharply on the retina to form an image.
(7 marks)