

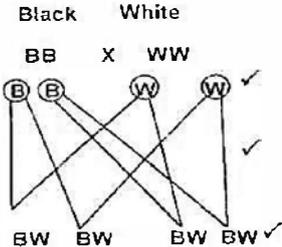
## KANGEMA/MATHIOYA FORM 4 JOINT EXAMINATION

## BIOLOGY

## Paper 2

July/ August 2016

## MARKING SCHEME

1. a) To show that soaked seeds produce heat when they respire; **1mk**  
 b) In flask A there was increase in thermometer reading; in flask B there was no noticeable increase in thermometer reading/ thermometer reading remained constant;  
 c) In flask A soaked seeds respire aerobically to produce heat energy which raised the temperature in the flask: in flask B no respiration; no heat was produced hence no increase in temperature / thermometer reading;  
 d) Vacuum flasks do not allow heat to enter to leave;  
 e) Flasks should be filled with seeds to ensure that the bulb is covered; bulb of thermometer  
 f) To kill bacteria / micro-organisms which would otherwise respire, giving wrong results
2. a) Fertilization in higher plants – involves one male nucleus fusing with a functional egg to form a zygote; while the other male nucleus fuses with the polar nuclei to form a triploid cell; In animals, fertilisation involves the fusion of the male nucleus and female ovum nucleus to form a zygote **2 mks**  
 b) i) Oestrogen  
 Promotes / causes / initiate the healing / repair of endometrium / uterine wall Stimulates the pituitary gland to secrete luteinising hormone **2mks**  
 ii) Luteinising hormone (LH)  
 - causes ovulation;  
 - stimulates the Graafian follicle remains to change into the corpus luteum  
 - stimulates / causes corpus luteum to secrete progesterone  
 - causes / stimulates the maturation of the Graafian follicle **any two, 2mks**  
 c) Provide site for exchange / diffusion of nutrients and waste products between the maternal blood and the foetal blood system; secretes / produces progesterone hormone; placenta attaches the foetus to the mother's uterus **mark the first two Total Smks**
3. a) Deamination; **1mk**  
 b) Eliminating the excess amino acids or proteins **1 mk**  
 c) Excess amino acid from ingested digested proteins **1 mk**  
 d) - used for respiration in cells  
 - converted into glycogen and stored in the liver  
 - converted into fat and stored in a dipose tissue under the skin **2 mks**  
 e) Essential amino acids - cannot be synthesised in the body and has to be provided in diet.  
 Mon-essential amino acids - can be synthesised in the body and there is no need to provide them in the diet **2mks**
4. a) - perception of sound;  
 - maintenance of body balance and posture; **2mks**  
 b) C - external auditory meatus G - semi-circular canals;  
 F - auditory nerve fibre; **2mks**  
 c) i) Balance atmospheric pressure on both sides of the tympanic membrane / ear drum **1 mk**  
 ii) Cochlea; **1 mk**  
 d) D **1 mk**
5. a) Parental Phenotypes Black White  
 Parental Genotypes BB x WW  
 Gametes B B W W ✓  
  
 BW BW BW BW ✓
- b) Incomplete dominance; rj. codominance **1mk**  
 c) To establish unknown genotypes of organisms; **1 mk**  
 d) Results in new combinations; causing variations; **2 mks**  
 e) (ABO) blood groups; **1mk**
6. a) graph  
 b) 5hrs and 24 min + 6min;  
 11 hrs + 6min  
 (10 hours 54mins - 11 hours 6mins)  
 c.) Paramecium Aurelia - predate on yeast - prey; **2mks**

- d) 6-4 = 2 hours  
 - when population prey / yeast increases is followed by increase in predator / paramecium aurelia: acc converse  
**2mks**
- e) i) 2 and 6 hours  
 - more cells are dividing; due to suitable environment/ adequate food / favorable condition; few are dying; hence high increase in number;  
**any 3mks**  
 ii) 6 and 12 hours  
 - Accumulation of toxic wastes; (that kill paramecium); depletion of nutrients; (leading to death) overcrowding; (leading to competition of food *i* leading to death / competition for space  
**any 3mks**
- f) Population will remain the same; temperature not conducive for reproduction;  
**2mks**
7. i) Process of inhalation in mammals  
 - external intercostals muscles contract; while internal intercostals muscles relax;  
 - (this movement) pulls ribs upwards and outwards;  
 - the diaphragm muscles contract; and the diaphragm flattens;  
 - (all the above movements) increases the volume of thoracic cavity; and decreases its pressure; atmospheric pressure being higher than thoracic cavity pressure; forces the air to rush into the lungs; (through the nose and trachea)  
 - the lungs are inflated  
**max. 10mks**
- b) During the day chloroplast of guard cells accumulate sugar / glucose produced through the process of photosynthesis;  
 - accumulated sugar / glucose in the guard cells increases osmotic pressure of the cell sap of the guard cells;  
 - water is drawn from the neighbouring epidermal cells by osmosis;  
 - guard cells become turgid and bulges outward;  
 - this opens the stomata;  
 - at night, sugar / glucose which had accumulated in guard cells is converted to starch;  
 - osmotic pressure of guard cells falls;  
 - the cells lose water to the neighbouring epidermal cells and become flaccid;  
 - the guard cells are drawn towards one another  
 - the stomata closes;  
**max 10mks**
8. a) i) Stomach  
 Pepsin; acts on proteins to polypeptides; renin; acts on milk protein caseinogens to casein; this occurs in acidic medium  
 ii) Trypsin; in pancreatic juice; hydrolyses polypeptides to peptides molecules; in alkaline conditions provided by / bile juice
- b) i) The root hair cell sap is hypertonic to the soil water; water from the soil moves into the root hair cell sap by osmosis; this makes the cell sap hypotonic / dilute; compared to hypertonic adjacent cortex cells; water moves into the cortex cells by osmosis; till it reaches the casparian layer; which pumps water into the xylem of the root; this is called the root pressure;  
 ii) Increase in temperature causes evaporation of water into the intercellular airspace of the leaf; this makes water vapour from adjacent cells to move into the stoma; creating diffusion gradient deficit between the atmosphere and intercellular space increased transpiration;  
 Increase in light intensity; increases rate of photosynthesis; leading to opening of stomata which leads to increased transpiration.