**MWAKICAN**

**TERM 1 - 2014**

**BIOLOGY PAPER 2: MARKING SCHEME**

**FORM 4**

1(a) RNA

Reason: presence of nitrogenous base – uracil

(b) Differences beween DNA and RNA

DNA RNA

1 Has the sugar deoxyribase 1. Has the sugar ribose

2 Is double stranded 2. Is single strand

(i) Complementary DNA strand

i) complementary RNA strands

GTTA CGAGA

(II) Complementary RNA strand

GUUACGUGU

2(a) Lactic acid

(b)(i) Anaerobic respiration in plants

(ii) No carbon iv oxide would be produced

Lactic acid would be produced instead of ethanol

(c) In the mitochondria

3 \_Always clean and store the microscope in a safe place free from moisture and dust

- Store the microscope when the low power objective lens clicks into position in line with the eye piece

(b)(i) brings the image into sharp focus

(ii) Concentrates light to the specimen

(c) it can crush the specimen and damage the lens and the slide

4(a)(i) Light splits the water molecule into oxygen and hydrogen ions a process called photolysis.

2H2O 4H+ + O2(g)

(ii) Carbon(iv) oxide combines with the hydrogen ions forming simple sugars(carbohydrates)

(iii) Chlorophyll absorb or trap light energy which is necessary for photosynthesis to take place.

(b)(i) Ptyalin - starch

(ii) Pepsin - proteins

(c) Cause – vitamin B1

Symptoms.

* General weakness
* Retarded growth in children
* Wasting of muscles
* Swelling of feet and legs

5(a) parental phenotype pure breeding plant

Heterozygous plant

Parental genotype GG X Gg

Gametes G G G g

Offspring genotype GG Gg

GG Gg

Genotypic ratio GG : Gg

1 : 1

(ii) Offspring phenotype – All have purple grains

6(a) X - Denitrification

Y - Animals

Z -Nitrification

(b) Rhizombium sp

Azolo bacter sp

7(a) Organic evolution is a concept which proposes that all living things arose from a few ancient simpler forms through gradual modification.

(b) Special creation is a concept which proposes that all living things were made by God at a specific time and have remained unchanged since

(c) Adaptive radiation are the modifications that occur to structures with a common embroyonic origin such structures a common embryonic origin to exploit different environments.

8)(a) Graph labeling the axis (2mks)

Scale (2mks)

Accuracy in plotting the (2mks)

(b) 24oC

c) Sweat production increases with increase in temperature because high temperatures increase the evaporation rate hence more sweat is converted to vapour. This uses latent heat of vaporization from the body causing cooling.

d) An increase in temperature decreases the amount of urine produced. This is due to increased osmotic pressure of blood. A lot of water is then reabsorbed into the blood at the kidney tubules resulting in the production of less and concentrated urine.

e)(i) Antidiuretic hormone

(ii) Pituitary gland

f) Hair: When it is hot the erector pili muscles relax,the hair lies flat on the skin surface to reduce insulation and encourages heat loss.

When it is cold,the erector – pili muscles contract causing the hair strands to trap a layer of warm air which insulates the body keeping it warm.

Sweat glands: These release sweat when it is hot. The sweat evaporates taking latent heat of vaporization from the body hence cooling it when it is cold,the sweat glands release less sweat. There is less evaporation and consequently less heat loss.

Blood vessels: when it is hot,blood vessels dilate (vasodilatation). More blood flows near the skin surface increasing heat loss by radiation and convection causing cooling of the body. When it is cold,the blood vessels constrict(vasoconstriction). Less blood flows near the skin surface reducing heat loss by radiation and convection.

Subcutaneons fat: The skin has fat deposits (or subcuitaneous fat) which insulates the body against heat loss or gain.

9(a) - They are moist to dissolve the diffusing gases

* They are highly folded to increase the surface area over which gaseous exchange take place
* They are thin walled to reduce the distance over which diffusion of gases take place
* They are well supplied with blood capillaries to carry the diffusing gases hence creating a high diffusion gradient

(b) - Skin

- buccal cavity

- Lungs

(C) Gaseous exchange takes place in the alveolus

The inhaled air has high concentration of oxygen compared to that of blood capillaries

The oxygen first dissolves in the moisture on the surface of the alveoulus. It then diffuses across the alveolar wall then through the capillary wall into the red blood cells.

* The haemoglobin in the red blood cells combines with the oxygen forming oxyhaemoglobin
* The blood is said to be oxygenated and is transported to the heart via the pulmonary vein
* The carbon(iv) oxide is more concentrated in the blood capillaries than in the alveolar cavity.
* It therefore diffuses across the capillary wall and then through the alveolar wall into the alveolar spaces.
* It is then expelled during exhalation

10 Structural features in terrestrial plants affecting in rate of transpiration

-Thickness of the cuticle. If the cuticle is thick and waxy the rate of cuticular transpiration decreases. If the cuticle is thin morecuticular transpiration take place.

Size of the leaf. Large and broad leaves have high surface area over which transpiration takes place thus more transpiration. Small and narrow leaves (needlelike) leaves have small surface area thus reducing the rate of transpiration

-Number of stomata

If the stomata are many the rate of transpiration increase. If the leaf has few stomata,the rate of transpiration decreases.

\_-Position of distribution of stomata

If the stomata are more on the upper surface of the leaf,the rate of transpiration increases as they are more exposed to environmental conditions.

If the stomata are more on the lower surface of the leaf,the rate of transpiration decreases as they are not exposed to light directly.

-Nature of stomata

Sunken stomata decreases the rate of transpiration as the sunken part reduces diffusion gradient. Stomata that are not sunken have higher rates of transpiration as there is high diffusion gradient with the substomatal air space

-Epidermal hairs

Presence of epidermal hairs reduces the rate of transpiration. Absence of epidermal hairs increases the rate of transpiration.