
FORM FOUR TERM ONE EXAM 2017

**MARKING SCHEME
BIOLOGY PP2**

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MARKING SCHEME BIOLOGY PP2

1a) A- Epidermis / $\sqrt{2}$ mrks

B-Pith

b) C (Phloem)- Transports manufactured food from the leaves to the rest of the plant .

D (Cambium) - They divide to form new cells that are added to older ones; brings about secondary growth $\sqrt{1}$

(Xylem) - Transports water and dissolved mineral salts from the soil to other parts of the plant. /

c) Section of the stem

section of the root

1. Lacks root hairs

1. Has root hairs $\sqrt{1}$

2. Has a pith

2. Lack a pith $\sqrt{1}$

3. Vascular bundles arranged radially

3. The xylem is star shaped with $\sqrt{1}$ phloem in between their arms or extension

4. It has a cambium ring

4. Lack a cambium ring **3mrks**

2. Gene for black coat colour completely dominant over brown coat colour; brown $\sqrt{1}$ colour gene recessive over gene for black colour.

(ii) Parental phenotypes Parental genotypes

Black

Heterozygous coat colour; $\sqrt{1}$

Parental genotype

BB

Bb; $\sqrt{1}$

Gametes

B

B

B

b; $\sqrt{1}$

F₁ generation

BB

BB

Bb $\sqrt{1}$

4mrks

Genotype ratio 1BB:1Bb; $\sqrt{1}$

(ii) 1. Down's syndrome $\sqrt{1}$

2. Klinefelter's syndrome $\sqrt{1}$

3. Turner's syndrome **2mrks**

3a) Buffalo consumes less oxygen per unit body weight than the mouse the mouse consumes more oxygen per unit body weight than the buffalo. $\sqrt{1}$

(b)(i) Buffalo-Has small surface area to volume ratio; $\sqrt{1}$ hence retains more heat leading to low rate of oxygen consumption or respiration $\sqrt{1}$ **(2mrks)**

(ii) Mouse – Has a large surface area to volume ratio; $\sqrt{1}$ hence loses more heat to the surrounding leading to high rate of respiration $\sqrt{1}$ more oxygen consumption.

(c) This is the minimum of energy required to maintain body function when at rest. $\sqrt{1}$

(d) Increase in temperature increase the kinetic energy of diffusing molecules ; $\sqrt{1}$ making them to move faster; $\sqrt{1}$ hence increasing the rate of diffusion. (2mrks)

4.(a) Osmosis $\sqrt{1}$

(b) (i) Set up A – The level of solution L in the visking tubing remained the same; $\sqrt{1}$ indicating /showing that L was Isotonic to solution K hence no osmosis; took place.

(ii) Set up B- Solution M in the visking tubing is full and the level of solution K $\sqrt{1}$ has reduced in the beaker. $\sqrt{1}$ This shows that solution M was hypertonic to solution; which enables water molecules from solution K to be drawn into the visking tubing by osmosis.

(c) (i) Support $\sqrt{1}$

(ii) Feeding in insectivorous plants $\sqrt{1}$

(iii) Opening and closing of stomata

(iv) Absorption of water from the soil

(d) Excess water and dissolved chemicals accumulate in the contractile vacuole which moves to cell surface on reaching maximum size and burst releasing the contents to the surroundings.√1

5.(a) It is the releases of nutrients (Phosphophates, Nitrates and Sulphates) into water bodies ;√1 as a result of discharge of domestic sewage, (agricultural fertilizers); √1which results into excessive (rapid) massive growth of water plants (algae bloom)√1 **(3mrks)**

(ii) It leads to reduce gases in water causing suffocation of fish which leads to death√1

(ii) It leads to reduce light in the water reducing the rate of photosynthesis hence depriving food for fish.√1

(iii) When algae decays, it reduces the rate of oxygen content in water which reduces the rate of respiration in fish.√1

(iv) The chemical substances released accumulates in their bodies leading to death.

(c) Agricultural Inorganic fertilizers contains phosphates and nitrates. This increase soil acidity so that soil micro-organic cannot inhabit such soil; formation of soil organic matter slows down and then stops soil becomes exhausted;(2mrks)

6a) Scale — 2mks Axes- 1mk

Plotting points — 2mks

(7mrks)

Identification — 1mk

Curves — 1mk

bi) Potometer ;√1

ii) The apparatus should be assembled under water to remove all air bubbles;√1

The leafy shoot should be cut under water to avoid blocking of xylem vessels by air bubbles;√1

The tap should be open when assembling the apparatus to remove the air bubbles.

Jelly should be smeared between the glass and rubber band and stem and rubber band to make the apparatus air tight.

c) Species X; √1 because of less water loss/low rate of water loss.√1

d) 10.30am 0.06 ½

ii) $29 \pm \text{g h}^{-1}$ √1

e) The rate of water loss increased gradually from 6.00am to 10.00am; √1and then,, rapidly from 10.00am to 1.00pm; √1as light intensity and temperature increased√1 due to stomata opening and faster evaporation of water√1

f) Sunken stomata,√1

Hairy stomata√1

Small stomatal pores

Fewer on the upper surface than lower surface

7) Fertilization is the fusion of the male and female nuclei in the embryo sac; The male gamete is contained in the pollen grain; produced in the anthers; The female gamete is found in ovules; within the embryo sac; After pollination, the pollen grain absorbs nutrients from the stigma; and develops an outgrowth called the pollen tube; which grows down the style to the embryo sac taking along the male gametes with it; The pollen grains usually adhere to the stigma as a result of the stigma cells secreting a sticky substance; which also stimulates the pollen grain to germinate sending down its pollen tube; The growth of the pollen tube into the stigma, through the style to the ovary, is by pushing its way between the cells where it gets its nourishment from the surrounding tissues;

As the pollen grain germinates; the tube nucleus occupies a position at the tip of the growing pollen tube; The generative nucleus divides by mitosis; into two male gamete nuclei; which follow behind the tube nucleus as the pollen tube grows down the style. The pollen tube enters an ovule through the micropyle; and when it reaches the centre of the ovule it penetrates the wall of the embryo sac and bursts open; the tube nucleus disintegrates leaving a clear way for the entry of the male nuclei; One of the male nuclei fuses with the egg cell nucleus; to form a diploid zygote; which develops into an embryo; while the other male nucleus fuses with the polar nucleoto form a triploid nucleus; This gives the double fertilization in flowering plants;

8a)i) They are densely supplied with blood capillaries highly vascularised for transportation of gases

ii) They are thin walled facilitate easy diffusion of gases and also to reduce the distance covered by the diffusing gases.

iii) They are moist dissolve gas

iv) They have a large surface area for gaseous exchange.

b) During inhalation/inspiration; the external intercostals muscles contract; while the internal intercostal muscles relax; raising the rib cage upwards and outwards; muscles of the diaphragm contract; making it to flatten; the volume of the thoracic cavity increases; as pressure decreases; higher pressure in the atmosphere forces air into the lungs inflating it;

During exhalation; the external intercostals muscles relax while the internal intercostals muscles contract; moving the rib cage downward and inwards; the diaphragm muscles relax; diaphragm retains its dome shape; volume of the thoracic cavity reduces; increasing pressure; higher pressure forces air out of the lungs.