MUSLIM SCHOOLS JOINT EVALUATION TEST

MARKING SCHEME

BIOLOGY 231/2

PAPER II

JULY - 2024

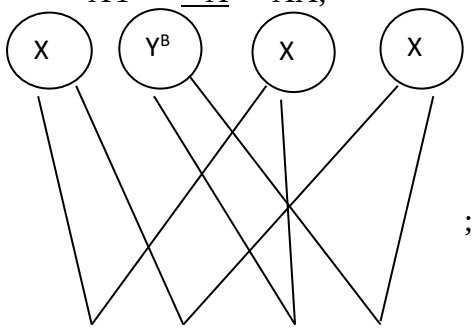
1. a) hypotonic; (1mk)

b) Solution Y was hypotonic to cell sap of the cortical cells; The epidermal cells are covered with waxy cuticle hence do not take in water by osmosis; while the cortical cells with thin walls take in water by osmosis. They therefore become turgid; hence the stem curves outwards. (4mks)

c) Absorption of end products of digestion in intestines; absorption of salts in the colon; re absorption of substances (any correct) in kidney tubules; (3mks)

2. (a)Parents Man/ ♂ Wife/ ♀

XY^B X XX^B; Rej – the mark for genotypes if the X is missing.

Gamete 

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; Rej – the mark for fusion lines if they penetrate the gametes.

Offspring XX^B XX^B XY^B XY^B ;

(b) (i) 0; **acc** – zero/none (1mk)

(ii) The gene for baldness is located on the Y chromosome which the girls lack;

(c) Blood group;

(d) Colour blindness; reject Colour blind

3. (a). Natural selection; (1 mk)

(b). **Observation** (2 mks)

A – Long- necked giraffes survived;

B -- Short – necked giraffes died from starvation;/perished

Accounting (2 mks)

Nature selected those giraffes with long necks allowing them to survive; while rejecting those with short necks thus eliminating them; OR

Natural selection favours survival of giraffes long-necked traits; and rejects/eliminates those with short-necked traits;

(c) Current continents existed as one large land mass/ Pangea/ Laurasia; the present continents drifted leading to isolation of organisms; organisms in each continent evolved along different evolutionary lines; (3mks)

4. i Plant tissue

ii. It has got no centrioles

iii R – anaphase
T– Telophase

b.) – Retention of chromosome number
- give rise to new cells
- Brings about growth in multicellular organisms

c.) Root tip, Shoot tip, Cambium, Flower, Bud, Young leaf

d.) Chromatids reach the poles and become densely packed.
- A cell plate grows across the equatorial plane.
- Nuclear membrane forms.

5. (a) Water; 72.2%;

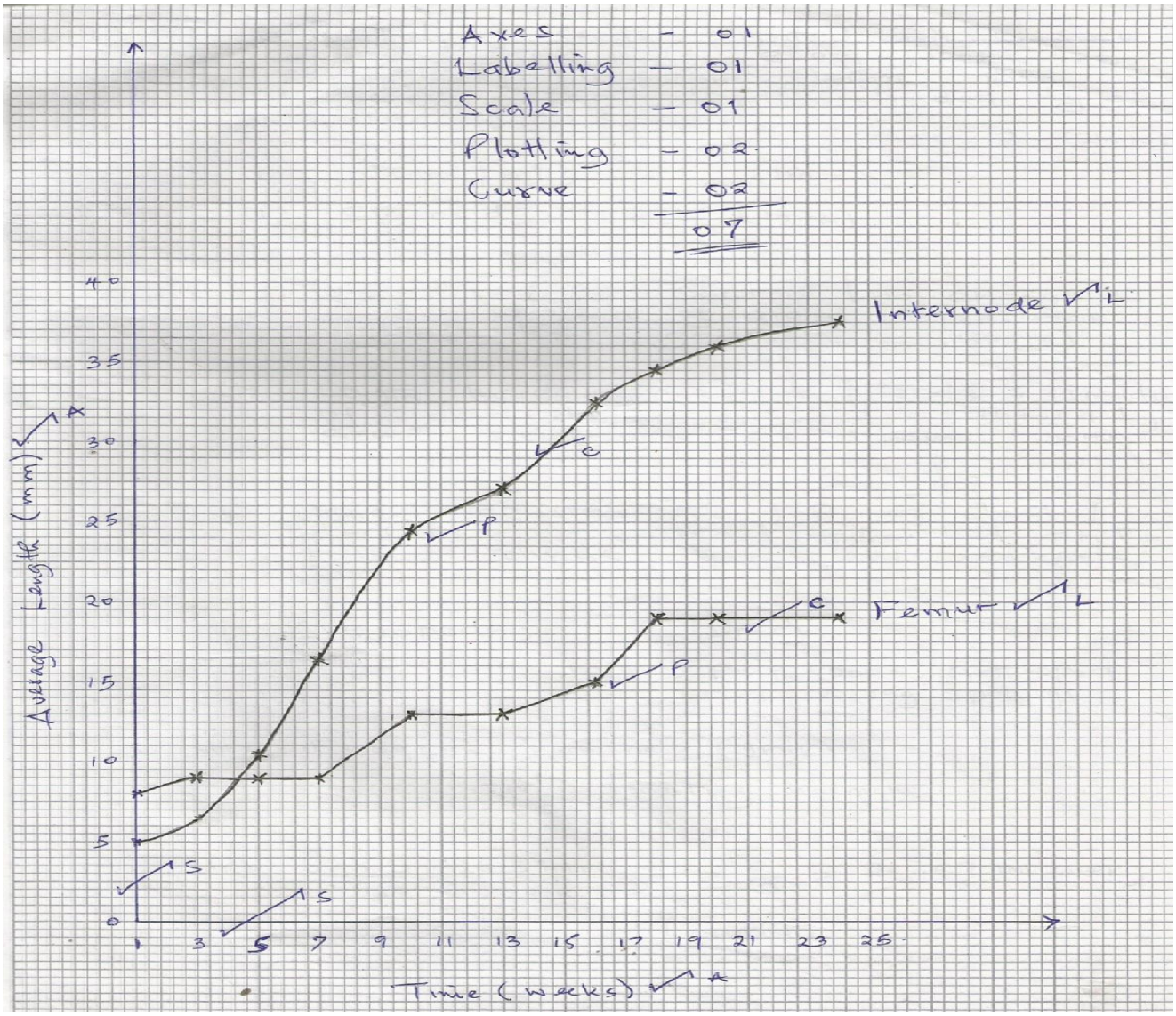
(b) Cellulose;

(c)(i) Proteins;

(ii) Proteins are broken down to ammonium compounds/ammonia; by saprophytic bacteria /fungi/microorganism; Ammonia is converted into nitrites by Nitrosomonas/Nitrococcus bacteria; nitrites are converted into nitrates by nitrobacter (bacteria);

(d)Urine contains urea/nitrogenous compounds; that add to the protein content of the faeces;

6. (a)



(b) (i) 18.5mm $\pm 0.5mm$; (1mk)

(ii) A number of seeds planted in the same condition/same plot; every week the samples of internode length was measured; total length divided by a number of samples; max 2 (2mks)

(c) (i) Intermittent; (1mk)

(ii) Sigmoid; (1mk)

(d) (i) Length remains constant/no change in length; presence of rigid exoskeleton/cuticle limit growth; (2mks)

(ii) Length increases; moulting/ecdysis/shedding/growth/expansion of tissues; (2mks)

(e) (i) Apical meristem at the tip of shoot/intercalary meristem/lateral bud at the node divide then cells elongate; (1mk)

(ii) Arthropoda; (1mk)

(rej-anthropoda,arthropod and any wrong spellings

(iii) Ecdyson hormone; (1mk)

Acc moulting hormone

(iv) $\frac{(24.5-16.5mm)}{(10-7)week}; = \frac{8}{3} = \frac{2.667mm}{week};$ (2mks)

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a) Epidermis has three layers

i) Cornified layer; Made of dead cells that protects against desiccation/mechanical damages;

ii) Granular layer; made of living cells that replace worn out cells of cornified layer;

iii) Malpighian layer; which actively divide to give rise to new epidermal cells

- Has melanin which screens against UV light; cells producing melanin synthesise vitamin D

b) Dermis cells

c) Has blood capillaries that supply food/and oxygen/remove excretory products; or arteries that vasodilate when temperatures are low

(i) Has sweat glands; that produce sweat which consists of water and salts/sodium chloride /urea and lactic acid; as sweat evaporates, latent heat of vaporization is taken away from the body therefore reducing the body temperatures; under cold conditions, little sweat is produced hence little latent heat of vaporization is taken away from the body therefore conserving heat;

(ii) Has hair follicles which have hair; which insulates the body against heat loss/hair stand erect to trap air when the temperature is low; hair lie flat to allow heat loss when temperature is high; through this the skin acts as a temperature regulator.

(iii) Nerve endings; which are sensitive to various stimuli; the skin therefore acts as a sensory organ.

(iv) Sebaceous gland; which produce oily substance sebum which is water repellant/antiseptic; prevents drying and cracking of the skin.

(v) Subcutaneous fat; which insulates the body against heat loss/shock absorbers.

8 a) Adrenal glands are triggered to secret adrenaline into blood stream; cardiac frequency/heart beat increases; while arterioles leading to skeletal muscles dilate; causing more blood to be directed to the tissues; to convey more oxygen; and glucose; and also remove carbon (iv) oxide and other metabolic wastes; liver convert glycogen to glucose; metabolic rate/respiration in skeletal muscles increase; to supply energy; intercostals muscles and diaphragm contract and relax; faster increasing depth of breathing; to supply more oxygen; and remove excess carbon (iv) oxide from the lungs (14mks)

(b) (i) Reflex action; (1mk)

(ii) Conditioned reflex; (1mk)

REFLEX ACTION	CONDITIONED REFLEX
Single stimulus bring about response Simple form of behavior and is Independent of experiences	Repeated stimulus to bring about response Involves modification of behavior and is dependent on experience
Sensory and motor components remains the same all the time	Primary sensory is replaced by secondary component but motor component remains the same.
Reflex simple	Reflex modified

1. (a) (i) It serves to cool the leaves especially during hot environment;

(ii) It provides a mechanism through which mineral salts are transported in the plants;

(iii) Allows loss of excess water from the plants;

(b) Root pressure: This is the force which push water from the root to the stem.

<u>Cohesion and adhesion force</u>

Cohesion force – force which attracts water molecules together maintaining a continuous column of water preventing the break of water column.

Adhesion force – water molecules cling to the sides of the xylem vessels wall.

Capillary force – The forces of adhesion and cohesion are the basis of capillarity the rise of liquids in Capillary tubes.

Transpiration pull – as water evaporates from the cells on the exposed parts of plants, water molecules are drawn from the adjacent cells. Eventually those cells that are adjacent to the xylem vessels draw Water from them by osmosis.

(iii) The guard cells have chloroplasts; in presence of light; photosynthesis occur in the guard cells of stomata; producing sugar in guard cells; This increases the osmotic pressure of guard cells; water is drawn from the neighbouring cells by osmosis; causing turgidity of guard cells; the inner walls of the

guard cells which are thicker than outer wall stretch more causing the guard cells to bulge outwards; stomata open. In absence of light, no photosynthesis in guard cells; sugar in guard cells is converted into starch; Osmotic pressure lowers; guard cell lose water to adjacent epidermal cells by osmosis; become flaccid; the inner walls of guard cells shrink; the thicker wall reduces; this closes this stomata.