

BIOLOGY

FORM II

END OF THE TERM 3 2023

MARKING SCHEME

1. i) Pitfall trap ✓ (1)
ii) Sweep net ✓ (1)
2. a) Cytology ✓ (1)
b) Taxonomy ✓ (1)
3. a) Species is the smallest unit of classification, whose members can naturally/freely interbreed to give rise to viable/fertile offspring's. ✓ (1)
b) The second name which represents species should start with a small letter. ✓ (1)
The two names should be underlined separately ✓ (1)
c) Because they do not belong to the same species. Only members of the same species can breed to give rise to offsprings.
4. Total magnification = eye piece lens magnification X objective lens magnifications
Therefore

$$\text{Magnification of objective lens} = \frac{\text{Total magnification}}{\text{Magnification of eye piece lens}} \quad \checkmark (1)$$

$$\frac{\checkmark (1)}{X200} = X20 \quad \checkmark (1)$$
5. a) Cell membrane/plasma membrane ✓ (1)
b) A – Phospholipid layer ✓ (1)
B – Protein layer ✓ (1)
c) It encloses the contents of the cell ✓ (1) either
It allows selective movement of particles in and out of the cell ✓ (1)
6. a) Osmosis ✓ (1)
b) The solution in tubing X was more dilute than that in the beaker/solution in tubing X is hypotonic to be solution in to beaker ✓ (2). Water moved from the tubing into the beaker

by osmosis/. Water molecules moved from the beaker where they are highly concentrated to where they are lowly concentrated. \surd ($\frac{1}{2}$)

The solution in tubing Y had the same concentration as that in the beaker. The solution is isotonic. There is no movement of water in either direction.

Z

The solution in tubing Z was more concentrated than in the beaker or Z is hypertonic \surd ($\frac{1}{2}$) to the solution in the beaker \surd . Water molecules moved from the beaker where there are more free water molecules than in the tubing Z. free water molecules move from the beaker to the tubing through osmosis.

- c) Uptake of water from the soil into the root hairs of plant roots \surd (2).
- Uptake of water from the surrounding medium into the cells of microorganisms.
 - Transport of water from the epidermal cells of the root to the cells at the center of the root (support).
 - Reabsorption of water from the kidney tubules (osmoregulation)
 - Reabsorption of tissue fluid into the bloodstream at the venous end of the capillaries.
 - Movement of H_2O from the veins of leaves through the leaf cells to the atmosphere during transpiration.
 - Opening and closing of stomata.
 - Feeding insectivorous plants.

7. a) Glucose
b) Glycogen
c) Starch

Act as a solvent in which all biology reactions take place

- It is a reactant in many biological reactions e.g. photosynthesis, hydrolysis of food molecules such as carbohydrates, fats and proteins.
- It is a solvent in which transport of nutrients, gases and waste products takes place.
- It is the solvent in which raw materials like minerals salts and finished products like sucrose are transported in plants.

- Helps in maintenance of constant body temperature in warm blooded animals because of its high specific heat capacity.
- It is responsible for turgidity of plant cells and hence the maintenance of an erect posture of plant.
- It is a habitat for many plants and animals.

8. a) Pepsinogen and trypsinogen

b) If secreted in active form, they would digest the cells which they are formed and also the lining of the glands that secret.

9. Structural factors

- Thickness of cuticle (rej. Cuticle alone)
- Leaf size and shape
- Location of the stomata/position
- Number of stomata & size
- Leaf fall
- Hairy leaves

Rej. Stomata alone

Any

Environmental

- | | |
|---------------|-------------------------|
| - Temperature | - Light intensity |
| - Wind | - Atmospheric pressure |
| - Humidity | - availability of water |

10. a) Young root ✓ (1)

b) Reason

- Presence of star shaped xylem with phloem strands lying between the arms of the star ✓.
- Presence of root hairs ✓

c) A – function

- Increases the surface areas for absorption of water, mineral salts ✓.

B

- Transport of water and dissolved minerals to the stem and the leaves ✓ (1).

11. Open circulatory system. Arthropods e.g insects any correct

Closed circulatory system. (Any correct) ✓ (1) (mammals)

12. On the diagram (put) if correct) (in – half a mark, out – half a mark)

b) A – Aorta ✓ (1)

C – Semilunar valves ✓ (1) (at the base of the aorta)

c) Because D (left ventricle) has to pump blood all over the body whereas E (right ventricle) only pumps blood to the lungs. (Thicker walls helps D to exert pressure to force blood all over the body) ✓ (1)

d) They have inherent contractility i.e they contract on their own without stimulation of nerve or hormones (myogenic) ✓ (1)

They can contract rhythmically throughout without fatigue

e) G. (pulmonary artery) carries deoxygenated blood from the right ventricle to the lungs ✓ (1).

13. a) To estimate the rate of transpiration by measuring the rate of water uptake by a plant shoot.

b) Stem of the shoot should be cut and fixed into to potometer under water to prevent air entering

into the xylem vessels. Either

All joints should be water tight ✓ (1)

c) The rate of transpiration would increase ✓ (1). Because heat causes temperature to increase hence increasing the rate of evaporation ✓ (1) of water from mesophyll cells of the leaf and reduces relative humidity of the air outside the leaf ✓ (1).

ii) Rate would decrease ✓ (1). Because removal of the leaves reduces the surface available for transpiration ✓ (1).

iii) Rate would increase ✓ (1). Because moving air washes away layers of water vapour ✓ (1) immediately outside the leaf. This lowers humidity of air outside the leaf thus increasing the relative humidity difference (saturation deficit) between the inside and outside of the leaf.

14. A – Enamel ✓ (1/2)

C – Dentine ✓ (1/2)

B – Gum ✓ (1/2)

D – Pulp cavity ✓ (1/2)

b) A – it is made up of hard organic substance consisting of mineral salt crystals (calcium sulphate) and carbonate) bound together by keratin \checkmark (1). It forms an efficient, hard biting surface.

D – Contains blood vessels provide nourishment for the dentine \checkmark (1).

Nerve endings for sensibility of the tooth \checkmark (1)

15. A – Microvilli

C – Venule

B – Lacteal

D – Arteriole

b) To provide a large surface area for the digestion and absorption of food

c) F – is network of capillaries where soluble end products of digestion diffuse into the blood stream

d) It is very long and the inner lining is highly folded offering a large surface area for absorption.

- Its surface area is increased further by villi and microvilli.

- Its epithelium is very thin allowing soluble food materials to pass through faster.

- It is richly supplied with blood capillaries and lacteals for transport of absorbed food materials.

e) Vitamins (any)

Inorganic ions

16. Explanation \checkmark (1)

1) Basal metabolism \checkmark (1). This is the energy required to maintain life it includes the energy used to drive vital processes as blood circulation, breathing maintenance of body temp etc. or basal metabolic rate (BMR). This is the lowest level of energy production \checkmark (1).

2) Sex \checkmark (1) explanation \checkmark (1)

Males require more energy than females because males are more masculine than female. Females have more fats males use more energy compared to females.

3) Body size \checkmark (1) explanation \checkmark (1)

Small bodies people have a small volume which leads to a large surface area to volume ratio. Their bodies lose a lot of heat to the surrounding. They therefore require more energy than big bodied people who have small surface area to volume ratio.

4) Occupation/activity \checkmark (1) – manual workers require more energy than for example an office worker (any correct explanation by use of an example)

5) Age \checkmark (1) explanation \checkmark (1)

Young children have many actively dividing cells and they are physically active.

Therefore their Basal metabolic rate is higher than that of adults.

