**231/2**

**BIOLOGY**

**PAPER 2**

Form 3

Paper 2

**MARKING SCHEME**

***FORM THREE BIOLOGY 231/2 2022***

 ***END OF TERM THREE EXAM***

***MARKING SCHEME***

AGrass B. toad. C. Centipede. . D. Lizard

b) Grass

C) The lowest feeding level on which all other organism depend.

D) Saprophytic fungi break down dead organic matter hence recycling nutrients for use by plants.

1. To investigate gas produced during photosynthesis;
2. X-Oxygen gas;

Y-Elodea/ water plant;

* Carbon (IV) oxide;
* Temperature;
* Water availability;
* Availability of mineral salts;
1. the gas rekindles/ relights a glowing splint;
2. water plant is adapted to live in water environment and will also generate more oxygen gas;
3. Autecology-study of a single species;
4. Synecology-study of many species;
5. A- aquatic/ fresh water;

B-terestrial/ forest;

C-arid/ semi-arid/ desert;

* Sunken stomata;
* Reversed stomatal rhythm;
* Mid-day closure;
* Small stomatal pore;
1. Diffusion;
2. Inside the visking – colour turns blue black while iodine in the beaker remains brown/ no colour change/iodine retains its brown colour;
3. Iodine molecules are smaller in size than starch molecules; iodine molecules diffused through the visking tubing and reacted with starch molecules;
* Reabsorption of mineral salts/ sodium ions in the kidney tubules;
* Reabsorption of glucose molecules from kidney tubules;
* Movement of waste products from blood cells into blood;
1. Proteins are not part of the glomerular filtrate as they are too large (have large molecular sizes) to pass through the small pores of the walls of glomerular;
2. $\frac{1.8}{0.03}$=60 times
3. As the filtrate flows in the tubules, water gets reabsorbed and not urea. This causes the concentration of urea to rise;
4. Glucose is completely reabsorbed at the proximal convoluted tubule;
5. Rubber-used in shoe and tyre industry;

 -manufacture of chewing gums; (max-1mk)

1. Papain-used as meat tenderizer;

 - Management of arthritis; (max-1mk)

* produces fewer and simple types of wastes products because they are autotrophic;
* plants wastes are produced in very small quantities due to plants low rate of activity;
* some organic waste products are stored in some i.e. leaves, flowers, fruits and bark which are removed when those organs are shed;
* excess amino acids are used to synthesize protein which can be stored unlike animals;
* plants can recycle their wastes;
* plants can store their wastes in non-toxic forms; **(max-2mks)**

**SECTION B**

1.
2. Axis(A)=1@ ½

 Scales (s)=1@ ½

 Plotting=3@1

 Curve =1 ½ @ ½

Identity (curves) =1 ½ @ ½

b) 38.5mg + 0.5

c)

1. There was hydrolysis of starch into simple sugar; which was used for respiration to provide energy for growing embryo;
2. Raw materials are synthesized and protoplasm produces new tissues; bringing about growth of embryo;
3. The rate of respiration was higher than that of synthesis of materials for growth in the embryo;
4. First leaves started carrying out photosynthesis thus increasing protoplasm;

**d) Factors within seed**

- Impermeable seed coat;

- Presence of abscisic acid (ABA) Germination inhibitors;

- Embryo not fully developed;

 Absence of hormone/enzyme that stimulates germination; (mark first two (2mks)

 **Factors outside seed**

* Unfavorable temperature;
* Absence of light;
* Lack of oxygen;
* Lack of water; (Mark first two (2mks)

(e) Have dense cytoplasm;

 They are small;

 Have thin cell walls;

 They do not have sap vacuole;

 Do not have chloroplast; (Mark first 1 = 1mk)

* Deep tap roots
* Thick waxy cuticle
* Succulent tissues
* Thin needle-like leaves
* Reduced number of stomata
* Have an inverted stomatal rhythm
* Fold their leaves
* Periodic shedding of leaves

; *(Total marks 22 max 15)*

* have biconcave shape that creates a large surface area for diffusion of gases;
* contain haemoglobin which readily combine with oxygen;
* lack nucleus and other organelles which allow more space for packing of haemoglobin;
* have thin plasma membrane which allows rapid diffusion of gases;
* small and numerous which offer a large surface area for diffusion of gases;
* have enzyme carbonic anhydrase which enables them to transport (carbon (IV)oxide);
* are (flexible/adaptable to change) enables them to move through capillaries;

Explain inspiration in the gills of bony fish

Mouth opens;

Muscular contractions in the mouth lowers the floor the of the mouth;

This increases volume in mouth cavity and decreases the pressure inside it;

The water outside is at a higher pressure and it rushes in through the open mouth;

Each operculum on the side of the fish bulges outwards by muscular action;

This increases volume and lowers pressure in the operculum cavity;

Water containing dissolved oxygen from the mouth is sucked into the gill chamber over the gills;

Oxygen diffuses into the blood capillaries; due to oxygen diffusion gradient;

 (b)Explain factors affecting the rate of breathing in human beings

 Exercise;

 During vigorous physical activity the rate of breathing increases so as to meet the increased demand of oxygen;

 Faster breathing also eliminates the extra carbon (IV) oxide produced by the increased respiration;

 Age;

 Young people have a higher demand of oxygen. They therefore have faster breathing rate; this is because young people are actively growing hence the faster rate of breathing is to supply tissues with oxygen;

 Emotions;

 Generally the body emotions affect the production of hormone adrenaline which increases the general metabolism and hence increased rate of breathing; e.g. fear anxiety and fright;

 Temperature;

 When the temperature is high; there is a tendency in the rate of gashouse exchange to increase. However if temperature is too high the breathing rate will reduce;

 Health

 During sickness the rate of breathing increases. The faster rate of breathing enables the liver to remove toxins in drugs those released by diseases causing micro-organism;

 The faster rate of breathing also enables the kidneys to excrete waste products of body metabolism through urine;