Grade 10 Science Telangana 2018

Paper -II

Q1. How can we say that Photosynthesis is the basic energy source for the living world?

Solution:

Photosynthesis is a key process that provides energy for all living things by producing oxygen, which is essential for life. Green plants and blue-green algae use sunlight to transform carbon dioxide and water into glucose, a simple sugar. This process is important for organisms that make their own food and plays a major role in the food chain. Without photosynthesis, the carbon cycle would not function properly.

Q2. Name the food material on which trypsin acts and name the end products.

Solution:

Trypsin, produced by the pancreas, helps break down protein-rich foods by digesting proteins into smaller peptides and amino acids. The inactive form, trypsinogen, gets converted into active trypsin, which acts on proteins and produces proteose and peptone as end products.

Q3. List the materials you have used to observe the goat heart in your laboratory.

Solution:

To observe a goat's heart in the lab, you will need a goat heart from a butcher, dissecting scissors, scalpels, soda straws, a tray, forceps, used pen refills, a jug of water, and other necessary tools.

Q4. Give any two suggestions to create awareness to stop female foeticide.

Solution:

The most effective way to prevent female foeticide is through awareness campaigns. Educating people about the value of girls can help change mindsets. Organizing street plays in areas with a low female population can also spread awareness. Additionally, the Beti Bachao, Beti Padhao scheme, introduced in 2015, supports the welfare of girls by promoting their safety and education.

Q5. Write two precautions you take while observing Rhizopus in the laboratory.

Solution:

Mould can cause allergies and may be harmful, so it's best to cover your skin and wear gloves when dealing with it. A toothpick can help scrape it off. If you accidentally touch it with bare hands, wash them thoroughly. If you have conditions like asthma or other allergies, it's safer to avoid contact with mould.

Q6. "We can't imagine the world without insects and birds". Suggest two methods to conserve them.

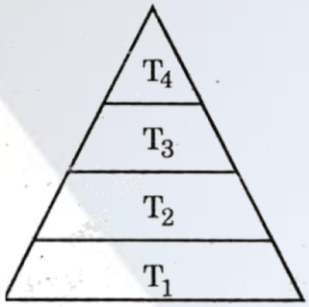
Solution:

Here are some ways to help protect insects and birds:

- Keep their natural environment safe
- Use pesticides carefully and only when necessary
- Set up safe areas for birds to live
- Teach people about proper waste disposal
- Reduce plastic use
- Support the growth of healthy animal populations

- Preserve natural habitats

Q7. The figure given below represents a food pyramid. Study it and answer the following questions:



a. Which trophic level has maximum energy?

b. Give one example for T_4 trophic level.

Solution:

(a) As energy moves through an ecosystem, the amount available at each level becomes less. Only about 10% of the energy is passed on to the next level, while the rest is lost mostly as heat through body processes. This means that the first level (T_1) has the most energy.

(b) An example of organisms at the fourth trophic level (T_4) includes top predators like hawks.

Q8. Explain two tropic movements with suitable examples.

Solution:

Tropism is when a plant grows in response to a stimulus. The plant's movement depends on the direction of the stimulus. If the plant moves toward the stimulus, it is called positive tropism. If the plant moves away from the stimulus, it is called

negative tropism. Different types of tropic movements happen based on how plants react to various stimuli, and examples can be found here.

Q9. Prepare four questions that you will ask a nephrologist about kidney failure.

Solution:

Here are some questions to ask your nephrologist about kidney failure:

- What is my creatinine level?
- What are the main reasons for kidney failure?
- What are the signs of kidney failure?
- How crucial is dialysis for my kidney failure?
- Can the kidneys be replaced?

Q10. Observe the chequerboard and answer the following questions:

♀ \ ♂	Y	y
Y	YY	Yy
y	yY	yy

a. Write phenotypic ratio of monohybrid cross.

b. How many heterozygous plants are present in the chequerboard?

Solution:

(a) We typically group the homozygous dominant (YY) and heterozygous (Yy) squares together as one phenotype, while the homozygous recessive (yy) squares form a different group. The ratio between the two groups can be 3:1 if one group

has three and the other has one. Therefore, the phenotypic ratio for a monohybrid cross is 3:1.

(b) The chequerboard contains two heterozygous plants, yY and Yy.

Q11. What will happen, if Islets of Langerhans fail to function?

Solution:

If the Islets of Langerhans do not work correctly, insulin will not be made, causing high blood sugar levels. This leads to diabetes in individuals. Since Gherlin is not released, you will also not feel hungry.

Q12. Suggest four measures to conserve fossil fuels.

Solution:

Here are some ways to conserve the fossil fuels:

- Use public transportation or carpool more often
- Organize seminars and workshops to raise environmental awareness
- Prevent deforestation and use other methods to protect soil
- Use less paper and plant more trees
- Reduce, reuse, or recycle plastic items

Q13. Observe the diagram and answer the following questions:

a. Name the male and female reproductive parts of the above figure.

b. Write the names of (1) and (2) in the diagram.

Solution:

A flower has reproductive parts that help it in reproduction. These parts include the stamen, which is the male reproductive organ, and the pistil, which is the female reproductive organ and the innermost part of the flower.

The reproductive parts of a flower are:

Stamen: This is the male reproductive organ, also called the androecium. It has two main parts:

i. **Anther** – A small, sac-like structure that is yellowish in color. It produces and stores pollen.

ii. **Filament** – A thin, thread-like stalk that holds and supports the anther.

Pistil: This is the female reproductive organ, also called the gynoecium. It consists of three parts:

i. **Stigma** – The topmost part that receives pollen during pollination.

ii. **Style** – A slender, tube-like structure that connects the stigma to the ovary.

iii. **Ovary** – The part of the flower that contains ovules. It is where seeds develop after fertilization.

(b) The names given are: (1) Filament (2) Sepal

Q14. Explain the vegetative methods of artificial propagation in plants.

Solution:

Vegetative propagation is a type of asexual plant reproduction that happens in the leaves, roots, and stem. It takes place when certain plant parts break off and grow into new plants. This can happen naturally through fragmentation and regrowth. You can also learn about artificial vegetative propagation.

Or

What do you understand by the term Natural Selection? Write Darwin's theory of evolution.

Solution:

Natural selection is a process in nature that explains how species change over time. According to Darwin's theory of evolution, new species develop from a single species as they adapt to their environment. This helps them survive better in changing conditions.

Q15. What are four R's? Explain how they help to conserve the environment.

Solution:

The process of building and maintaining a strong recycling program follows three key steps. Here’s a simple way to understand them:

Reduce: Fix leaking taps, take shorter showers, and turn off lights and fans when not needed. Think about other ways to use fewer resources.

Reuse: Instead of throwing away items like paper and gift wrap, find ways to use them again. This helps save trees and reduces pollution.

Recycle: While recycling is useful, it is not always the best option, especially for plastic. Plastics come in many types, and each type must be recycled separately. Sorting them correctly is important before they can be processed.

The fourth important step—**Recover**. This means retrieving valuable materials from waste to make use of them again.

Or

How do pesticides, herbicides and fungicides affect the ecosystems? Explain about Bioaccumulation and Biomagnification with examples.

Solution:

Pesticides and fungicides kill pests and fungi but also harm the environment, leading to bans or restrictions. Around 95% to 98% miss their targets, contaminating soil, water, and plants. They can also harm birds, fish, helpful insects, and other plants. Overuse leads to bioaccumulation, where harmful chemicals enter living things through air, water, or food, as seen with DDT in the 1950s and 1960s.

Biomagnification makes toxins more concentrated as they move up the food chain. For example, pesticides in water are absorbed by tiny organisms, then by fish, and finally by larger animals, increasing toxicity at higher levels.

Q16. List out the materials required and the procedure to be followed to prove that "Carbon dioxide is essential for photosynthesis."

Solution:

Photosynthesis requires raw materials like water, carbon dioxide and cellular components like plastids. Plants utilise these raw materials to synthesise carbohydrates only in the presence of light. These key features of photosynthesis were revealed during the midnineteenth century. Here, we have listed out the materials and the procedure to be followed to prove that "Carbon dioxide is essential for photosynthesis."

Materials required: A healthy potted plant, a wide-mouthed glass bottle with a

split cork, potassium hydroxide solution (KOH), and starch solution.

Experiment:

1. Select a healthy potted plant and place it in the darkroom for two to three days to ensure leaves are free from starch.
2. In a wide-mouthed glass bottle add 10 – 15ml of potassium hydroxide solution and split the cork vertically.
3. Now carefully insert half part of a leaf into a glass bottle through the split cork and the other half exposed to air.
4. Place the complete unit undisturbed in sunlight for about 3 – 4 hours.
5. After 4 hours, detach the leaf from the plant and slowly remove it out from the bottle and test it with the starch solution.
6. We can observe that the half part leaf which was inside the glass bottle (KOH solution) did not show any colour change but the other half part exposed to surroundings turned its colour to dark brown indicating the presence of starch in it.

Conclusion: In this experiment, we can conclude that carbon dioxide is essential for photosynthesis. Both portions of the leaf received the same amount of water, chloroplasts, and sunlight but the half part which was inside the glass bottle did not receive carbon dioxide.

Or

Write the procedure you have followed to observe "heat is evolved during respiration" in your laboratory. What precautions did you take during the activity?

Solution:

Given here are some precautions taken during this activity:

- The opening of the thermos flask is sealed tightly with a cork.
- A thermometer is inserted through the cork, ensuring its bulb is placed among the gram seeds.

- One flask should contain wet seeds, while the other should have only dry seeds.

Aim: To show that heat is released during respiration

Experiment:

- Place a thermometer in two thermos flasks, each containing 200 seeds that have been soaked in water for 24 hours.
- Next, separate the seeds into two flasks. Flask A will hold the live, germinating seeds, while Flask B will contain the live, germinating seeds that have been boiled and washed with formalin or carbolic acid.

Observation: After some time, the thermometer in Flask A shows an increase in temperature, but the thermometer in Flask B does not show any change.

Result: The increase in temperature shows that germinating seeds release heat. This experiment demonstrates that heat is produced during respiration.

Q17. Analyse the following information and answer the questions:

Sl No.	Organ	List 1- Effect of Nervous System	List 2- Effect of Nervous System
1	Eye	Dilates Pupil	Constricts Pupil
2	Mouth	Inhibits Salivation	Stimulates Salivation
3	Lungs	Relaxes Bronchi	Constrict Bronchi
4	Heart	Accelerates Heart Beat	Heart beat to normalcy

5	Blood Vessel	Increase Blood Pressure	Decrease Blood Pressure
6	Pancreas	Inhibits Pancreas Activity	Stimulates Pancreas Activity

(i) Write two functions of Sympathetic Nervous System.
(ii) Name two organs that are influenced by Parasympathetic Nervous System.
(iii) Name the nervous system mentioned in the table that increases the blood pressure.
(iv) What systems constitute an Autonomous Nervous System?

Solution:

(i) The Sympathetic Nervous System has two primary roles: it reduces salivation and speeds up the heart rate.

(ii) The Parasympathetic Nervous System helps return the heart rate to normal and also promotes the activity of the pancreas. Therefore, the heart and pancreas are two organs affected by this system.

(iii) The Sympathetic Nervous System raises blood pressure.

(iv) The Autonomous Nervous System consists of both the Sympathetic and Parasympathetic Nervous Systems.

Or

Read the following table and answer the following questions:

SI. No	Structure	Location

1	Tricuspid Valve	Right auriculo-ventricular aperture
2	Guard Cells	Epidermis of leaves
3	Glomerulus	Nephron
4	Alveoli	Lungs
5	Acrosome	Above the head of a sperm

(i) Name the structure concerned to the heart.

(ii) What is the function of an acrosome?

(iii) Name the structures, which are helpful for gaseous exchange.

(iv) Name the part performing excretion.

Solution:

(i) The tricuspid valve, also known as the right auriculo-ventricular valve, is located on the right side of the mammalian heart, between the right atrium and the right ventricle.

(ii) The acrosome in eutherian mammals contains digestive enzymes like hyaluronidase and acrosin. These enzymes break down the outer membrane of the egg, called the zona pellucida, allowing the sperm's haploid nucleus to fuse with the egg's haploid nucleus.

(iii) Alveoli, small balloon-shaped sacs in the lungs, play a crucial role in the respiratory system by exchanging oxygen and carbon dioxide between the lungs and the bloodstream. They are located at the ends of the respiratory tree and are grouped together in clusters.

(iv) The glomerulus in the kidney filters waste and harmful chemicals from the blood. It is part of the nephron, which also includes the proximal and distal tubules involved in excretion.