

# Brainiacs Biology Olympiad Preliminary Round Sample Exam Paper

## Category I – grades 7 and 8

### Easy Questions (5 questions)

**Q1.**

**Photosynthesis is the process where plants use sunlight to make their food.** During this process, plants take in carbon dioxide from the air and water from the soil. With the help of sunlight, they turn these into glucose, which is used for energy and growth.

Indicate if each of the following is true or false:

- A. Photosynthesis happens mostly in the plant's leaves.
- B. Plants use glucose for energy, but they don't release oxygen.
- C. Sunlight is needed for plants to make their food through photosynthesis.
- D. Plants take in carbon dioxide and water to make food.

**Q2.**

**The human skeleton gives the body shape, supports organs, and helps with movement.** It is made of bones, and joints allow for flexibility. The skeleton also protects vital organs, like the brain and heart.

Indicate if each of the following is true or false:

- A. The skeleton helps the body move by connecting muscles to bones at joints.
- B. Bones protect important organs like the brain and lungs.
- C. The skeleton is made of bones, muscles, and skin.
- D. There are no joints in the skeleton; bones are fixed in place.

**Q3.**

**The circulatory system is made up of the heart, blood, and blood vessels.** Blood carries oxygen and nutrients to all parts of the body. The heart pumps blood through arteries, veins, and capillaries.

Indicate if each of the following is true or false:

- A. The heart pumps blood throughout the body.
- B. Blood travels only through arteries, not veins.
- C. Veins carry blood back to the heart after it has delivered oxygen to cells.
- D. Blood is not needed for transporting oxygen to body cells.

**Q4.**

**Digestion is the process where your body breaks down food into smaller parts.** The mouth, stomach, and small intestine are key parts of the digestive system. Once food is broken down, the body can absorb the nutrients it needs.

Indicate if each of the following is true or false:

- A. Digestion starts in the mouth with the help of saliva.
- B. The stomach does most of the digestion before food moves to the small intestine.
- C. Nutrients are absorbed into the body mainly in the large intestine.
- D. Digestion happens only in the stomach.

**Q5.**

**Cellular respiration is how cells get energy.** In this process, cells use oxygen to break down glucose into energy. This energy is used for activities like growth and movement. Cells also release carbon dioxide as a waste product.

Indicate if each of the following is true or false:

- A. Cellular respiration happens in the mitochondria of cells.
- B. Cells get energy by breaking down glucose using oxygen.
- C. The waste product of cellular respiration is water.
- D. All cells perform cellular respiration to get energy.

#### **Normal Questions (10 questions)**

**Q6.**

**Plants make their own food through a process called photosynthesis.** During photosynthesis, plants take in sunlight, carbon dioxide from the air, and water from the soil. These are transformed into glucose and oxygen.

Indicate if each of the following is true or false:

- A. Photosynthesis produces glucose for the plant's energy.
- B. Oxygen is used by the plant during photosynthesis.
- C. Photosynthesis only happens at night when there is no sunlight.
- D. Chloroplasts in plant cells absorb sunlight for photosynthesis.

**Q7.**

**The human circulatory system consists of the heart, blood, and blood vessels.** Blood carries oxygen, nutrients, and waste products throughout the body. The heart pumps blood to the lungs and the rest of the body.

Indicate if each of the following is true or false:

- A. Arteries carry oxygen-rich blood away from the heart.
- B. The heart pumps oxygenated blood to the lungs.
- C. Veins carry oxygen-poor blood back to the heart.
- D. The circulatory system only works to move blood, not nutrients.

**Q8.**

**The human digestive system breaks down food into smaller molecules for absorption.** Food enters the mouth, is digested in the stomach, and nutrients are absorbed in the small intestine. Waste moves through the large intestine.

Indicate if each of the following is true or false:

- A. The stomach is the only part of the digestive system that breaks down food.
- B. Nutrients from digested food are absorbed in the small intestine.
- C. The mouth and stomach are responsible for digesting food chemically and physically.
- D. The large intestine absorbs most of the nutrients from food.

**Q9.**

**Cells are the basic building blocks of all living organisms.** Plant and animal cells have many similarities, but plant cells have structures like the cell wall and chloroplasts that animal cells do not.

Indicate if each of the following is true or false:

- A. Both plant and animal cells have a nucleus.
- B. Chloroplasts are found in both plant and animal cells.
- C. The cell wall gives plant cells structure and protection.
- D. Animal cells have chloroplasts for photosynthesis.

**Q10.**

**The respiratory system allows humans to take in oxygen and release carbon dioxide.** When you breathe in, oxygen enters the lungs and is transferred to the bloodstream. Carbon dioxide is removed when you breathe out.

Indicate if each of the following is true or false:

- A. The lungs are where oxygen is transferred into the blood.
- B. The respiratory system only functions when you breathe out.
- C. Oxygen enters the bloodstream through the alveoli in the lungs.
- D. The nose is the only organ involved in the respiratory system.

**Q11.**

**Food chains describe the feeding relationships between organisms in an ecosystem.** In a typical food chain, plants are eaten by herbivores, which are then eaten by carnivores. Decomposers break down dead organisms and recycle nutrients.

Indicate if each of the following is true or false:

- A. Plants are producers in a food chain.
- B. Decomposers do not play an important role in ecosystems.
- C. Herbivores are primary consumers in a food chain.
- D. Carnivores eat other consumers in a food chain.

**Q12.**

**The skeletal system provides support, protection, and helps in movement.** The human skeleton is made up of bones, which are connected by joints. The spine, or backbone, is a key part of the skeletal system.

Indicate if each of the following is true or false:

- A. Bones in the body are connected by ligaments.
- B. The spine is not part of the skeletal system.
- C. The human skeleton protects organs like the brain and heart.
- D. Bones in the skeleton are always flexible and can bend easily.

**Q13.**

**Ecology studies how organisms interact with each other and their environment.** An ecosystem includes all living organisms (plants, animals, microorganisms) and the physical environment (air, water, soil) in a specific area.

Indicate if each of the following is true or false:

- A. Ecosystems only include living organisms.
- B. Plants, animals, and microorganisms are part of an ecosystem.
- C. The physical environment, like water and soil, is not considered in ecology.
- D. An ecosystem is limited to just one species of organism.

**Q14.**

**The cell membrane controls what enters and leaves the cell.** It acts as a barrier that allows some substances to pass while blocking others. This process is important for maintaining a stable internal environment.

Indicate if each of the following is true or false:

- A. The cell membrane is made of a single layer of molecules.
- B. The cell membrane is completely impermeable and does not allow anything to pass.
- C. The cell membrane helps in controlling the movement of substances into and out of the cell.
- D. All substances can easily pass through the cell membrane without restriction.

**Q15.**

**The excretory system removes waste products from the body.** It includes the kidneys, ureters, bladder, and urethra. The kidneys filter blood to remove excess substances, which are then excreted as urine.

Indicate if each of the following is true or false:

- A. The kidneys are responsible for filtering blood.
- B. Urine is produced by the heart and transported by the lungs.
- C. The excretory system helps maintain water balance in the body.
- D. The bladder stores urine until it is excreted.

**Hard Questions (5 questions)**

**Q16.**

**In an experiment, two plants are placed in identical conditions, but one is exposed to direct sunlight, and the other is kept in a dark room. Over a period of several weeks, the plant in the dark room shows slower growth and yellowing of its leaves.**

Indicate if each of the following is true or false:

- A. The plant in the dark room is unable to perform photosynthesis properly due to the lack of sunlight.
- B. The yellowing of leaves in the dark plant is caused by a lack of chlorophyll, which is needed for photosynthesis.
- C. Both plants will produce equal amounts of glucose regardless of the light exposure.
- D. The plant in the dark room may not be able to produce enough energy to survive in the long term.

**Q17.**

**A group of students sets up an experiment to investigate how temperature affects the rate of cellular respiration in yeast. They place equal amounts of yeast and sugar in two test tubes. Test tube 1 is kept at room temperature (22°C), while test tube 2 is heated to 37°C. After 30 minutes, the students measure the amount of carbon dioxide produced in each test tube.**

Indicate if each of the following is true or false:



- A. Yeast will produce more carbon dioxide at the higher temperature due to faster cellular respiration.
- B. The rate of cellular respiration in yeast decreases at temperatures higher than 37°C.
- C. The amount of carbon dioxide produced will be the same in both test tubes if the conditions are the same.
- D. This experiment shows how temperature affects the metabolic rate of living organisms.

**Q18.**

**In a controlled experiment, students investigate the effect of different types of fertilizers on plant growth. They plant seeds in four pots, each with a different type of fertilizer (A, B, C, D). After four weeks, they measure the height of the plants in each pot and find that plants in fertilizer B grow the tallest.**

Indicate if each of the following is true or false:

- A. The results suggest that fertilizer B promotes the best plant growth in this experiment.
- B. Fertilizers A, C, and D may have different effects on plant growth, but they cannot be compared directly to fertilizer B.
- C. The students can conclude that fertilizer B will always work best for all types of plants.
- D. The height of the plants alone is enough to determine the most effective fertilizer.

**Q19.**

**A student is studying the relationship between the amount of water a plant receives and its growth. They create three groups of plants: Group 1 receives 50 ml of water daily, Group 2 receives 100 ml of water daily, and Group 3 receives 150 ml of water daily. Over a month, the student records the height of the plants in each group.**

Indicate if each of the following is true or false:

- A. The plant in Group 2 will likely grow the tallest, as it receives the most water.
- B. The results might show that watering too much (Group 3) could harm plant growth.
- C. If the plants in Group 1 are the tallest, it would suggest that more water is not always better for growth.
- D. All plants in each group will show exactly the same height growth after a month, regardless of the water amount.

**Q20.**

**A scientist is studying the impact of pollutants in the air on the respiratory health of mice. Over six months, the scientist exposes one group of mice to clean air and another group to polluted air. The mice are monitored for changes in lung function.**

Indicate if each of the following is true or false:

- A. The mice exposed to polluted air are likely to show a decline in lung function compared to the control group.
- B. Pollutants in the air can directly affect the respiratory system by causing inflammation in the lungs.
- C. The scientist can conclude that all pollutants in the air are harmful to respiratory health after this experiment.
- D. The experiment will show that polluted air has no effect on the mice's lung function if the exposure is brief.

## **Brainiacs Biology Olympiad Preliminary Round Sample Exam**

### **Paper Answer Key**

#### **Category I – grades 7 and 8**

### **Easy Questions (5 questions)**

1. A. **True**  
B. **False**  
C. **True**  
D. **True**
2. A. **True**  
B. **True**  
C. **False**  
D. **False**
3. A. **True**  
B. **False**  
C. **True**  
D. **False**
4. A. **True**  
B. **False**  
C. **False**  
D. **False**
5. A. **True**  
B. **True**  
C. **True**  
D. **False**

## **Normal Questions (10 questions)**

1. **A. True**

**B. False**

**C. False**

**D. True**

2. **A. True**

**B. False**

**C. True**

**D. False**

3. **A. False**

**B. True**

**C. True**

**D. False**

4. **A. True**

**B. False**

**C. True**

**D. False**

5. **A. True**

**B. False**

**C. True**

**D. False**

6. **A. True**

**B. False**

**C. True**

**D. True**

7. **A. True**

**B. False**

**C. True**

**D. False**

8. **A. False**

**B. True**

**C. False**

**D. False**



9. A. **False**

B. **False**

C. **True**

D. **False**

10.

A. **True**

B. **False**

C. **True**

D. **True**

### **Hard Questions (5 questions)**

1. A. **True**

B. **True**

C. **False**

D. **True**

2. A. **True**

B. **True**

C. **False**

D. **True**

3. A. **True**

B. **False**

C. **True**

D. **False**

4. A. **False**

B. **True**

C. **True**

D. **True**

5. A. **True**

B. **True**

C. **False**

D. **False**