Pollination and Fertilization

Pollination and fertilization are crucial processes in the reproductive cycle of flowering plants. Pollination involves the transfer of pollen from the male structure (anther) of a flower to the female structure (stigma). This transfer can occur through various agents, including wind, water, animals, and insects. Once the pollen reaches the stigma, it travels down the style to the ovary where fertilization takes place. Fertilization occurs when the male gamete (sperm) fuses with the female gamete (egg) within the ovule. This leads to the formation of seeds, which can grow into new plants.

Fill in the Blank: Fill in the blank with the correct words.

1. The transfer of pollen from the anther to the stigma is called ----------
2. ----------can help in transferring pollen from one flower to another.
3. After pollination, pollen travels down the---------- to reach the ovary.
4. The fusion of male and female gametes is known as ----------
5. Seeds develop from ----------after fertilization.

Multiple Choice Questions: Choose the correct answer from the choices for each question.

1. What is the primary purpose of pollination?
    - A) To produce leaves
    - B) To transfer pollen to the ovary
    - C) To create roots
    - D) To assist in photosynthesis
2. Which of the following can act as a pollinator?
    - A) Rocks
    - B) Insects
    - C) Clouds
    - D) Metal
3. What does the pollen tube grow through to reach the ovule?
    - A) Petal
    - B) Stigma
    - C) Style
    - D) Sepal
4. What part of the flower becomes the seed after fertilization?
    - A) Stigma
    - B) Ovary
    - C) Anther
    - D) Ovule
5. Which process occurs first in the reproductive cycle of plants?
    - A) Fertilization
    - B) Germination
    - C) Pollination
    - D) Seed dispersal

Answer the following questions in complete sentences.

1. Explain why pollination is important for plants.

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2. Describe the role of the pollen tube in the fertilization process.

The following questions are Assertion –Reason based questions .Choose the answer based on the codes given below .

a. Both A and R are true, and R is the correct explanation of A

b. Both A and R are true, but R is not the correct explanation of A

c. A is true, but R is false

d. A is false, but R is true

1. Assertion (A): Pollination is a prerequisite for fertilization in flowering plants.

Reason (R): Pollination helps in the transfer of pollen grains from the anther to the ovary.

Answer:

2. Assertion (A): Cross-pollination promotes genetic diversity in plants.

Reason (R): In cross-pollination, pollen grains are transferred between flowers of different species.

Answer:

3. Assertion (A): Fertilization in flowering plants results in the formation of a zygote.

Reason (R): Fertilization is the fusion of the male gamete with the egg cell in the ovule.

Answer:

4. Assertion (A): Self-pollination occurs in bisexual flowers only.

Reason (R): Bisexual flowers contain both androecium and gynoecium.

Answer:

5. Assertion (A): Pollen tube grows through the style to reach the ovule.

Reason (R): The pollen tube helps the sperm cells to reach the egg cell for fertilization.

Answer:

Case Study 1:

Meera observed that her grandfather's garden had fewer butterflies and bees this year. Although the plants were flowering well, very few fruits developed. Her grandfather mentioned that the use of pesticides had increased recently in nearby farms.

Questions:

1. Identify the type of pollination mainly affected in this case.----------
2. How does the reduction in insects influence fruit formation?----------

Case Study 2:

A farmer growing wheat noticed that even without many insects around, his crop produced grains successfully. The flowers were small, dull-coloured, and produced large quantities of light pollen grains.

Questions:

1. Name the type of pollination occurring in wheat.----------
2. List one adaptations seen in these flowers that support this method.----------
3. Why do such plants produce a large quantity of pollen grains?----------
4. What will happen if pollination does not occur in these plants?----------

Fill in the Blank: Fill in the blank with the correct words.

1. The _---------- is the protective outer covering of a seed.
2. Monocots have ----------_ cotyledon(s).
3. Seed germination requires water, oxygen, and the right _----------.
4. In ----------_ germination, the cotyledons stay below the ground.
5. The ----------_ provides nourishment to the developing embryo.

Multiple Choice Questions: Choose the correct answer from the choices for each question.

1. Which part of the seed is responsible for protecting the embryo?
   - A) Endosperm
   - B) Cotyledon
   - C) Seed coat
   - D) Embryo
2. What type of germination involves the cotyledons rising above the ground?
   - A) Hypogeal
   - B) Epigeal
   - C) Monocot
   - D) Dicot
3. Which of the following is necessary for seed germination?
   - A) Sunlight
   - B) Soil
   - C) Water
   - D) Insects
4. How many cotyledons do dicots have?
   - A) One
   - B) Two
   - C) Three
   - D) Four
5. What does the endosperm provide for the seed?
   - A) Protection
   - B) Nourishment
   - C) Growth
   - D) Photosynthesis

Open-Ended Questions: Answer the following questions in complete sentences.

1. Describe the role of the embryo in a seed.

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2. Explain the difference between epigeal and hypogeal germination

The following questions are Assertion –Reason based questions .Choose the answer based on the codes given below .

a. Both A and R are true, and R is the correct explanation of A
b. Both A and R are true, but R is not the correct explanation of A
c. A is true, but R is false
d. A is false, but R is true

1. Assertion (A): The seed coat protects the embryo from mechanical damage and desiccation.

Reason (R): The seed coat is a hard, waterproof layer that prevents water loss and microbial invasion. -------

2.Assertion (A): Cotyledons store food reserves in dicot seeds.

Reason (R): The endosperm is completely absorbed by the cotyledons during seed development in dicots.----------

3.Assertion (A): Oxygen is essential for seed germination.

Reason (R): Germinating seeds require energy for cell division and growth, which is obtained through aerobic respiration. ----------

4.Assertion (A): Soaking seeds in water speeds up germination.

Reason (R): Water softens the seed coat and activates enzymes required for breaking down stored food. ----------

5.Assertion (A): Some seeds do not germinate immediately after dispersal.

Reason (R): They undergo a period of dormancy due to unfavorable environmental conditions or hard seed coats.-----

Case based Study questions –

1. A student conducted an experiment with four seeds (A, B, C, D) under different conditions:

- Seed A: Placed in dry cotton at 30°C
- Seed B: Placed in wet cotton at 5°C
- Seed C: Placed in wet cotton at 30°C
- Seed D: Placed in waterlogged cotton at 30°C

1. Which seed(s) will likely germinate? Justify. ----------
2. Why did Seed B fail to germinate? ----------
3. What role does oxygen play in seed germination? ----------
4. How does waterlogging (Seed D) hinder germination? ----------

2.A farmer noticed that some seeds sown in his field failed to germinate even though they were healthy. Later, after proper irrigation and loosening of the soil, the seeds germinated successfully.

Questions:

1. List the essential conditions required for seed germination.----------
2. Why did loosening of soil help in germination?----------
3. What is the role of water in the germination process?----------
4. What would happen if seeds are kept in waterlogged soil?----------

3.During a laboratory activity, students soaked gram seeds overnight and observed them the next day. The seed coat had become soft and swollen. When they removed the seed coat, they observed two cotyledons and a tiny embryo.

Questions:

1. Name the type of seed observed in this activity.----------
2. What process caused the seed to swell after soaking?----------
3. Name the parts of the embryo present inside the seed.----------
4. What is the function of cotyledons in this seed?----------

Fill in the Blank: Fill in the blank with the correct words.

1. Respiration in plants primarily occurs in the ----------
2. The main byproducts of plant respiration are carbon dioxide and ----------
3. Unlike photosynthesis, respiration occurs during both **---------** and _.----------
4. The energy produced in respiration is used for **----------**and other functions.
5. Plants take in **----------**for respiration.

Multiple Choice Questions: Choose the correct answer from the choices for each question.

1. Where does respiration occur in plant cells?
   - A) Chloroplasts
   - B) Nucleus
   - C) Mitochondria
   - D) Cell wall
2. Which of the following is a byproduct of respiration in plants?
   - A) Glucose
   - B) Oxygen
   - C) Carbon dioxide
   - D) Sunlight
3. How often does respiration occur in plants?
   - A) Only during the day
   - B) Only at night
   - C) Only in the presence of sunlight
   - D) Continuously, day and night
4. What is the main purpose of respiration in plants?
   - A) To produce glucose
   - B) To release oxygen
   - C) To generate energy
   - D) To absorb sunlight
5. What is required for respiration to occur in plants?
   - A) Light
   - B) Water
   - C) Glucose and oxygen
   - D) Chlorophyll

Open-Ended Questions: Answer the following questions in complete sentences.

1. Why is respiration essential for plant growth and survival?

   _____

2. Describe how respiration in plants is similar to respiration in animals.

The following questions are Assertion –Reason based questions .Choose the answer based on the codes given below .

a. Both A and R are true, and R is the correct explanation of A
b. Both A and R are true, but R is not the correct explanation of A
c. A is true, but R is false
d. A is false, but R is true

1. Assertion (A): Respiration in plants occurs both during the day and night.

Reason (R): Plants only respire when photosynthesis is not taking place. -------

2..Assertion (A): Mitochondria are called the "powerhouses of the cell."

Reason (R): Aerobic respiration occurs in mitochondria, releasing energy in the form of ATP. ---------

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3. Assertion (A): Anaerobic respiration in plants produces ethanol and carbon dioxide.

Reason (R): Oxygen is completely absent during anaerobic respiration. ---------

4. Assertion (A): Respiration is a catabolic process.

Reason (R): It involves the breakdown of glucose to release energy. ----------

5. Assertion (A): Leaves have stomata to facilitate gaseous exchange during respiration.

Reason (R): Stomata allow the intake of oxygen and release of carbon dioxide. ----------

Case based study Questions

Case 1 A group of students observed that waterlogged soil affects plant growth. Their teacher explained that in such conditions, plant roots switch to anaerobic respiration.

Questions:

1. Why do roots undergo anaerobic respiration in waterlogged soil? ----------

2. Write the chemical equation for anaerobic respiration in plants. ----------

3. Name one plant product formed due to anaerobic respiration. ----------

4. What long-term effect does waterlogging have on plant roots? ----------

Case 2 In an experiment, germinating seeds were placed in a thermos flask with a thermometer. A rise in temperature was observed after some time.

Questions:

1. Why does the temperature increase in the flask? ----------

2. What does this experiment prove about respiration in seeds? ----------

3. Would dry seeds show the same result? Justify your answer. ----------

4. How would using a disinfectant affect the experiment? ----------

5. Name the gas released during this process. ----------

A student said, “Only leaves respire because they have stomata.” The teacher corrected the student and explained that all living parts of a plant respire.

Questions:

1) Why is the student’s statement incorrect?----------

2) How do woody stems carry out gaseous exchange?----------

3) How do roots exchange gases with the atmosphere?----------

4) Name the cell organelle where respiration takes place.----------

Write the overall balanced chemical equation of aerobic respiration –

Understanding Nutrition

Nutrition is a key component of a healthy lifestyle. It involves consuming the right balance of nutrients to fuel our bodies. Nutrients are substances that our bodies need to function properly, and they include carbohydrates, proteins, fats, vitamins, and minerals. Each of these nutrients plays a specific role in maintaining our health. For instance, carbohydrates provide energy, proteins are essential for growth and repair, fats store energy, vitamins support various bodily functions, and minerals contribute to the structure of bones and teeth. A balanced diet ensures that your body receives all these nutrients in the right amounts.

Fill in the Blank: Fill in the blank with the correct words.

1. Carbohydrates are the body's main source of ----------
2. Proteins are important for the **----------**and repair of body tissues.
3. **----------**help regulate various bodily functions and are organic compounds.
4. Minerals are crucial for building strong ----------and teeth.
5. Fats are used by the body to **----------** energy.

Multiple Choice Questions: Choose the correct answer from the choices for each question.

1. Which nutrient is primarily responsible for providing energy to the body?
   - A) Vitamins
   - B) Carbohydrates
   - C) Proteins
   - D) Minerals
2. Which of the following is NOT a function of proteins in the body?
   - A) Energy storage
   - B) Tissue repair
   - C) Muscle growth
   - D) Immune support
3. Which nutrient is essential for the absorption of calcium?
   - A) Vitamin D
   - B) Vitamin C
   - C) Iron
   - D) Fiber
4. Which type of fat is considered the healthiest for consumption?
   - A) Trans fats
   - B) Saturated fats
   - C) Unsaturated fats
   - D) Hydrogenated fats
5. What is the primary mineral found in dairy products that strengthens bones?
   - A) Iron
   - B) Calcium
   - C) Potassium
   - D) Magnesium

Open-Ended Questions: Answer the following questions in complete sentences.

1. Explain why a balanced diet is important for maintaining good health.
   ---
2. Describe the role of vitamins in the body and provide an example of one vitamin and its function.
   ---

3. Discuss the potential health risks associated with consuming too much sugar in one's diet.

- Riya, a 14-year-old girl, often feels tired and dizzy. Her diet mainly consists of rice, bread, and very little green vegetables or fruits. A doctor diagnosed her with anaemia.
  Questions:

  1. Which nutrient is deficient in Riya's diet? ----------
  2. Suggest food items she should include to overcome this condition.----------

- A 9-year-old boy from a rural area shows swollen abdomen, thin legs, and stunted growth. His diet is mainly cereal-based with very little protein intake.
  Questions:

  1. Name the deficiency disease the boy is suffering from.----------
  2. Explain how proteins are important in his growth and development.----------

- Sneha has poor night vision and often complains of dryness in her eyes. On examination, the doctor advised her to include carrots, papaya, and green leafy vegetables in her diet.
  Questions:

  1. Which vitamin deficiency is Sneha suffering from? ----------
  2. What is the role of this vitamin in our body?----------

Ramesh, a school student, brings lunch every day consisting of only chapati and pickles. His teacher notices that he is often tired, underweight, and has low immunity.
Questions: Why is Ramesh's diet not considered balanced? ----------

Suggest three food items that should be added to his lunch to make it a balanced meal.

- A. Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A.
- B. Both A and R are true, but R is not the correct explanation of A.
- C. A is true, but R is false. D. A is false, but R is true.

1.Assertion (A): Deficiency of Vitamin D in children causes rickets.
Reason (R): Vitamin D helps in absorption of calcium and phosphorus, which are essential for healthy bones. Ans----

Q2. Assertion (A): Proteins are called the body-building food.
Reason (R): Proteins provide the maximum energy to the body compared to carbohydrates and fats.
Ans------
Q.3 Assertion (A): Cellulose cannot be digested by humans.
Reason (R): Humans lack the enzyme cellulase in their digestive system
. Ans-------
Q4.
Assertion (A): Hydrochloric acid in the stomach kills harmful bacteria.
Reason (R): Hydrochloric acid provides an alkaline medium for the action of pepsin.-------
Q5.
Assertion (A): Pancreatic juice contains enzymes that act on carbohydrates, proteins, and fats.
Reason (R): Pancreatic juice contains trypsin, amylase, and lipase.-------

Understanding the Digestive System

The digestive system is a complex network of organs working together to convert food into energy and essential nutrients for the body. This process begins in the mouth and continues through the oesophagus, stomach, small intestine, and large intestine. Each organ plays a specific role in breaking down food, absorbing nutrients, and eliminating waste. Understanding this process is crucial for maintaining a healthy lifestyle.

Fill in the Blank: Fill in the blank with the correct words.

1. The process of digestion begins in the -------- where food is broken down by chewing and saliva.
2. The stomach produces **----------**acid to help digest food.
3. Nutrients are primarily absorbed in the**----------**intestine.
4. The **----------**is responsible for removing water from waste material.
5. The **----------**connects the mouth to the stomach.

Multiple Choice Questions: Choose the correct answer from the choices for each question.

1. Which organ is responsible for producing bile, which helps digest fats?
    - A) Stomach
    - B) Liver
    - C) Pancreas
    - D) Gallbladder
2. What is the main function of the small intestine?
    - A) Storing waste
    - B) Absorbing nutrients
    - C) Producing digestive enzymes
    - D) Breaking down carbohydrates
3. Which of the following is NOT part of the digestive system?
    - A) Heart
    - B) Stomach
    - C) Pancreas
    - D) Small intestine
4. Where does most chemical digestion occur?
    - A) Mouth
    - B) Stomach
    - C) Small intestine
    - D) Large intestine
5. What is the role of the oesophagus in digestion?
    - A) Absorb nutrients
    - B) Produce enzymes
    - C) Transport food to the stomach
    - D) Break down fats

Open-Ended Questions: Answer the following questions in complete sentences.

1. Explain how the stomach contributes to the digestive process.
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2. Describe the role of enzymes in digestion and give an example of one enzyme and its function.
   ---
3. Why is it important for the large intestine to remove water from waste material?

Assertion–Reason Questions

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true, R is false.
- (d) A is false, R is true.
- **Q1.**
  Assertion (A): Bile juice does not contain any digestive enzymes.
  Reason (R): Bile salts help in emulsification of fats, breaking them into tiny droplets. Ans ----------
- **Q2.**
  Assertion (A): Digestion of starch begins in the stomach.
  Reason (R): Salivary amylase is active in acidic medium. Ans ----------

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- **Q3.**
  Assertion (A): The small intestine is the main site of digestion and absorption.
  Reason (R): Villi present in the small intestine increase the surface area for absorption. Ans ----------
- **Q4.**
  Assertion (A): Hydrochloric acid in the stomach kills harmful bacteria.
  Reason (R): Hydrochloric acid provides an alkaline medium for the action of pepsin. Ans ----------
- **Q5.**
  Assertion (A): Pancreatic juice contains enzymes that act on carbohydrates, proteins, and fats.
  Reason (R): Pancreatic juice contains trypsin, amylase, and lipase. Ans ----------

Case Study 1:
Riya ate a plate of samosas with spicy chutney. After a few minutes, she started feeling a burning sensation in her chest (acidity).
Questions:

1. Which organ secretes the acid responsible for digestion? ----------
2. Name the acid and the enzyme secreted along with it.----------
3. Why does excess acid secretion cause discomfort?----------
4. Suggest one natural way to relieve acidity.----------

Case Study 2:
A small child was given milk. After a few hours, he complained of stomach pain and diarrhea. The doctor diagnosed him as **lactose intolerant**.
Questions:

1. Which sugar present in milk could not be digested?----------
2. Name the enzyme that digests this sugar.----------
3. In which part of the alimentary canal is this enzyme normally secreted?----------
4. Why does lactose intolerance lead to diarrhea?----------

Rohan chewed a piece of bread slowly and noticed that after some time it started tasting sweet.
Questions:

1. Which enzyme acts on bread during chewing?----------
2. What type of nutrient is present in bread that changes into sugar?----------
3. Which sugar is formed in the mouth?----------
4. Why does this process not continue for long after swallowing?----------

Sketch and label the diagram of ---- 1. V.S. Of tooth 2. Villus

V.S. Of tooth	**Villus**

Q.1 . Multiple Choice Questions Choose the correct option.

1. Vaccines work by:
   a) Killing pathogens directly
   b) Stimulating production of antibodies
   c) Lowering body temperature
   d) Increasing red blood cell count

2. Which of these is NOT a viral disease?
   a) Tuberculosis
   b) Influenza
   c) Polio
   d) Hepatitis

3. The full form of WHO is:
   a) World Health Organisation
   b) World Health Office
   c) Welfare Health Organisation
   d) World Healing Organisation

4. Disinfectants are used for:
   a) Killing microbes on living tissues
   b) Killing microbes on non-living surfaces
   c) Curing deficiency diseases
   d) Increasing immunity

5. Which vitamin is produced in the skin upon exposure to sunlight?
   a) Vitamin A
   b) Vitamin B12
   c) Vitamin C
   d) Vitamin D

Q.2 . Assertion-Reasoning Questions
Directions:
Choose A if both Assertion (A) and Reason (R) are true and R explains A.
Choose B if both A and R are true but R does not explain A.
Choose C if A is true but R is false.
Choose D if A is false but R is true.

1. Assertion (A): Antibiotics are ineffective against viral infections like common cold.
   Reason (R): Antibiotics target bacterial metabolic pathways or cell walls, which viruses lack.
   Answer: ____

2. Assertion (A): Maintaining proper sanitation helps in controlling communicable diseases.
   Reason (R): Sanitation prevents the breeding of disease-causing vectors like mosquitoes and houseflies.
   Answer: ____

3. Assertion (A): Vaccination provides lifelong immunity against all diseases.
   Reason (R): Vaccines stimulate the immune system to produce memory cells.
   Answer: ____

Q.3 . Case-Based Study Questions
Case 1:
Ravi's school recently organized a health camp where students were vaccinated against Hepatitis B. The doctor explained that Hepatitis B is a viral infection affecting the liver and spreads through contaminated blood, unprotected sex, or from mother to child during birth. Vaccination is the most effective preventive measure.

1. Why is Hepatitis B considered more dangerous than Hepatitis A?
2. Name one other way (apart from vaccination) to prevent the spread of Hepatitis B.
3. Which organ is targeted by the Hepatitis B virus?
4. What type of immunity is provided by vaccination – active or passive?

Q.4 . Short Answer Questions

1. Differentiate between antiseptics and disinfectants with one example each.

2. Define Antitoxins and antivenins .

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3. What is the importance of childhood immunization programs?

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4 . Define 'vaccination'. Name two diseases that can be prevented through vaccination.

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5 .What are antibiotics? Give one example of a commonly used antibiotic.

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6 . What is meant by 'immunization'? How does it differ from vaccination?

7.Why are some disinfectants not suitable for application on living tissues? Explain briefly.

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8. Explain the difference between innate and acquired immunity.

Innate immunity.	Acquired immunity.