CHAPTER – 4

POLLINATION AND FERTILIZATION

P. 52 Check Your Progress 1

A. Fill in the blanks.

1. pollen grains, anther, stigma
2. self-pollination, cross-pollination
3. self
4. cross
5. anther, stigma
6. stigma, anther
7. anther, stigma

B. Answer these questions.

1. Pollination is the transfer of pollen grains from the anther to the stigma. Pollination is essential for the process of fertilization. Fertilization results in the formation of fruits and seeds. Without pollination there would be no fruit and seed formation, therefore no reproduction will take place.
2. Self-pollination and cross-pollination are two types of pollination.

   i. **Self-pollination**

   Advantage: It preserves the parental characters indefinitely because the gametes of the same flower or flowers of the same plant are involved.

   Disadvantage: As self-pollination occurs regularly generation after generation, it leads to loss of vigour and vitality of the plant variety. Repeated self-pollination produces poor quality seeds that produce weak offsprings.

   ii. **Cross-pollination**

   Advantage: Seeds produced contain another source of genetic material which may contain genes which are advantageous for survival of the seedling.

   Disadvantage: Pollination is uncertain because plants have to depend on external agents for pollination, which may or may not be available at the right time.
3. Pollination in maize usually takes place through wind. Large quantity of pollen grains are produced in maize so that some of it may land on a receptive stigma of the flower to be pollinated.

P. 53 Check Your Progress 2

A. Given below is a description of events during fertilization of the egg. Complete the description by filling the blanks numbered from 1 to 16.

1. male
2. female
3. pollen
4. stigma
5. cytoplasm of the pollen grain
6. pollen tube
7. style
8. ovary
9. generative nucleus
10. mitosis
11. egg cell
12. embryo sac
13. micropyle
14. embryo sac
15. zygote
16. fertilization

P. 54 Exercises

I. Multiple-Choice Questions

A. Choose the most appropriate answer.

1. b	2. d	3. a	4. a
5. d	6. c	7. b	8. c
9. a	10. c		

II. Assertion–Reason Type Questions

A.	1. c	2. d	3. c	4. d

III. Very Short Answer Type Questions

A. Name the following.

1. Homogamy
2. Cleistogamy
3. Bisexual
4. Protandry
5. Self-sterility
6. Honey guides
7. Ornithophily
8. Endosperm

B. Complete the following paragraph by filling in the blanks (1) to (5) with appropriate words.

1. pollen grains
2. stigma
3. pollen tube
4. fertilization
5. double

IV. Short Answer Type Questions

A. Explain the following terms.

1. **Anemophily:** The pollination by wind is called anemophily.
2. **Ornithophily:** The pollination by birds is called ornithophily.
3. **Dichogamy:** The different timing of maturity in male and female whorl is called dichogamy.
4. **Heterostyly:** Flowers in which position of the anther and length of style is different.
5. **Artificial pollination:** The manual transfer of pollen grains on stigma by human is called artificial pollination.
6. **Triple fusion:** Since three nuclei are involved during double fertilization, it is called triple fusion.
7. **Double fertilization:** The process of fertilization in flowers involves the fusion of two male gametes separately, one with the egg and the other with the secondary nucleus. This process of fertilization is called double fertilization.

B. What happens to following after fertilization?

1. Ovules develop into seed.
2. Sepals degenerate and fall-off.
3. Petals degenerate and fall-off.
4. Style degenerate and fall-off.
5. Ovary develops into fruit.

V. Long Answer Type Questions

A. What is the advantage of the following in the flower to the concerned plant?

1. Cross-pollination is facilitated so that there is genetic variation in the next generation.
2. Cross-pollination is possible by wind. Pollen grains can be dispersed to a long distance through wind.
3. Attract insects for cross-pollination.
4. Self-pollination.
5. Attract insects for cross-pollination.
6. To be carried away by wind for cross-pollination.
7. To receive pollen grains by blow of the wind for cross-pollination.

B. Answer these questions.

1. a. **Advantages of self-pollination.**
   - Easy and most likely to occur as stamen and carpel mature at the same time.
   - Preserves parental characters.
   - Small quantity of pollen is required and the flowers also need not be showy.

   Disadvantages of self-pollination
   - It leads to loss of vigour and vitality.
   - The genetic defects cannot be eliminated.
   - New varieties cannot be obtained.

   b. **Advantages of cross-pollination**
   - The plants of new generation have great genetic variation.
   - Seeds produced are viable and healthy.

   Disadvantages of cross-pollination
   - Pollination is uncertain as there is dependency on external agents for pollination.
   - Pollen grains are to be produced in large quantity.
   - Flowers have to be showy, secrete nectar and are brightly coloured.

2. The two features that favour cross-pollination:
   i. **Dichogamy:** The timing of maturation of androecium and gynoecium are different. This difference in timing of maturation acts as a barrier in self-pollination.
   ii. **Heterostyly:** Length of style and position of anther is different.

3. Four adaptations in flowers pollinated by insects:
   i. The flowers are large and often brightly coloured.
   ii. The petals are scented with nectaries. They produce nectar which is food for the insects.

iii. Many flowers have markings which are visible in ultraviolet light. Bees can see in ultraviolet light and thus, can recognize and pollinate flowers.

iv. The stigma is sticky, flat or knob-like and secretes a sugary fluid where pollen grains become attached.

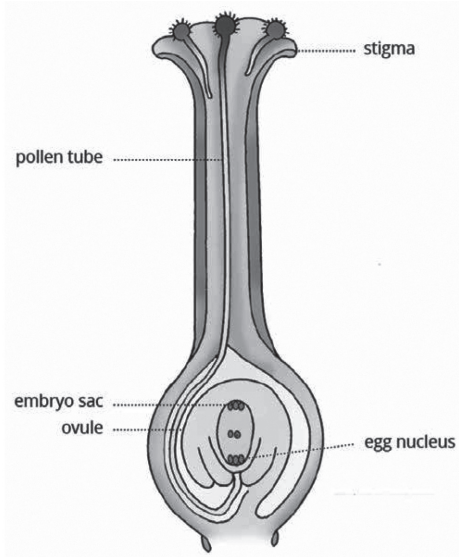
VI. Structured/Application/Skill Type Questions

A. Given below are names of certain plants. Categorize them as per their pollinating agent and complete the table.

Wind pollinated	Water pollinated	Insect pollinated	Pollination by animals
Maize	*Vallisneria*	Dandelion	*Begonia*
Grass		Sweet pea	*Canna*
		Buttercup	*Rafflesia*

B. Given below is the L.S. of a pistil.

1.



2. Pollen tube carries male gametes to the ovule.

3. Ovule after fertilization is converted into seed.

4. Stigma receives pollens during pollination.