# The Flower

## Review Questions

**Multiple Choice Questions:**

**1. Put a tick mark (✓) against the correct alternative in the following statements:**

**(a) In a germinating seed, the roots develop from:**
**(i) Radicle**
(ii) Plumule
(iii) Tegmen
(iv) Hilum

**(b) In a germinating seed, the shoot develops from:**
(i) Radicle
**(ii) Plumule**
(iii) Tegmen
(iv) Hilum

**(c) Which one of the following is a monocotyledonous seed ?**
(i) Bean
(ii) Pea
**(iii) Maize**
(iv) Gram

**(d) If the cotyledons are pushed above the soil, then such type of germination is called :**
**(i) Epigeal**
(ii) Hypogeal
(iii) Perigeal
(iv) Progeal

**(e) If the cotyledons remain under the soil, then such seeds type of germination is called:**
(i) Epigeal
**(ii) Hypogeal**
(iii) Perigeal
(iv) Progeal

**(f) Pollen is produced in the:**
(i) Filament
(ii) Style
(iii) Pistil
**(iv) Anther**

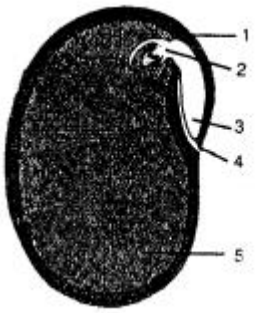
**(g) Reproductive whorls of a flower are:**
**(i) Stamens and carpels**
(ii) Sepals and petals
(iii) Sepals and stamens
(iv) Petals and carpels

**PQ. Vegetative propagation is not observed in:**
(i) Potato
**(ii) Tomato**
(iii) Pea
(iv) Bean

**(h) Which one of the following is a false fruit ?**
(i) Tomato
**(ii) Apple**
(iii) Potato
(iv) Pea

**(i) In a seed, food is generally stored in:**
(i) Radicle
(ii) Plumule
(iii) Fruit
**(iv) Catyledons or endosperms**

1. Given below is a longitudinal section of a bean seed. Label the parts marked 1 to 5 and write their functions.




**Answer :**
1. Testa (seed coat)
2. Plumule
3. Radicle
4. Micropyle
5. Cotyledon

1. **Testa (seed coat) —** It protects the seed from insects and bacteria as well as from mechanical injury.

2. **Plumule** — Plumule develops into a shoot.
3. **Radicle** — Radicle develops into a root
4. **Micropyle** — The micropyle absorbs as much water as is required for germination.
5. **Cotyledon** — Contain stored food material which is used by the seeding during germination.

**2. Name the following:**

(a) A seed which shows hypogeal germination.
**Ans.** pea seed, maize. seed
(b) Amonocotseed.
**Ans.** Maize seed, wheat seed
(c) A dicot seed.
**Ans.** Bean seed, gram seed, pea seed
(d) A seed which shows epigeal germination.
**Ans.** Bean seed castor seed, tamarind seed

**Question 3.**
**Differentiate between the following pairs of terms:**
**Answer :**
**(a) Radicle and plumule.**
**Radicle:** In a seed the radicle lies downwards near the lower pointed end of the grain. It gives rise to the root.
**Plumule:** In a seed the plumule lies upwani near the cotyledon and gives rise to the shoot.

**(b) Ilium and micropyle.**
**Answer :**
**Illum :** On one side of seed câat, there is scar called hi hum, which marks the place where the seed was attached to the fiiüt wall.
**Micropyle :** Above the hilum is a small pore called microp e. The micropyle absorbs as much water as is required for germination

**(c) Testa and tegmen.**
**Answer :**
**Testa:** The seed is protected by a thick outermost coat called the testa or seed coat.
**Tegmen:** Under the testa lies a very thin membrane called the tegmen.

**Question 4.**
Give two functions of a fruit.
**Answer :**
**Functions of a fruit are:**

1. Fruit is a protective case for the seeds.
2. Fruit is a temptation to animals and man to eat it and scatter the seeds

**Question 5.**

**Match the columns :**

| Column A | ColumnB |
|---|---|
| **(a) Radicle** | **(i) Shoot** |
| **(b) Plumule** | **(ii) Store food material** |
| **(c) Cotyledon** | **(iii) Root** |
| **(d) Testa** | **(iv) Absorb water needed for germination** |
| **(e) Micropyle** | **(v) Protection of seed** |

**Answer :**

| | Column A | Column B |
|---|---|---|
| (a) | Radicle | (iii) Root |
| (b) | Plumule | (i) Shoot |
| (c) | Cotyledon | (ii) Store food material |
| (d) | Testa | (v) Protection of seed |
| (e) | Micropyle | (iv) Absorb water needed for germination |

**Question 6.**

Radicle emerges out of the seed earlier than plumule. What one advantage is served by this ?

**Answer :**

Radicle comes out of the seed earlier than the plumule has advantages as it gets water and minerals from the soil and gives it to the growing plumule.

**Question 7.**

**State whether the following statements are True or False.**

(a) Some seeds have no cotyledons.
**False**
(b) Warmth is necessary for the germination of seeds.
**True**
(c) All seeds have two cotyledons.
**False**
(d) Oxygen is necessary for the germination of seeds.
**True**

**Question 8.**

**State one function of the following:**
(a) radicle

(b) cotyledons
(c) endosperm
(d) micropyle
**Answer :**

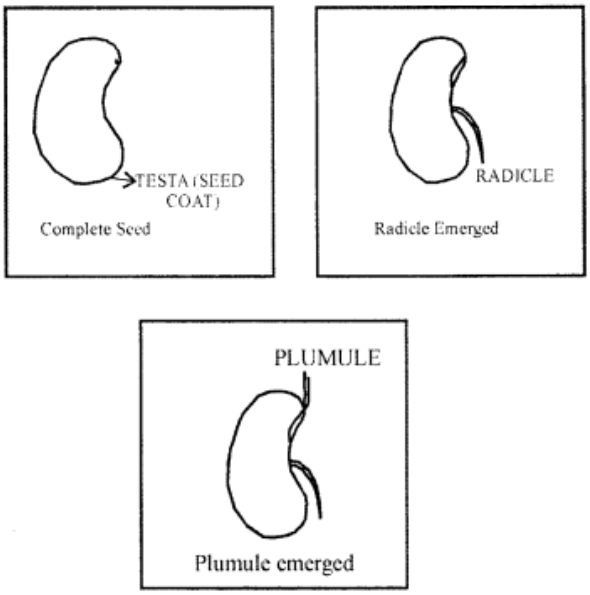
1. **Radicle** — form the roots
2. **Cotyledons** — On removing th& testa and the tegmen from a soaked bean seed, you will find that the seed is made up of two fleshy seed leaves called the cotyledolm. They contain stored food material which is used by the seedlling for growth.
3. **Endosperm**—ovary forms the fruit.
4. **Micropyle** —Above the hilum is a small pore called micropyle (micro = small, pyle = passage). The micropyle absorbs and allows as much water as is required for germination.

**Question 9.**
**The three conditions necessary for germination of seeds are (tick the correct answer):**
**(a) Oxygen, suitable temperature and water.**
(b) Good soil, water and air
(c) Good soil, suitable temperature and light.
(d) Light, oxygen, and temperature.
(e) Oxygen, carbon dioxide, and light.

**Question 10.**
**Name the part of the seeds from which the following are given out:**
(a) Roots : .
(b) Leaves :
**Answer :**
**(a) Roots —** Radicle give rise to roots.
**(b) Leaves—**Plumule gives rise to shoot bearing leaves.

**Question 11.**
In the spaces provided below, draw labelled diagrams to show the three stages in the germination of any seed you have observed.

**Answer :**




**Long Answer Questions**
**(Write the answers in your note-book)**

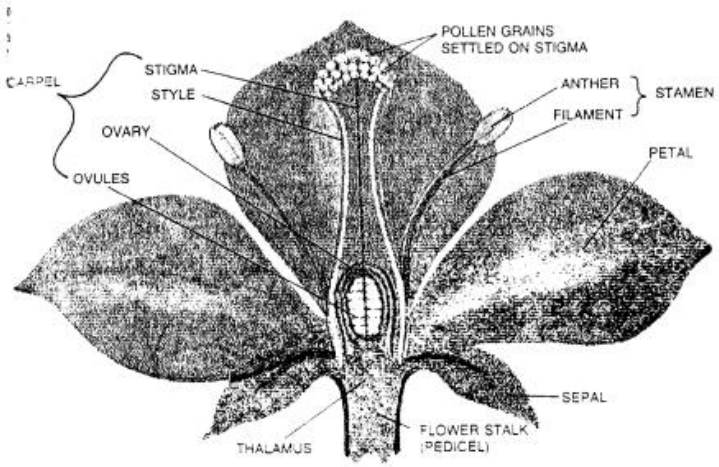
**Question 1.**
What is meant by pollination ? Name the two types of pollination.
**Answer :**
The transfer of the pollen grains from the anthers to the stigma of a flower is called pollination.
**The two types of pollination found in flowering plants are.**

1. **self-pollination** – that occurs within the same plant.
2. **cross-pollination** – that occurs between two flowers of two different plants but of the same kind.

**Question 2.**
Imagine that all the seeds produced by a plant happen to fall under the same plant and sprout into new plants. Mention any two problems that will be faced by the new plants.
**Answer :**
If all the seeds produced by a plant happen to fall under the same plant and sprout into new plants then in this situation plants will face the following problems:

1. A large number of plants will grow in a small limited space. The water and the minerals available to them in the soil will be limited.
2. The air surrounding them will not be enough and less sunshine will be available to them. As a result, most of these sprouted plants will die.

**Question 3.**
What is a flower ? Draw a typical flower and label its different parts.
**Answer :**




*A flower with its different parts*

A flower is a reproductive part of a plant. It helps in sexual reproduction as it has male parts and female parts.
**A fully opened flower has the following parts:**
**Stalk**—A flower is attached to the shoot by means of stalk or pedicel stalk. The tip of the stalk is swollen or flattened. This is called toms or thalamus or receptacle.
The different parts of a flower are inserted on the thalamus. There are usually four whorls as Calyx

- (Sepals)
- Corolla (Petals)
- Androecium (stamens)
- Gynoecium (Carpels)
- Present on the thalamus.

1. **Sepals (Calyx):** These are the outermost part of the flower. These are leaf like and green in colour. This is the outer covering of the flower and form outer whorl in a flower. The Calyx (sepals) enclose the inner parts of the flower when it is a bud. It is protective in function.
2. **Corolla (Petals):** Petals form the second whorl inner to the sepals. These are usually coloured, gaudy, or white in colour and scented and give sweet smell. The value of a flower is due to the attractive colour of the petals. These attract the insects for pollination.
3. **Stamens (Androecium):** The third whorls inner to the petals are stamens. This third whorl is called Androecium. These are the male parts of the flower. Each stamen is formed of a long narrow, hair like structure called filament. On its tip it bears a rounded broad sac like structure called anther. Each anther has two

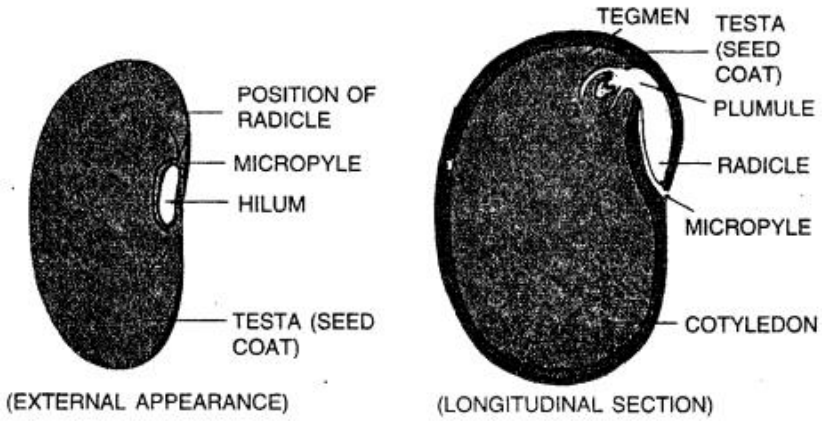
anther lobes. Each anther lobe has two pollen sacs which have powdery mass called pollen grains.

4. **Carpels (Gynoecium):** Carpels are the inner most or fourth whorl in a flower. It is lodged on the thalamus and forms the female part of a flower. This whorl of carpels is called gynoecium. Each carpel or pistil has three parts,
    1. The lower most, swollen part is ovary. It is attached to the thalamus
    2. The middle part is style which is narrow, thread like
    3. **Stigma:** The style ends in a knob like, rounded structure which is sticky in nature to receive the pollen grains.The ovaries contain ovules which later turn into seeds after fertilization and the ovary wall forms the fruit sometimes the thalamus also becomes a part of the fruit as in apple.

**Question 4.**

With the help of a suitable labelled diagram, describe the structure of a dicot seed.

**Answer :**




**Structure of seed of Bean**

It is a dicotyledonous and non-endospermic seed. It is produced in a long cylindrical pod (fruit – phali) External characters. The seed is brown or whitish brown in colour. The seed is hard and smooth and kidney shaped i.e.. Convex on one side and concave on the other side. Concave side bears whitish scar called hilum. It is the place which is attached to the wall of the pod through a stalk called funicle. At one side of the hilum is a small pore called micropyle water enters through it.

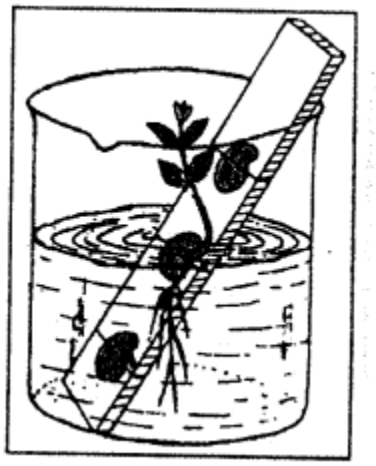
**Internal structure** — The seed is covered by a hard, tough covering called testa. Inner to the tests is the embryo. Embryo consists of two cotyledons and embryo axis. Embryo axis has plumule and radicle. The plumule is present in between the two cotyledons and its top bears two folded tiny leaves. It forms future shoot and leaves of the growing seed. Radicle is rod shaped and is out of the two cotyledons. It forms the root of the growing seed. When the seed grows the two cotyledons come out of the soil and form cotyledonary leaves and turn green in colour. Cotyledons give food to the growing seedling as it has food. The germination in this seed is epigeal as cotyledons come outside the soil in the growing seed.

**Question 5.**
Define germination ? Name the two types of germination. Explain with examples.
**Answer :**
The growth and development of the embryo present in the seed into a seedling (or a young plant capable of independent existence) is called as seed germination.
The embryo in a seed remains inactive or dormant. When the seed is put into the soil and given water and under suitable temperature, the embryo becomes active on absorbing the water and the embryo turns into a seedling.
**Types of germination — There are three types of germinations.**
(i) Epigeal
(ii)Hypogeal
(iii) Viviparous
**(i) Epigeal germination —** Epi means above ; geo-ground (earth)
When the cotyledons in growing seed come out of the soil it is epigeal type of germination as in case of castor seed, cucumber, tamarind, bean seed the cotyledons come out of the soil and turn green. These are called cotyledonary leaves. These cany on photosynthesis till new leaves arise. .
**(ii) Hypogeal germination**—Hypo-below, gea soil.
When in a growing seed the cotyledons remain under the ground as in case of gram, pea, groundnut and maize. The plumule firms the aerial shoot to which bears leaves and the radicle gives rise to roots. The growing seedling gets food from the cotyledons. As the seedling grows the cotyledons die in the soil.
**(iii) Viviparous germination**—This is special type of germination.
This occurs in plants growing along the sea coasts and in salt lakes. The seed start growing while it is still attached to the plant as in mangrove plants. The embryo comes out of the fruit with a long, dart like radicle. It falls directly into soft, slushy, wet mud. The radicle gives root and establishes as a seedling and the plumule give rise to shoot. This is in mangrove plants.

**Question 6.**
What are the three conditions necessary for the germination of seeds. How would you demonstrate this?
**Answer:**
**F or successful germination of any viable seed, three external conditions are necessary as:**

1. Water or moisture
2. Warmth or temperature
3. Air or oxygen.

We can demonstrate this with “Three seed experiment This is a simple experiment to demonstrate the necessity of these factors for proper germination.



**Experiment:**
Three seed experiment to demonstrate germination Three mature dried bean seeds are taken and tied on a wooden strip at three different positions (above the figure). This strip is placed in a beaker containing water in such a way that the lower seed is completely submerged in water, the middle seed is partially submerged inside the water and the top seed is kept above water. This set-up is left in a warm place for few days.
It is observed that the middle seed shows germination and gives out radicle and shoot leaves. The top seed shows no growth and the bottom one shows negligible growth. The middle seed gets fully germinated due to the fact that this seed has all the favourable conditions required for germination i.e., air (oxygen), moisture and warmth (favourable temperature), which are necessary for germination.

**Question 7.**
Give the main difference between hypogeal and epigeal and germination.
**Answer :**
**Epigeal germination**—Epi means above; geo-means ground (soil). When the cotyledons in a growing seed come out of the soil it is epigeal type of germination as in case of castor seed, bean seeds, pulses, tamarind cucumber.
The cotyledons come out of the soil and turn green these are cotyledonary leaves and carry on the function of photosynthesis till new leaves arise in the growing seedling.
Hypogeal germination — Hypo-below, geo-soil it is that type of germination in which in the growing seed the cotyledons remain under the soil as in case of pea, gram, ground-nut, maize. The plumule forms the aerial shoot which later bears leaves and die radicle gives rise to root. The tiny seedling gets food from the cotyledons till it establishes itself in the soil by its roots and starts getting water and minerals and as well the new leaves arise on the ascending axis and they start making food by the process of food making.

**Differences—**

**Epigeal germination**

1. In this type of germination the cotyledons come out of the soil.
2. The cotyledons turn green as they come out of the soil and serve as cotyledonary cotyledons
   leaves and carry on photo¬synthesis to make food for the growing seedling.
3. The cotyledons become pale and fall off when the ascending axis bear leaves

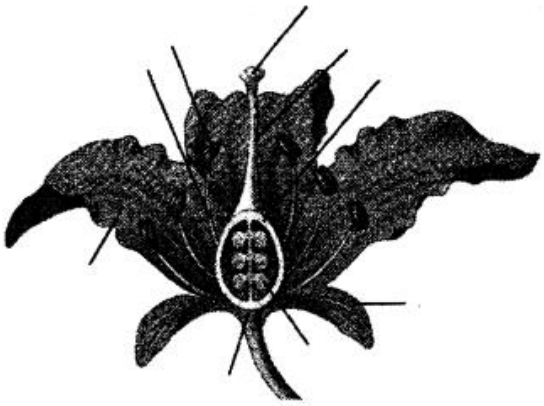
**Hypogeal germination**

1. In this type of germination the cotyledons remain under the soil.
2. The cotyledons remain under the ground and the seedling gets food from the till it establishes in the soil.
3. The cotyledons get rotten up in the soil when the seedling matures.

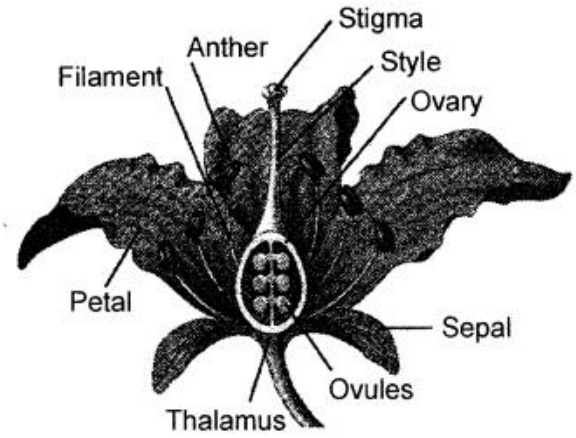
**Question 8.**
State the location of the following in a flower:
**Answer :**

1. **Sepals**: These are the outermost part of the flower. These are leaf like and green in colour. This is the outer covering of the flower and form outer whorl in a flower. The Calyx (sepals) enclose the inner parts of the flower when it is a bud. It is protective in function.
2. **Petals**: Petals form the second whorl inner to the sepals. These are usually coloured, gaudy, or white in colour and scented and give sweet smell. The value of a flower is due to the attractive colour of the petals. These attract the insects for pollination.
3. **Anther**—It is present at the end of a stamen. Anther has poller sacs in which pollen grains are formed. Pollen grains contain the male gametes.
4. **Stigma**—It is the terminal knob-like part, it may be divided into two or more lobes and assume a feathery appearance. The stigma is covered with hair or with glandular papillae. It serves as the landing place grains for pollen during pollination.

**Question 9.**
Given below is the diagram of a typical flower. Label the parts marked by guidelines.



**Answer:**




**Question 10.**
Give the difference in the function between the following parts:
(a) Ovary and ovule
(b) Petal and sepal
(c) Filament and style
(d) Pollen and ovule

**Answer :**

**(a) Ovary and ovule —**

1. Ovary is the female reproductive part of a flower and ovules are located inside the ovary.
2. Ovary after fertilization turns into a fruit whereas ovules turn into seeds of fruit.

**(b) petal and sepal**—Petals are colourful and attractive and helps to attract insects for pollination whereas the main function of sepals is to provide protection to the growing bud.

**(c) filament and style**—The filament is a stalk like structure that attaches and support the flower and support the anther which is the structure that produces pollens whereas

the style transfers the male gametes of the pollen grains into the ovary.
**(d) pollen and ovule** — The function of pollen is to deliver male gametes (sperm) from stamen of a plant to an ovule whereas ovule, when fertilized, well developed into a seed. It is a female reproductive cell.

## ADDITIONAL QUESTIONS

**I. Multiple choice questions. Tick (✓) the correct choice:**

**1. A seed consists of**
(a) embryo
(b) seed coat, embryo and cotyledons,
**(c) embryo and seed coat**
(d) seed coat and endosperm

**2. An embryo of a seed consists of**
(a) plumule
**(b) radicle, plumule and cotyledons,**
(c) plumule and radicle
(d) radicle and cotyledons

**3. Conditions necessary for seed germination are**
**(a) water, oxygen and suitable temperature**
(b) water and oxygen
(c) water and suitable temperature
(d) water, oxygen and enzymes

**II. Fill in the blanks:**

1. In bean seed, germination is **epigeal**.
2. Three conditions necessary for seed germination are **water**, **oxygen** and **favourable temperature**.
3. A mature seed consists of **embryo** and **seed coat.**

**III.Differentiate between the following:**

**1.Epigeal germination and Hypogeal germination**
**Answer**
**Epigeal germination**

1. It is a type of germina¬tion where cotyledons are pushed above the soil.
2. It is shown by dicot

**Hypogeal germination**

1. It is a type of germination where cotyledons remain in the seed below the soil.
2. It is shown by monocot

**2.Dicot seed and Monocot seed**
**Answer:**
**Dicot seed**

1. The dicot seed has two cotyledons.
2. Endosperm is absent.
3. Seed coat is not fused with fruit wall.
4. **Examples :** bean, pea, gram.

**Monocot seed**

1. Monocot seed has one cotyledon.
2. Endosperm is present.
3. Seed coat is fused with fruit wall.
4. **Examples:** rice, maize.

**3.Seed coat and Embryo**
**Answer:**
**Seed coat**

1. It is the protective covering of the seed.
2. It develops from the protective layer around the ovules.
3. The seed coat determines the shape of the seed.
4. Water diffuses through the seed coat into the embryo causing swelling of seed and rupturing of seed coat during germination

**Embryo**

1. It is the young plant enclosed within the seed coat which germinates to form a new plant.
2. It is a product of fertilisation inside the ovary.
3. Embryo just fills in the shape determined by seed coat.
4. It consists of radicle, . plumule and cotyledons which give rise to root and shoot system of the plant.

**IV. Define the following:**
1. Embryo
2. Seed germination
**Answer:**

1. **Embryo:** In plants, embryo is the baby plant present inside a seed which consists of radicle, plumule and cotyledons. It develops into a plant. In animals, embryo is the early stage in the development of an organism. A fertilized egg develops into an embryo which grows into an adult plant or animal.
2. **Seed germination:** Seed germination is the process by which the embryo within the seed becomes active and grows into a new plant under favourable conditions.

**V.Mention the functions of the following:**

1.Radicle
2.plumule
3.Cotyledons
4.Endosperm
5.Seed coat

**Answer:**

1. **Radicle:** The radicle is the part of embryo inside the seed which first comes out of the seed coat during germination and forms the root system of the plant.
2. **Plumule:** The plumule is the portion of the plant embryo which gives rise to first leaves and forms the shoot system of the plant during germination.
3. **Cotyledons:** The cotyledons provide food for the embryo during the first stages of germination in dicot plants. They act as leaves and perform photosynthesis in a seedling. In monocots, it absorbs the food from the endosperm and transport it to the embryo.
4. **Endosperm:** The endosperm is the nutritive tissue surrounding the embryo in a seed which provides nourishment to the developing embryo in a seed during germination.
5. **Seed coat:** Seed coat is the outer covering of the seed which protects the seed (embryo and endosperm) from injury and attack of bacteria, fungi and insects.

**VI. Answer the following questions :**

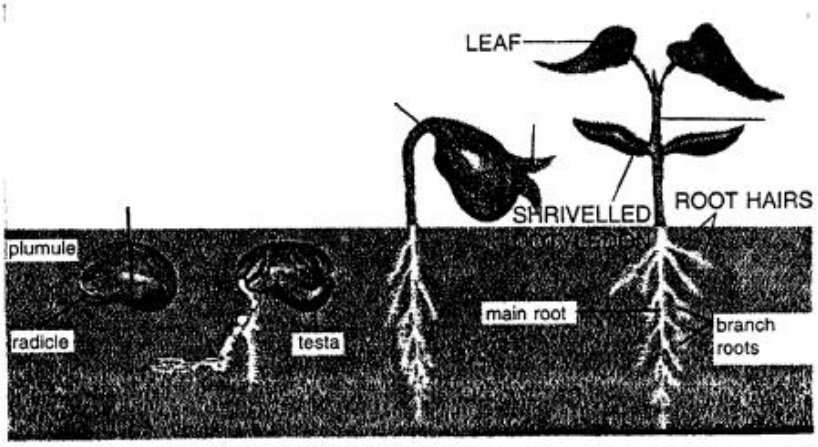
**Question 1.**
Mention the conditions necessary for seed germination.
**Answer:**
**The conditions necessary for seed germination are:**

1. **Water:** It is needed for seed to swell up and burst open. It is also needed to make the stored food soluble to feed the embryo inside a seed.
2. **Oxygen:** Oxygen is required for respiration.
3. **Favourable temperature:** Temperature ranging from 25°C to 35°C is suitable for germination.

**Question 2.**
Describe the process of germination in bean and maize seeds.

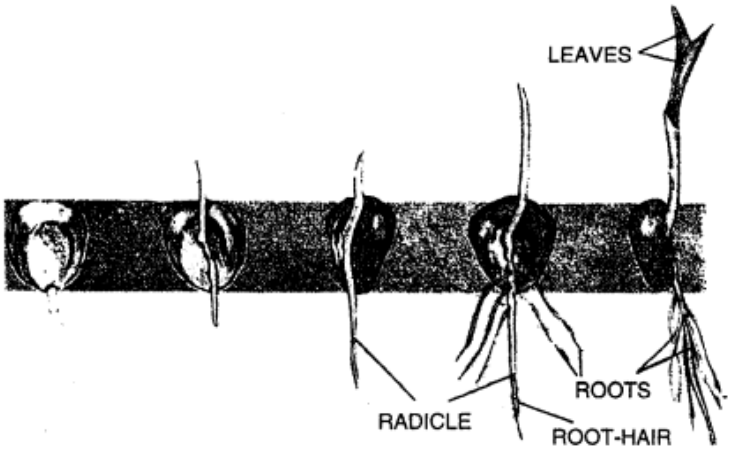
**Answer :**
Germination in bean seed is called epigeal germination.
**It occurs as follows:**

1. Germination starts with the uptake of water which bursts the seed coat and radicle comes out and grows downwards.
2. Region of plumules elongates and seed comes out of the soil. The plumule emerges between the two cotyledons.
3. The plumule forms two green leaves.
4. The food stored in the cotyledons is used for growth and cotyledons shrivel and fall off.
5. The radicle gives rise to the root system while the plumule forms the shoot.




Germination in maize seed is called hypogeal germination.
**It occurs as follows:**

1. The seeds absorb water and swells.
2. Radicle comes out of the seed and forms the primary root.
3. The plumule comes out forming the leaves.
4. The food stored in the endosperm is used for growth
5. The cotyledons remain below the ground.




**Question 3.** Name the two types of seed germination.
**Answer:**
**The two types of seed germination are:**

1. Epigeai germination.
2. Hypogeal germination