

7

REPRODUCTION IN PLANTS

INTRODUCTION

The production of new individuals from the parents is known as **reproduction**. Reproduction thus, ensures that organisms of a species continue to live, even after the death of the parent organisms. There are different methods by which new individual are produced by their parents.

MODES OF REPRODUCTION

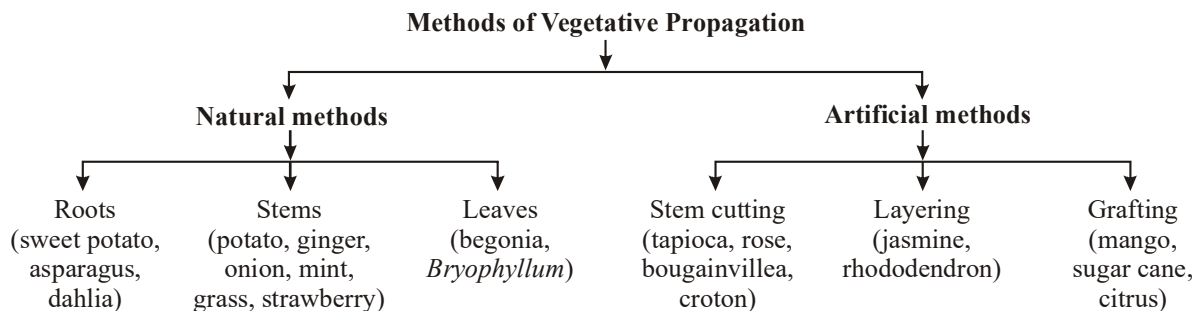
Plants reproduce by various methods. These methods can be divided into two types: (i) asexual reproduction and (ii) sexual reproduction.

In **asexual reproduction**, the new individual is produced by a single parent. Seeds are not produced and there is no union of **gametes** (sex cells). The new individual is **identical** to the parent.

In **sexual reproduction**, fusion of two types of gametes takes place. Two parents take part in the formation of gametes and new individuals are produced from these. The new individual is **not identical** to either of the parents. It has features of both the parents.

ASEXUAL REPRODUCTION

- In asexual reproduction new plants are obtained without production of seeds or spores. A single parent can produce offsprings, which are genetically and morphologically similar to their parent and called as **clone**. It occurs by different methods :



1. Vegetative propagation

- It is a type of asexual reproduction in which new plants are produced from roots, stems and leaves.** For eg. by stem in potato and ginger, by roots in sweet potato, raddish and by leaves in bryophyllum. Since reproduction is through the vegetative parts of the plant, it is known as vegetative propagation.
- Plants produced by vegetative propagation take less time to grow and bear flowers and fruits earlier than those produced from seeds. The new plants are exact copies of the parent plant, as they are produced from a single parent.

- (iii) Cut branch of rose or champa with node called as cutting. When these cuttings are buried in the soil than from node new leaves arises and from buried part roots arises.

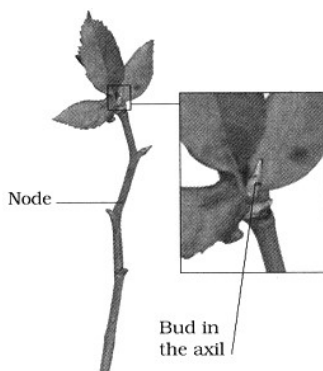


Figure: Stem-Cutting of Rose

- (iv) **Over the stem, multicellular out growths appear called buds.** Buds, which develops into flower called **floral buds**. Some buds are present in axil of leaves, which develop into shoots. These buds are called **vegetative buds**. A bud consists of a short stem around which immature overlapping leaves are folded. Such vegetative buds can give rise to new plants.
- (v) Over a fresh potato, some scars are found having buds. These scars are called “**eyes**”. A piece of potato having eye when buried in soil can produce a new plant.

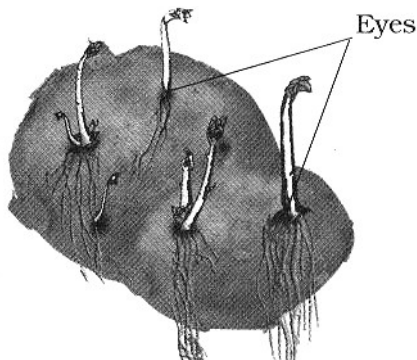


Figure: Potato Plant Sprouting from an ‘eye’

Similarly ginger and turmeric can be grown.

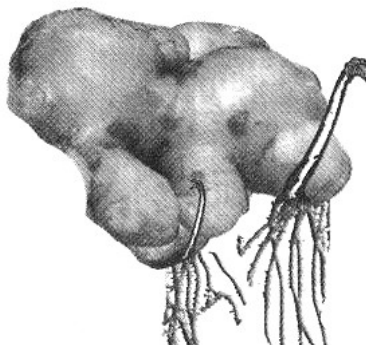


Figure: Ginger with new plants sprouting from it

- (vi) Bryophyllum (Sprout leaf plant) has fleshy leaves with serrated margin. Over margins buds are present, when leaf falls on a moist soil, each bud can give rise to a new plant.

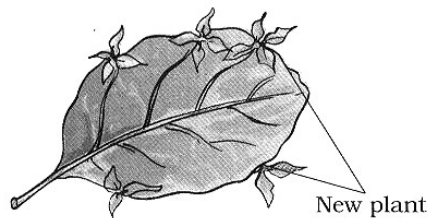


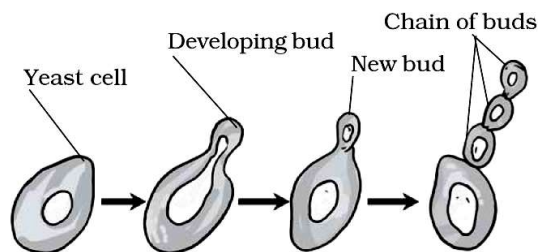
Figure: Leaf of Bryophyllum with buds in the margin

- (vii) The roots of some plants can also produce new plants. For e.g. sweet potato, Dahlia, raddish, carrot etc. The pairs of cacti plant, when get detached from the main plant body can produce in plants.

Advantages of Vegetative fropagation

- Plants produced by this method take less time to grow and bear flowers and fruit faster than those produced from seeds.
- Seedless plants can be obtained.
- Plants produced are exact copies of the parent plant. No variations are present.

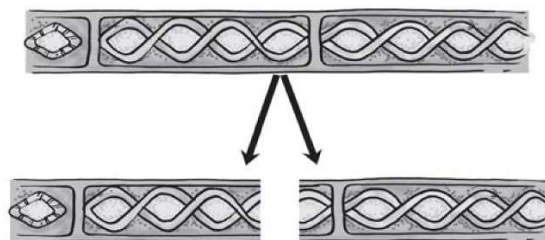
2. Budding



Reproduction in yeast by budding

- Yeast is a single-celled microscopic organism.
- In yeast small bulb-like projection coming out from the yeast cell is called a bud.
- The bud gradually grows and gets detached from the parent cell and forms a new yeast cell.
- The new yeast cell grows, matures and produces more yeast cells. Sometimes, chain of bud arises from single yeast cell.
- If this process continues, a large number of yeast cells are produced in a short time. Yeast can be easily grown in sugar solution. Yeast is commercially used in bakery etc.

3. Fragmentation

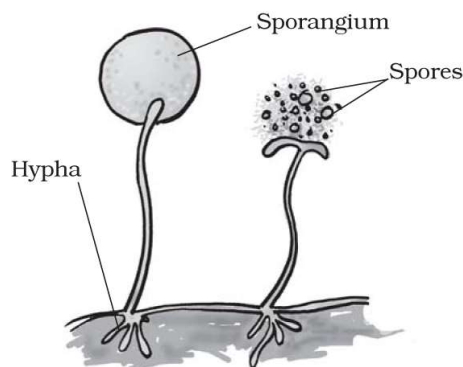


Fragmentation in spirogyra (an alga)

- Slimy green patches in ponds, or in other stagnant water bodies can be easily seen.
- These are the algae i.e. spirogyra or pond silk.

- (iii) When water and nutrients are available algae grow and multiply rapidly by fragmentation.
- (iv) An alga breaks up into two or more fragments.
- (v) These fragments or pieces grow into new individuals. This process continues and they cover a large area in a short period of time. e.g. Spirogyra.

4. Spore formation

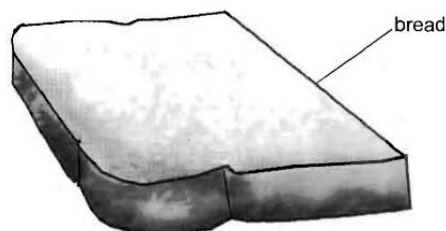


Reproduction through spore formation
in fungus

- (i) The fungi on a bread piece grow and form spores which are present in the air. When spores are released they keep floating in the air. As they are very light they can cover long distances.
- (ii) **The spores are asexual reproductive bodies.**
- (iii) **Each spore is covered by a hard protective coat** to withstand unfavourable conditions such as high temperature and low humidity. So, **they can survive for a longer time.**
- (iv) Under favourable conditions, a spore germinates and develops into a new individual. Plants such as mosses and ferns also reproduce by means of spores.

Activity : To observe spore formation in bread mould.

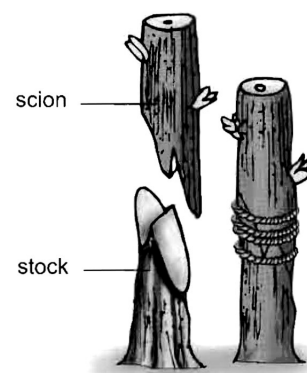
- Take a slice of bread and slightly moisten it.
- Leave it in air for 3 days.
- Observe after 3 days with a magnifying glass. You will notice fine thread-like structures (hyphae) and small spherical structures (sporangia) on long stalks are seen in Fig:
- Now, take a spherical structure on a slide in a drop of water and put a cover slip on it. Observe under the microscope. You will see very small rounded bodies called the spores.



Artificial Methods of Vegetative Propagation

Vegetative propagation carried out by human beings is called artificial propagation. There are several methods of artificial propagation. Two of the methods are stem cutting and grafting.

- **Stem cutting** is generally used in plants like rose, champa, sugar cane and bougainvillea. A stem cutting is a short piece of a branch of a plant having a node. This cutting when placed in the soil under suitable conditions develops roots and leaves. Finally the complete plant develops.

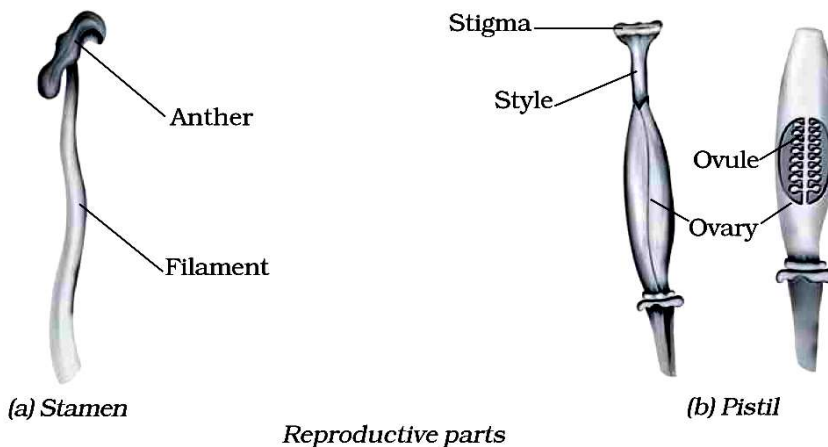


Grafting

- **Layering** is done when the other propagation methods are unsuccessful and only a few plants are needed. It is a method in which roots develop on a shoot or branch that is still attached to the parent plant. The stem is cut off from the parent plant only after it has rooted. Layering is generally used in plants like honeysuckle, rhododendron and forsythia.
- **Grafting** is a very common method of artificial vegetative propagation in fruit plants like mango. New varieties can be developed by this method. In this method, the root portion is taken from one plant. This is called the **stock**. The stem portion, with several buds, is taken from another plant called the **scion**. The scion is taken from a plant which has the desired features that are intended to be introduced in the root portion. The ends of the stock and the scion are obliquely cut and firmly tied together. In this manner, a new plant variety is developed.

SEXUAL REPRODUCTION

- In this kind of reproduction two opposite sexes i.e. male and female are required.
- The flowers are the reproductive parts of a plant. The **stamens** are the **male reproductive part** and the **carpel or pistil** is the **female reproductive part**.
- The flowers which contain either only the pistil or only the stamens are called **unisexual flowers**.
- The flowers which contain both stamens and pistil are called **bisexual flowers**.
- Corn, papaya and cucumber produce unisexual flowers, whereas mustard, rose and petunia have bisexual flowers. Both the male and the female unisexual flowers may be present in the same plant or in different plants.



- Anther contains pollen grains which produce male gametes.**
- A pistil consists of stigma, style and ovary. The ovary contains one or more ovules. The female gamete or the egg is formed in an ovule. In sexual reproduction, a male and a female gamete fuse to form a **zygote**.

1. Pollination

The transfer of pollen from the anther to the stigma of a flower is called pollination.

Types of pollination:

- Self pollination
 - Cross-pollination
- If the pollen lands on the stigma of the same flower it is called **self-pollination**.
 - When the pollen of a flower lands on the stigma of another flower of the same plant, or that of a different plant of the same kind, it is called **cross-pollination**. In plants pollination is followed by fertilization.

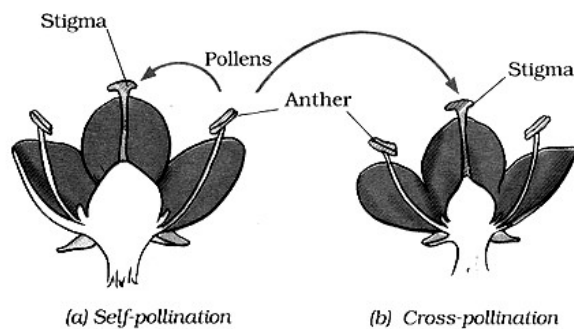


Figure: Pollination in Flower

2. Fertilisation

The process of fusion of male and female gametes (to form a zygote) is called fertilisation. The zygote develops into an embryo.

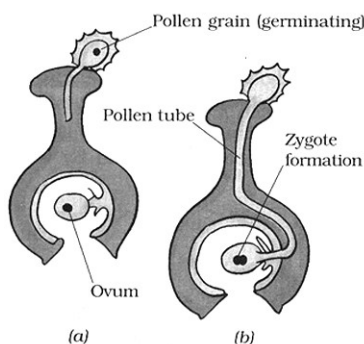


Figure: Fertilization (Zygote formation)

3. Fruits and Seed Formation

- (i) After fertilisation, the ovary grows into a fruit and other parts of the flower fall off.
- (ii) **The fruit is the ripened ovary.**
- (iii) The seeds develop from the ovules.
- (iv) The seed contains an embryo enclosed in a protective seed coat. Seed contain cotyledon, which store food materials. Some fruits are fleshy and juicy such as mango, apple and orange. Some fruits are hard like almonds and walnuts.

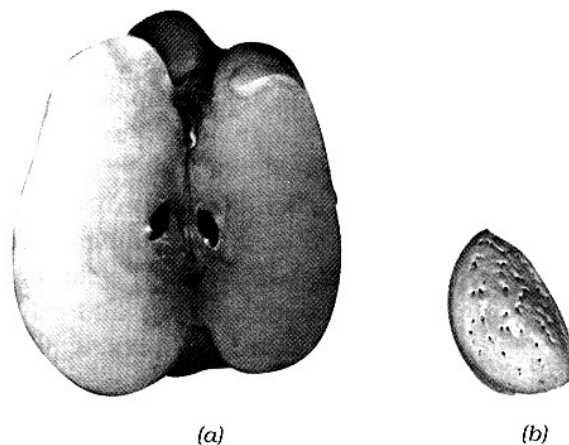
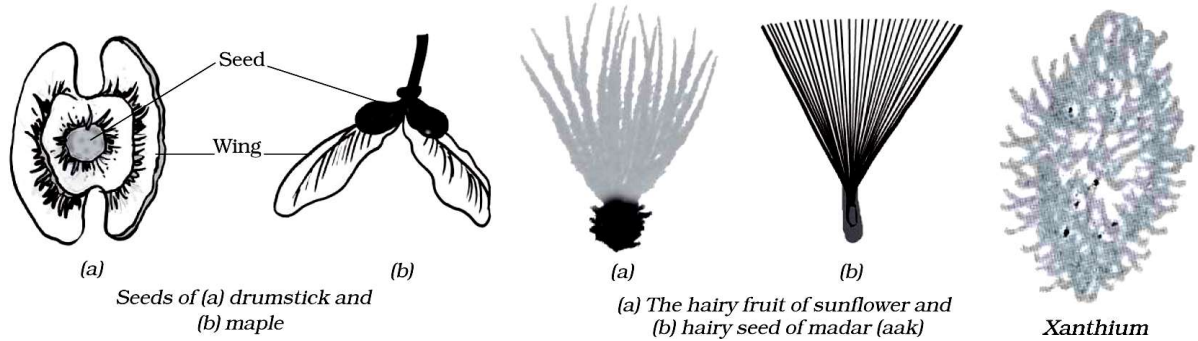


Figure: (a) Section of an apple (b) Almond

4. Seed Dispersal

- (i) Seeds are dispersed to different places by means of some special structure through wind, water, animals etc.
- (ii) Dispersal of seeds is very essential, if all seeds fall at the same place and grow than it will cause competition between germinating seeds for space, nutrients, water, sunlight, minerals etc. and seed would not grow into healthy plants.



- (iii) Thus, seed dispersal prevents overcrowding and competition between the plant and its own seedlings for sunlight, water and minerals.
- (iv) It also enables the plants to invade new habitats for wider distribution.
- (v) Winged seeds such as those of drumstick and maple. (a) and (b)], light seeds of grasses or hairy seeds of aak (Madar) and hairy fruit of sunflower. (a), (b)], get blown off with the wind to far away places.
- (vi) Some seeds are dispersed by water. These fruits or seeds usually develop floating ability in the form of spongy or fibrous outer coat as in coconut.
- (vii) Some seeds are dispersed by animals, especially spiny seeds with hooks which get attached to the bodies of animals and are carried to distant places. Examples are Xanthium and Urena.
- (viii) Some seeds are dispersed when the fruits burst with sudden jerks. The seeds are scattered far from the parent plant. This happens in the case of castor and balsam.

CONCEPT APPLICATION LEVEL - I [NCERT Questions]

Q.1 Fill in the blanks :

- (a) Production of new individuals from the vegetative part of parent is called _____ .
 (b) A flower may have either male or female reproductive parts. Such a flower is called _____ .
 (c) The transfer of pollen grains from the anther to the stigma of the same or of another flower of the same kind is known as _____ .
 (d) The fusion of male and female gametes is termed as _____ .
 (e) Seed dispersal takes place by means of _____ , _____ and _____ .

Ans. (a) vegetative propagation (b) unisexual flower
 (c) pollination (d) fertilisation (e) wind, water, animals.

Q.2 Describe the different methods of asexual reproduction. Give examples.

Ans. Various methods of asexual reproduction are:

- (i) **Vegetative propagation:** When new plants are obtained from leaves, stems and roots, it is called as vegetative propagation, e.g., in rose, sugarcane, potato, ginger (stem), bryophyllum (leaf), sweet potato, dahlia (roots) and any detached body part of cacti.
 (ii) **Budding:** Reproduction in yeast is by budding. The small bulb like projection called bud comes out from the parent cell. The bud gradually grows and get detached from the parent cell and form a new yeast cell.
 (iii) **Fragmentation:** Some organisms like spirogyra breaks up into two or more fragments and each fragment develops into a new plant.

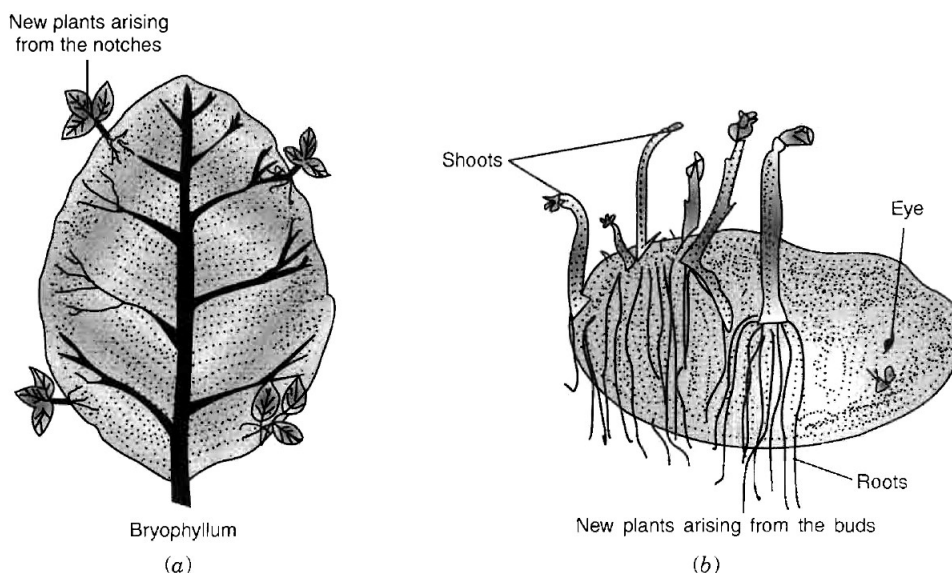


Fig. Vegetative propagation in (a) bryophyllum (by leaf) (b) potato (by stem)

- (iv) **Spore formation:** The spores are the asexual reproductive parts which are covered by a protective covering to withstand unfavourable conditions. Under favourable conditions, the spore germinates and develops into a new individual.

Q.3 Explain what do you understand by sexual reproduction?

Ans. In sexual reproduction, the male and the female gametes fuse to form a zygote. For sexual reproduction one or two parents are required to produce two different gametes and ultimately after zygote formation, new individual forms.

Q.4 State the main difference between *sexual* and *asexual reproduction*.

Sexual Reproduction	Asexual Reproduction
1. New plants are obtained from seeds.	1. Plants can give rise to new plants without seeds.
2. Two parents are required to produce an individual.	2. The new individual comes from a single parent.
3. Takes place with the help of specialized sex cells.	3. No sex cells are required.
4. New individual has the characters of both the parents.	4. Characters of the new individual are same as that of the parent.

Q.5 Sketch the reproductive parts of a flower.

Ans.

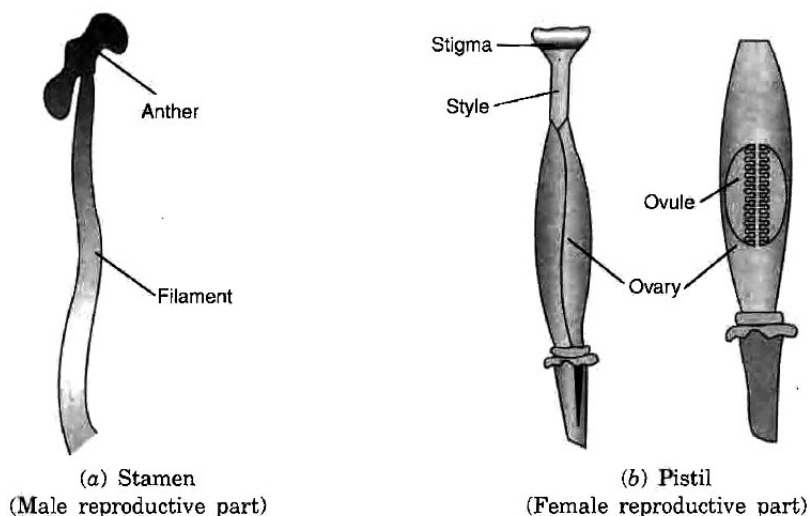


Fig. Reproductive parts of a flower

Q.6 Explain the difference between *self-pollination* and *cross-pollination*.

Self-Pollination	Cross-Pollination
1. In self-pollination, pollen grain of a flower reaches to the stigma of same flower.	1. In cross-pollination, the transfer of pollen grains from the anthers of a flower to the stigma of another flower on a different plant of the same species.
2. No pollinating agent is required.	2. Pollinating agent like wind, air or insects are required.
3. Occurs only in bisexual flowers.	3. Occurs in unisexual flower, under monoecious/dioecious condition.
4. It does not lead to genetic variation in the progeny.	4. It leads to genetic variation in the progeny.

Q.7 How does the process of fertilisation take place in flowers?

Ans. Pollen grain reaches on the stigma of a carpel by pollination. On the stigma, the pollen grain germinates and a pollen tube comes out. This pollen tube grows and approaches through the style to ovary, carrying male gametes with it, where it enters the ovule. Inside the ovule, there is female gamete or egg. The male gamete fuses with the female gamete. This process is called fertilisation.

Q.8 Describe the various ways by which the seeds are dispersed.

Ans. Seeds are dispersed to different places in the following way:

- (i) **By wind:** Seeds dispersed by wind are either winged (e.g., drumstick and maple) or light (e.g., grasses) or hairy (e.g., aak and sunflower).
- (ii) **By water:** Seeds dispersed by water develop floating ability (e.g., coconut).
- (iii) **By insects and other animals:** Seeds which are spiny (e.g., xanthium and urena) have hooks and get attached to the body of animals or to clothes of passers by. There are own carried to different places.
- (iv) Some seeds are dispersed when the fruit burst with sudden jerks (e.g., castor and balsam).

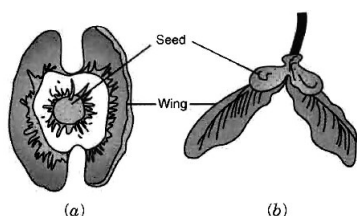


Fig. Seeds of (a) drumstick and (b) maple

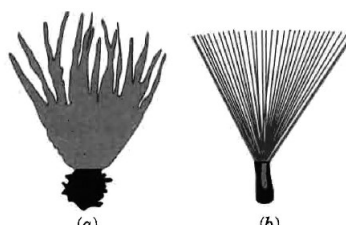


Fig. (a) The hairy fruit of sunflower and (b) hairy seed of madar (aak)

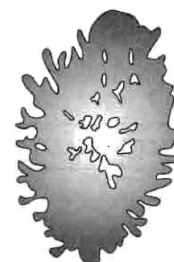


Fig. Xanthium

Q.9 Match items in Column I with those in Column II:

Column I	Column II
(a) Bud	(i) Maple
(b) Eyes	(ii) Spirogyra
(c) Fragmentation	(iii) Yeast
(d) Wings	(iv) Bread mould
(e) Spores	(v) Potato
	(vi) Rose

Ans. Column I	Column II
(a) Bud	(iii) Yeast
(b) Eyes	(v) Potato
(c) Fragmentation	(ii) Spirogyra
(d) Wings	(i) Maple
(e) Spores	(iv) Bread mould

Q.10 Tick (✓) the correct answer:

- (i) The reproductive part of a plant is the
 (A) leaf (B) stem (C) root (D) flower
- (ii) The process of fusion of the male and the female gametes is called
 (A) fertilisation (B) pollination (C) reproduction (D) seed formation

- (iii) Mature ovary forms the
(A) seed (B) stamen (C) pistil (D) fruit
- (iv) A spore producing plant is
(A) rose (B) bread mould (C) potato (D) ginger
- (v) Bryophyllum can reproduce by its
(A) stem (B) leaves (C) roots (D) flower
- Ans. (i) (D) flower (ii) (A) fertilisation (iii) (D) fruit (iv) (B) bread mould
(v) (B) leaves

CONCEPT APPLICATION LEVEL - II

Section – A

Q.1 Define vegetative parts and reproductive parts of a plant?

Ans. Vegetative parts: Most plants have roots, stem and leaves. These are called the vegetative parts of a plant.

Reproductive parts: The flowers perform the function of reproduction in plants. Flowers are the reproductive parts of a plant. A flower may have either the male part or the female part or both male and female parts.

Q.2 Name the two types of reproduction in plants.

Ans. Sexual and asexual reproductions.

Q.3 What is vegetative propagation?

Ans. Vegetative propagation is a type of asexual reproduction in which new plants are produced from roots, stems and buds. Since reproduction is through the vegetative parts of the plant, it is known as vegetative propagation.

Q.4 What are “eyes” found in potato?

Ans. “Eyes” are the vegetative buds.

Q.5 Do plants produce new plants when their parts get detached?

Ans. Yes, plants such as cacti produce new plants when their parts get detached from the main plant body. Each detached part can grow into a new plant.

Q.6 What is budding?

Ans. It is a mode of asexual reproduction in some plants (i.e., Yeast) and animals (i.e., Hydra). In this method, a small bulb like projection comes out from the organism. It is called a **bud**. The bud gradually grows, attains the shape of the parent, and gets detached from the parent cell to form a new individual. The new individual grows, matures and produces more individual.

Q.7 Give one example each of budding, fragmentation and spore formation.

Ans. (i) Budding: Yeast
(ii) Fragmentation: Spirogyra
(iii) Spore formation: Fungus.

Q.8 What use do the plants make of food stored in tubers, corms and rhizomes?

Ans. Many plants can reproduce by giving new plants from the single parent plant. The food is stored in different plant in different ways. The food is stored in the form of tubers, corms and rhizomes, which are used for the production of new plant. For example:

(i) Potato tubers: A potato is an underground stem of a potato plant, which forms tuber to store food. The eyes on the potato represents the nodes, that sprout into a new plant.

(ii) Gladiolus corms: A corm is a short stem, swollen with stored food. The nodes present on the corms get separate from each other and form new plants.

(iii) Rhizomes (ginger): Rhizomes are stems that grow horizontal to the soil. They are swollen with stored food. Under favourable conditions, they produce by giving buds from the node and forms a new plant.

Q.9 Where do the moulds on bread come from?

Ans. Spore of moulds are present in the air. Wherever they get favourable conditions for germination, i.e., food, water and temperature, they grow and form a mass of moulds. On moist bread the moulds spore get favourable conditions and germinates to form the new plant.

Q.10 Classify the flowers on the basis of their reproductive parts.

Ans. On the basis of their reproductive parts, flowers can be classified into two groups:

- (i) **Unisexual flowers:** The flowers which contain only one reproductive organ (either male i.e., stamen or female i.e., pistil) are called unisexual flowers. The plant such as papaya, watermelon, corn have unisexual flowers.
- (ii) **Bisexual flowers:** The flowers which contain both the reproductive organs. i.e., male-‘stamen’ as well as the female-‘pistil’. The plants such as rose, mustard, hibiscus have bisexual flowers.

Q.11 What is a zygote?

Ans. The diploid cell which results after the fusion of the gametes, is called a **zygote**.

Q.12 What is pollination? Explain in brief self- and cross-pollinations.

Ans. The transfer of pollen grains from the anther to the stigma of a flower is called **pollination**. If the pollen lands on the stigma of the same flower it is called **self-pollination**. When the pollen of a flower lands on the stigma of another flower of the same plant, or that of a different plant of the same species, it is called **Cross-pollination**.

Q.13 What is cloning?

Ans. Cloning is the creation of an organism that is an exact genetic copy of another. This means that every single bit of DNA is the same between the two organisms.

Q.14 What is a fruit? What are fleshy and dry fruits?

Ans. The fruit is the ripened ovary. Fruits are of two types:

- (i) **Fleshy fruits:** The epicarp and mesocarp of some fruits are fleshy and juicy such as mango, apple and orange. These are called fleshy fruits.
- (ii) **Dry fruits:** The pericarp of some fruits are dry, papery and hard such as almonds, walnut, etc. which are called dry fruits.

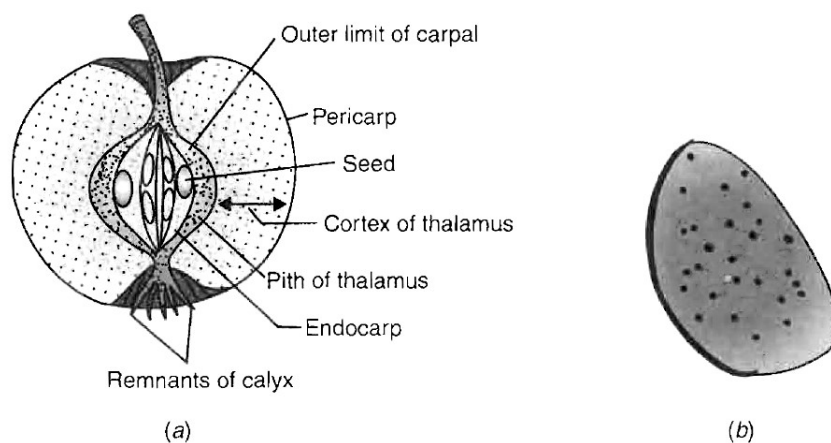


Fig. (a) Section of an apple, **(b)** Almond

Q.15 What will happen if all seeds of a plant were to fall at the same place and grow there? What are the benefits of seed dispersal and how the seeds are dispersed?

Ans. If all seeds of a plant were to fall at the same place and grow, there will be a severe competition for sunlight, water, minerals and space. As a result, the survival for the plants will be difficult and those which survived would not grow into healthy plants.

Plants benefit by seed dispersed in following ways:

- (i) It prevents competition between the plant and its own seedlings for sunlight, water and minerals.
- (ii) It also prevents such competition between the seedlings.
- (iii) It also enables the plants to invade new habitats for wider distribution.

Dispersal of seeds: Seeds of a plant are dispersed in various ways as discussed below:

- (i) **By winds:** Winged seeds such as those of drumstick and maple, light seeds of grasses or hairy seeds of aak (madar) and hairy fruit of sunflower get blown off with the wind to far away places.
- (ii) **By water:** Some seeds are dispersed by water. These fruits usually have the floating ability in the form of spongy or fibrous outer coat as in coconut.
- (iii) **By animals:** Some seeds are dispersed by animals, especially spiny seeds with hooks which get attached to the body of animals and are carried to distant places. Examples are Xanthium and Urena.
- (iv) **By humans:** Human beings carry various fruits to long distances with them and thus helping in seed dispersal.
- (v) Some seeds are dispersed when the fruits burst with sudden jerk. The seeds are scattered far from the parent plant. This happens in the case of castor and balsam.

Section – B

PREVIOUS YEAR'S NSO QUESTIONS

Q.1 Match **column I** with **column II** and select the correct option from the codes given below.

[NSO 2010]

Column I	Column II
(a) Ovary	(i) Lowermost swollen part of pistil
(b) Filament	(ii) Slender stalk of the stamen
(c) Style	(iii) Numerous small bead like structures
(d) Ovule	(iv) Knob-like structure on the top of stamen
(e) Anther	(v) Elongated tube connecting ovary and stigma
(A) a-(i), b-(ii), c-(iii), d-(iv), e-(v)	(B) a-(i), b-(ii), c-(v), d-(iii), e-(iv)
(C) a-(iv), b-(v), c-(ii), d-(iii), e-(i)	(D) a-(iii), b-(v), c-(ii), d-(i), e-(iv)

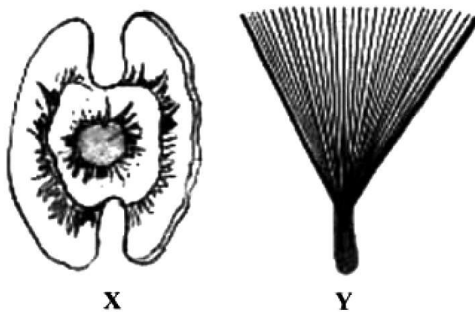
Q.2 The given figure shows _____

[NSO 2012]



- (A) Seed dispersal carried out by explosion
- (B) Seed dispersal carried out by wind
- (C) Seed dispersal carried out by insect
- (D) Seed dispersal carried out by sunlight

Q.3 The given figures show two kinds of fruits :



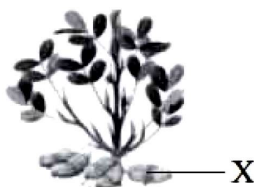
How are 'X' and 'Y' adapted for their dispersal in the surroundings?

[NSO 2013]

- | | |
|--------------------------------------|---|
| X | Y |
| (A) Fleshy and sweet | Hair-like structure to stick onto bodies of animals |
| (B) Able to float | Hook-like structure to stick onto fur of animals |
| (C) Air trapped within its structure | Dry seeds |
| (D) Wing-like structure | Hair-like structure to get blown off with the wind |

Q.4 Which of the following are the functions of the part marked X?

[NSO 2013]



P : It stores food for the developing embryo.

Q : It is called the 'poor man's protein'.

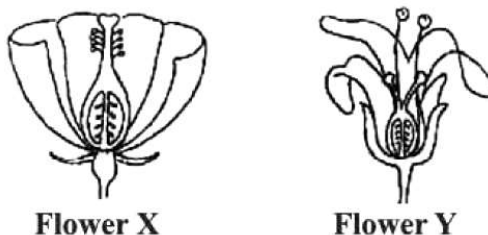
R : It can grow into new plant.

S : It absorbs water from the soil.

T : It holds the plant firmly in the ground.

- (A) P and R (B) P, Q and R (C) P only (D) S and T

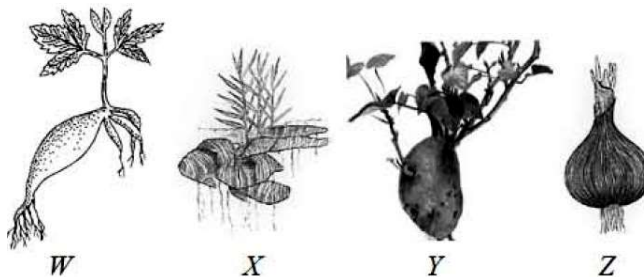
Q.5 Study the given diagrams showing the cross-section of two flowers. Which of the following statements is/are correct regarding them? [NSO 2013]



- (i) The flowering plants have developed from seeds.
 (ii) Flower X is a female flower and flower Y is a bisexual flower.
 (iii) Fertilization can take place in both flowers.

- (A) (i) only (B) (ii) only (C) (i) and (ii) (D) (ii) and (iii)

Q.6 A teacher showed the following plants to students and asked them to write their methods of reproduction. Given below are answers written by the students : [NSO 2014]



Student P : W, X and Y propagate vegetatively through stem.

Student Q : W and X are rhizomes which propagate vegetatively through roots.

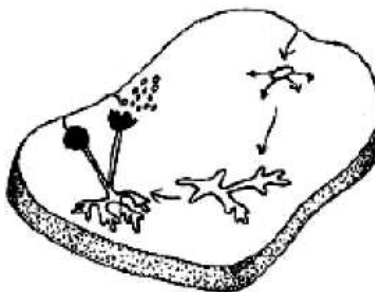
Student R : Z is called bulbil which propagates vegetatively through stem.

Student S : Y vegetatively propagates through roots.

Which student(s) wrote the correct answer?

- (A) Students P and S (B) Only Student S (C) Students Q and R (D) Only Student Q

Q.7 Which of the following statements best describe the organism growing on the given piece of bread? [NSO 2014]



(i) It belongs to flowering plants.

(ii) It reproduces by spores.

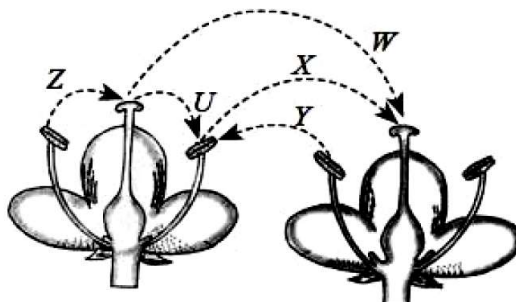
(iii) It is a chlorophyllous organism.

(iv) It prepares its own food.

(v) It obtains food from dead and decaying organic matter.

- (A) (ii), (iii) and (iv) (B) (i), (ii) and (v) (C) (ii) and (v) (D) (iii) and (iv)

Q.8 The given figure shows the longitudinal section of two flowers of the same type. Study the following statements with reference to the given figure.



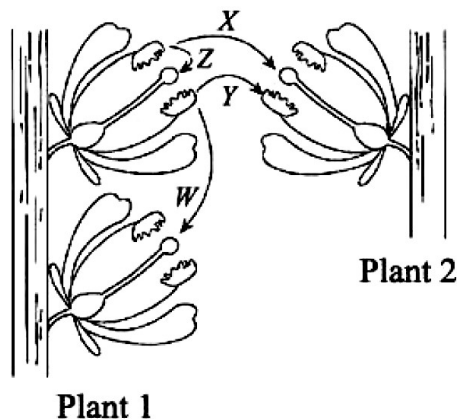
- (i) Z, and U show self pollination, whereas Y shows, cross pollination.
 (ii) W, X and Z show transfer of pollen grains that will result in fruit formation.
 (iii) Z shows self pollination, while X shows cross pollination.
 (iv) X and Z show pollination that will result in fruit formation.
 (v) W, X and Y show cross pollination.

Which of the given statements are true or false?

[NSO 2014]

- (A) (i) and (iv) are true; (ii), (iii) and (v) are false.
 (B) Only (v) is true; rest are false.
 (C) (i), (ii), (iii) and (v) are true; (iv) alone is false.
 (D) (i), (ii) and (v) are false; (iii) and (iv) are true.

- Q.9 The diagram below shows two plants of the same species. Refer to the diagram to answer the following questions.



- (i) Which arrow indicates a process that would not lead to sexual reproduction?
 (ii) Which arrow represents a type of pollination that would result in greater adaptability of the particular species to potential environmental changes?
- [NSO 2014]
- (A) (i)-Y, (ii)-Z (B) (i)-Z, (ii)-X (C) (i)-Y, (ii)-X (D) (i)-X; (ii)-Y

CONCEPT APPLICATION LEVEL - III

SECTION - A

- **Fill in the blanks with suitable words.**
- 1. In _____ reproduction, one individual can produce many individuals from body parts.
- 2. Both stamen and carpel are present in _____ flowers.
- 3. Budding is a type of _____ reproduction.
- 4. The process of _____ ensures continuity of life on the earth.
- 5. _____ are the reproductive parts of a plant.
- 6. Buds in potato are also called _____ .
- 7. Plants produce seeds as a result of _____ reproduction.
- 8. The small bulb like projection coming out from the yeast cell is called a _____ .
- 9. The _____ develops into an embryo.
- 10. The fruits are ripened _____ .

SECTION - B

- **Match the following (one to one)**

Q.1 Match the items given in **Column I** with **Column II**:

Column I	Column II
(i) Bread mould	(a) Cutting
(ii) Yeast	(b) Leaves
(iii) Potato	(c) Fragmentation
(iv) Rose	(d) Detached body part
(v) Sweet potato	(e) Spores
(vi) Bryophyllum	(f) Eye
(vii) Cactus	(g) Roots
(viii) Spirogyra	(h) Budding

SECTION - C

- **Mark 'T' if the statement is true and 'F' if it is false:**
- 1. Two individuals are needed for a sexual reproduction.
- 2. Seed is the only structure which develops into new plant.
- 3. Plants such as cacti produce new plants when their parts get detached from the main plant body .
- 4. Plants produced by vegetative propagation take less time to grow and bear /lower and fruit.
- 5. The spores are asexual reproductive bodies.
- 6. Anther contains female gametes called eggs.
- 7. The fruit is ripened ovary.
- 8. Seed dispersal in coconut is aided by winds.
- 9. Fusion of male and female gametes is called pollination.
- 10. A bisexual flower has both male and female reproductive parts.

SECTION - D

- **Choose the correct option in the following:**
- 1. Vegetative propagation in potato takes place by
 (A) leaves (B) stem (C) root (D) seed

2. In which of the following plants buds are present on the margins of leaves?
(A) Bryophyllum (B) Touch me not (C) Chandan (D) Coriander
3. In yeasts reproduction occurs by
(A) fragmentation (B) binary fission (C) budding (D) spore formation
4. A spore
(A) is a sexual reproductive body
(B) is covered by a hard protective coat
(C) germinates and develops into a new individual
(A) all of these
5. Which one of the following is not a part of a pistil?
(A) Filament (B) Ovary (C) Style (D) Stigma
6. Pollination is the movement of pollen grains from
(A) anther to ovary (B) anther to egg (C) anther to stigma (D) none of these
7. The fusion of male and female gametes is called
(A) pollination (B) fertilisation (C) ovulation (D) gametogenesis
8. The cell which results after fusion of male gamete and female gamete is called
(A) egg (B) ovule (C) zygote (D) all of these
9. Process of fertilisation in plants occurs
(A) inside the ovary (B) inside the anther (C) on the stigma (D) outside the ovary
10. Which of the following is a winged seed?
(A) Drumstick (B) Xanthium (C) Aak (D) Castor
11. Dispersal of seeds in coconut is aided by
(A) wind (B) water (C) insects (D) by burning of fruit
12. Which of the following is dispersed by sticking on the body of animals?
(A) Xanthium (B) Maple (C) Balsam (D) All of these
13. Which of the following show vegetative reproduction?
(A) Wheat (B) Sugarcane (C) Sunflower (D) Rice

ANSWER KEY

CONCEPT APPLICATION LEVEL - II

Section – B

- Q.1 B Q.2 B Q.3 C Q.4 B Q.5 C Q.6 D Q.7 C
 Q.8 D Q.9 C

CONCEPT APPLICATION LEVEL - III

SECTION - A

- | | | | |
|------------|-------------|------------|-----------------|
| 1. asexual | 2. bisexual | 3. asexual | 4. reproduction |
| 5. Flowers | 6. eyes | 7. sexual | 8. bud |
| 9. zygote | 10. ovary | | |

SECTION - B

- Q.1 (i)-(e), (ii)-(h), (iii)-(f), (iv)-(a), (v)-(g), (vi)-(b), (vii)-(d), (viii)-(c)

SECTION - C

- | | | | | | |
|---------|----------|----------|-----------|---------|----------|
| 1. True | 2. False | 3. True | 4. True | 5. True | 6. False |
| 7. True | 8. False | 9. False | 10. False | | |

SECTION - D

- | | | | | | |
|-------|------|------|-------|-------|-------|
| 1. B | 2. A | 3. C | 4. C | 5. A | 6. C |
| 7. B | 8. C | 9. A | 10. A | 11. B | 12. A |
| 13. B | | | | | |