

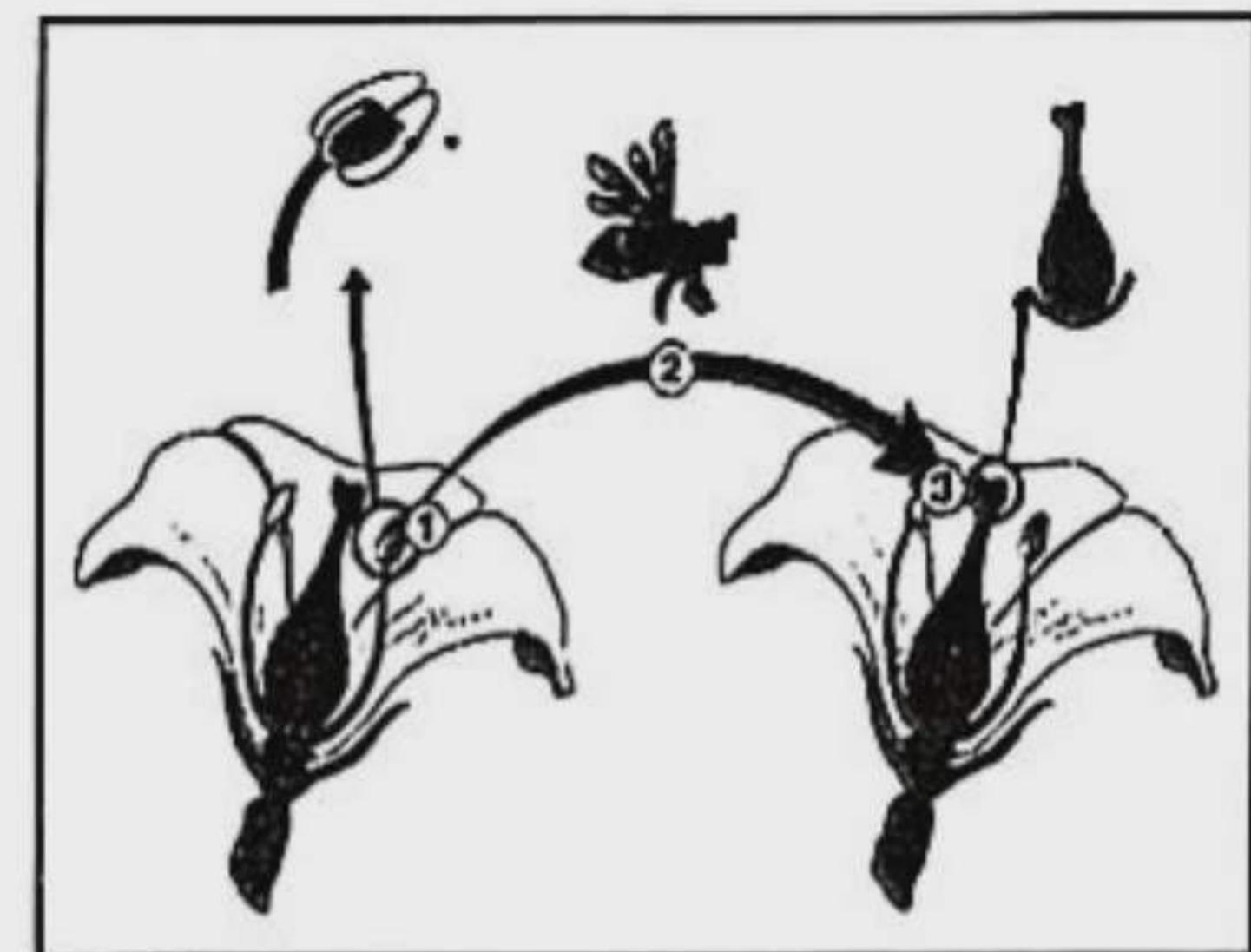
Reproduction in Plants

Contents for Discussion

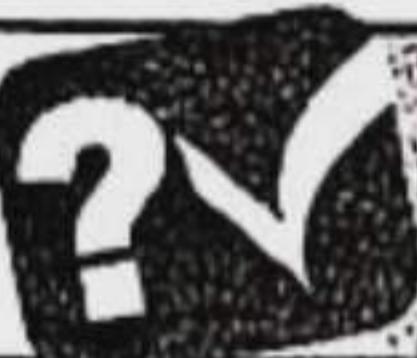
- Reproduction • Sexual reproduction • Pollination • Fertilization and fruit formation • Structure of seeds and its germination.

Learning Outcomes : After studying this chapter I will be able to-

- differentiate between sexual and asexual reproduction;
- differentiate between different pollinations;
- identify self pollination and cross pollination in environment and explain the reason behind it;
- explain pollinations;
- explain the process of fertilization;
- demonstrate germination through experiment.



Practice



Multiple Choice, Short & Creative Q/A
following 100% accurate format for best prep.

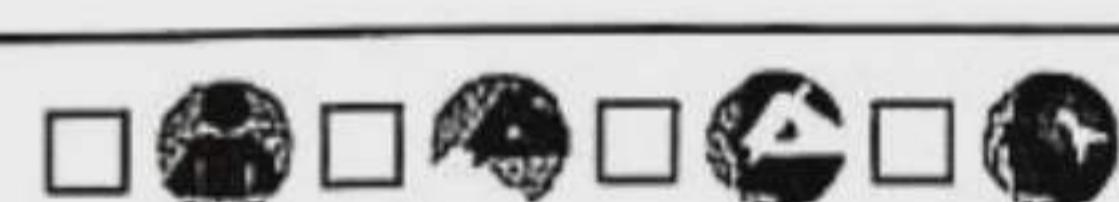
Dear learners, the Q/A of this chapter have been divided into exercise, multiple choice, short, creative & exercise-based activities in light of the learning outcomes. Practice the questions well to ensure the best preparation in the exam.



Textual Q/A



Let's learn the textbook Q/A



Fill in the Blanks



1. Reproduction is mainly of two types, — and —.
2. When fruit develops from single ovary, the fruit is called —.
3. The flower which bears — part, is known as complete flower.
4. Pollination is of two types — and —.
5. When all the flowers of an inflorescence together form a fruit, it is known as — fruit.
6. Ovule of the matured fruit develops into —.

Ans. 1. asexual, sexual; 2. plain fruit; 3. complete; 4. self pollination, cross pollination; 5. compound; 6. seeds.



Short Answer Questions



Question 1. Why asexual reproduction is important for plants?

Ans. Reproduction by any organ other than seed is called asexual reproduction. The survival of unflowering plants (cryptogams) depends on asexual reproduction. Potato, banana, ginger, garlic, onion, etc. are great sources of food that belong to asexual reproduction. Besides this, various methods of vegetative reproduction like cutting, layering, budding and grafting are also applicable to flowering plants (phanerogams) like mango, lichi, blackberry, rose, jasmine, etc. The flowers and fruits of new plants bear similar characteristics as those of their mother plant. The new plants give flowers and fruits early.

Question 2. Why grafting is made from mango tree?

Ans. Grafting is done with branches of mango tree on the ground that flowers and fruits of new plants bear the similar characteristics as those of their mother plant. The new plants also give early flowers and fruits. Grafting ensures preserving all the features of the mother plant.

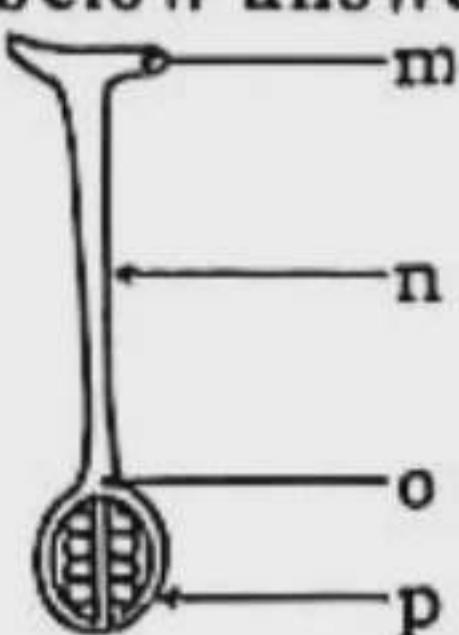
MCQs with Answers



Put tick (✓) the correct answer :

1. Which one of the following is aggregate fruit?
 A Mango B Custard apple
 C Jackfruit D Pineapple
 ► Explanation : (a) Fleshy fruits : Mango, Black berry, Banana etc.
 (b) Aggregate fruits : Champa, Sharifa, Nayantara, Akand, Custard apple etc.
 (c) Multiple fruits : Jackfruit, Pineapple etc.
 (d) Dry fruits : Bean, Lady's finger, Mustard etc.
2. Which one is the characteristic of insect-pollinated flowers?
 A They are colourless B They are scentless
 C They are very light
 D They are colourful and bears nectar gland
 ► Explanation : Insect-pollinated flowers are large, colorful, with honey glands. Pollen and stigma are sticky and fragrant. For example, china rose, pumpkin, mustard etc.

- From the figure below answer questions no. 3 & 4.



3. Which part receives pollen grains?

- a) @ m b) o c) n d) p

► Explanation : In the stimulus image, m.n.o and p are stigma, style stamen and ovary respectively. In the image, m i.e., stigma contains pollen.

4. p part of the figure—.

- i. develops into fruit
- ii. develops into seed
- iii. helps in reproduction

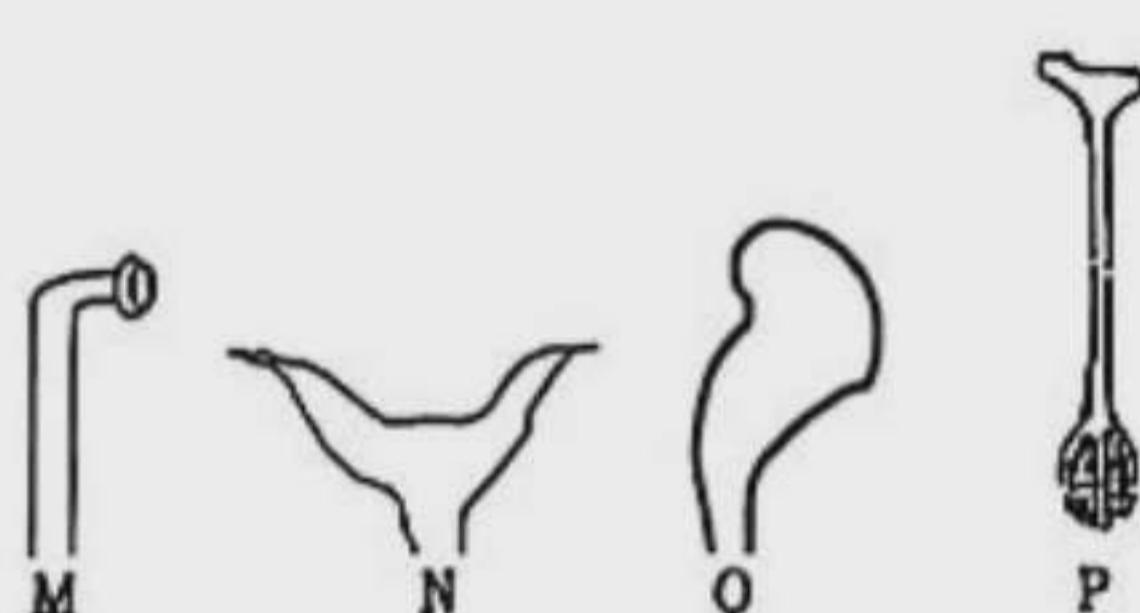
Which one of the following is correct?

- c) @ i & ii b) i & iii c) ii & iii d) i, ii & iii

► Explanation : The part p in the image is the ovary. The process of fertilization causes the uterus to become a fruit, which gradually develops into a seed. The seed germinates and produces a full-fledged sporophyte, which helps in reproduction.

Creative Questions with Answers

Ques. 01

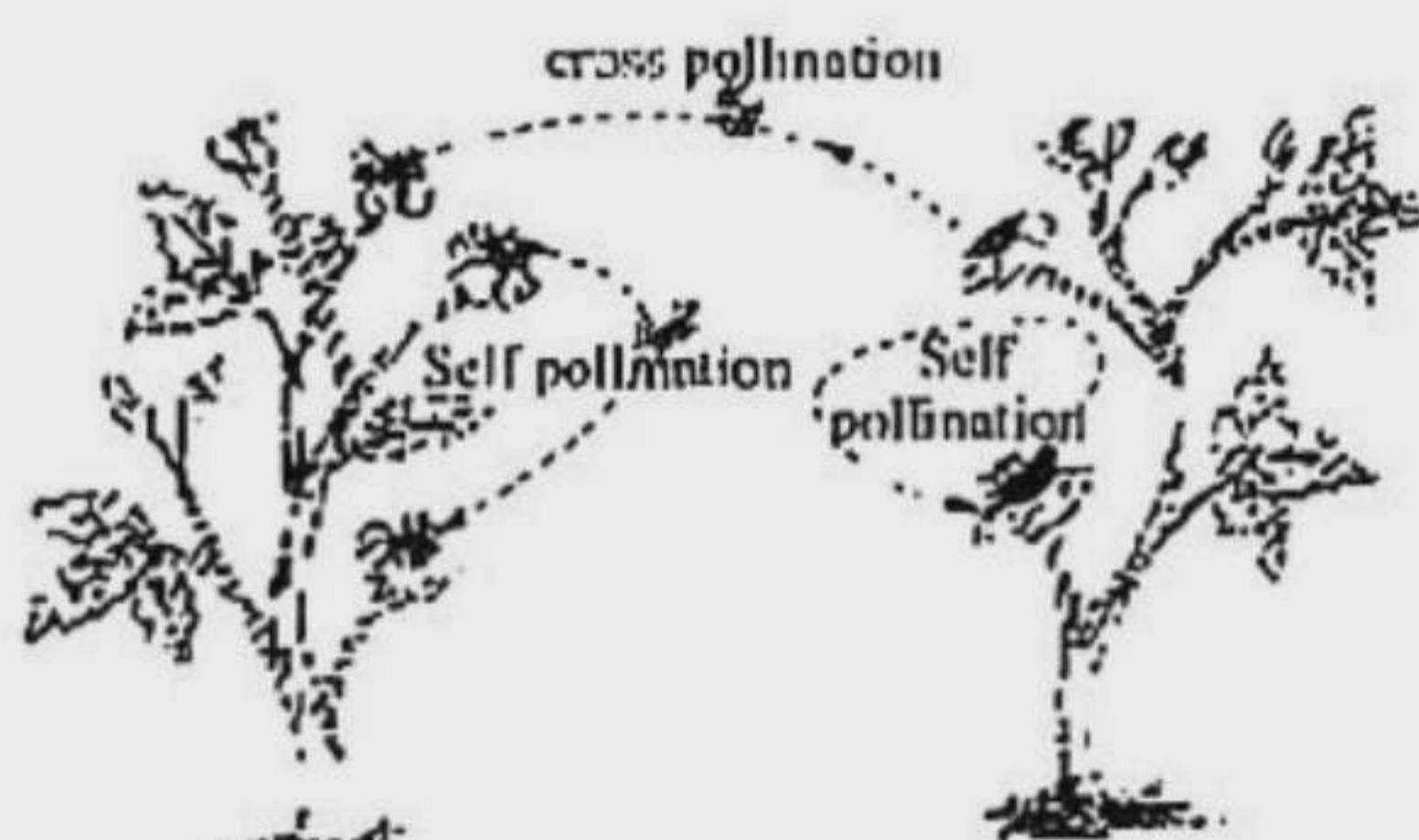


- a. What is reproduction? 1
- b. What do you mean by pollination? 2
- c. Draw a labelled diagram of the longitudinal section of the plant part constituted by M, N, O and P parts. 3
- d. Of M, O and P, which two parts are more essential for plant reproduction? Give reasons in favour of your answer. 4

Answer to Question No. 01 :

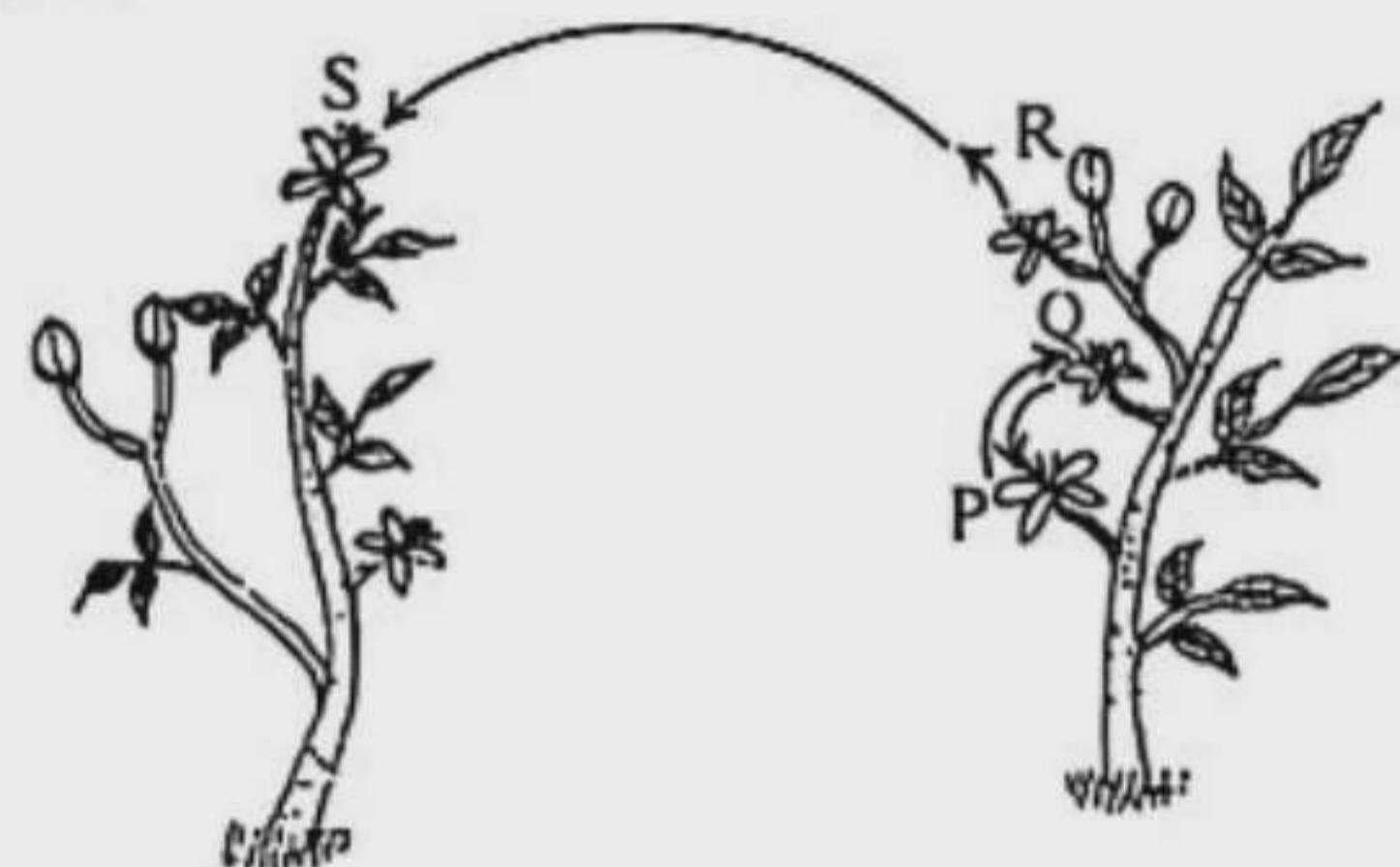
- a) The process by which a plant gives rise to grow a similar new plant is called plant reproduction.
- b) Every fertile stamen contains an anther. Pollen grains develop inside the anther. At a certain time the anther bursts and pollen grains are carried and attached to the stigma (of the same flower or flower of the same plant or flower of the same species of a different plant) by insects, air or any other agent. The process by which pollen grains are transferred from anther to the stigma is called pollination.

- c) A labelled diagram of the longitudinal section of the whorl comprising of M, N, O and P is represented below :



d) Parts M and P are more important in plant reproduction. Part 'O' is a petal that attracts insects and in this way entomophilous pollination takes place. But in case of anemophilous and hydrophilous flowers, part 'O' does not play any role. 'M' is a stamen and the capsule shaped part at the end of the stamen is an anther. P is the female organ having ovary at the bottom and stigma at the top. Pollen grains are transferred from M-top to P-top (anther to stigma) as a consequence of which pollination takes place. Pollination leads to fertilization and the ovules in the ovary develop seeds. The ovary gradually develops to a fruit with its seeds inside. It paves the way to reproduction.

Ques. 02



- a. What is vegetative reproduction? 1
- b. What do you mean by germination? 2
- c. Explain pollination between P and Q flowers. 3
- d. Which pollination of the two figures play role in creating new characteristics? Give your comments after having a comparative analysis. 4

Answer to Question No. 02 :

- a) Reproduction that takes place through vegetative organ is called vegetative reproduction. It usually takes places through organs like root, stem and leaf.
- b) Germination refers to the process of sprouting out of a seed. In other words, that a seed develops a child plant is called germination. The process depends on a congenial environment which includes space, water, light and air. Without favourable environment, no seedling can grow big.

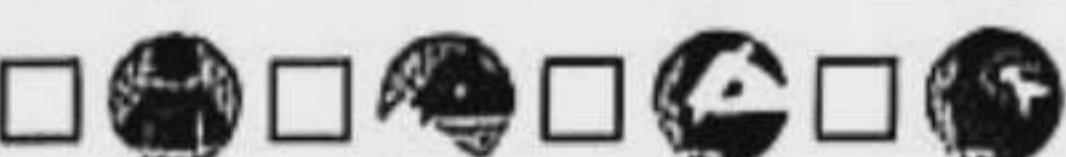
c P and Q refer to self-pollination because pollen grains are carried and attached to the stigma of P from the anther of Q by air (no insect or other agent is drawn in the diagram). Both the flowers P and Q belong to the same tree. So the process is self-pollination. The other features of this process are — (i) It usually takes place before blooming. (ii) It does not need the presence of other plants of the same species nearby. (iii) It depends little on pollinating agents. (iv) It preserves purity of species (v) No new variety develops.

d According to the diagrams, pollination taking place in plant P plays role in creating new variety. We see, it is taking place between two plants P and Q of the same species. Pollen grains are carried and attached to the stigma of flower S of plant A from the anther of flower R of plant Q by air. So, it is cross pollination. In this case, there are possibilities of origin of new variety. But in case of plant Q, there occurs self-pollination because flowers S and R belong to the same plant. In this case, there develops no new variety.

► Multiple Choice Q/A



Designed as per topic



Lesson 1-3 : Reproduction ► Textbook Page 35

1. Origin of spores belong to —. (Comprehension)
Ⓐ pollination Ⓑ germination
Ⓒ sexual reproduction Ⓒ asexual reproduction
2. How many kinds of spores are there? (Knowledge)
Ⓐ Ⓐ 2 Ⓑ 3 Ⓒ 4 Ⓓ 5
3. Asexual reproduction takes place in —.
(Comprehension)
i. penicillium
ii. spirogyra
iii. fern

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
4. Asexual reproduction is carried out by —. (Application)
i. endospore
ii. exospore
iii. conidia

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
5. Asexual reproduction —. (Knowledge)
i. sporadic
ii. conidian
iii. vegetative

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ i & iii Ⓒ ii & iii Ⓓ i, ii & iii
6. Ways of normal vegetative reproduction —.
(Comprehension)
i. segmentation ii. root
iii. grafting

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
7. We do not eat —. (Knowledge)
i. stolons ii. offsets
iii. phyloclads

Which one is correct?

- Ⓑ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
- Read the passage and answer the following question numbers 8 and 9 :

The great English poet Dylan Thomas composed a masterpiece named 'Fern Hill'. The great Bengali novelist Bivitibusan also mentioned this plant in his compositions.

8. What type of plant is fern?

- Ⓐ Sporal Ⓑ Conidia
Ⓑ Flowering Ⓒ Stolon

9. Features of this plant —.

- i. they do not produce any gamete
- ii. they belong to vegetative reproduction
- iii. they produce conidia

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
10. What type of plant is fern? (Knowledge)

- Ⓐ Sporal Ⓑ Conidia
Ⓑ Flowering Ⓒ Stolon

11. Features of this plant —. (Comprehension)

- i. they do not produce any gamete
- ii. they belong to vegetative reproduction
- iii. they produce conidia

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
- Read the following passage and answer the question numbers 12 and 13 :

Alexander Fleming invented Penicillin, the first antibiotic in the world from a tiny plant named Penicillium. This invention was a great contribution to mankind.

12. How do Penicillium carry on reproduction? (Knowledge)

- Ⓐ Through segmentation
Ⓑ Through the roots
Ⓒ By producing conidia
Ⓓ By producing spores

13. On the basis of the mode of reproduction, this plant compares with —. (Application)

- Ⓐ sesame Ⓑ spirogyra
Ⓑ mucor

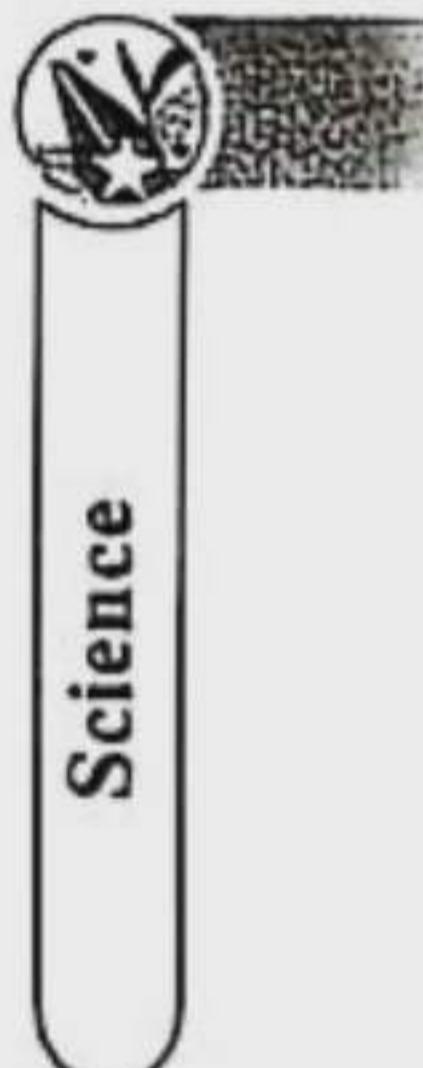
Which one is correct?

- Ⓑ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
- Read the passage and answer the following question numbers 14 and 15 :

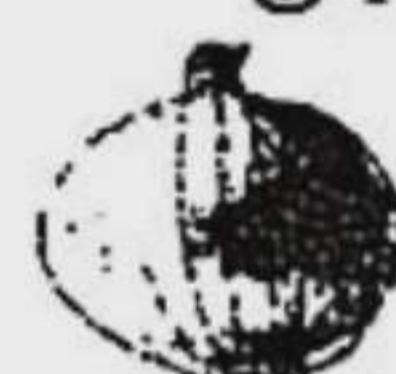
Ginger is a popular spice. Ginger with honey cures cold and cough. It is a good expectorant.

14. What type of modified stem is ginger? (Comprehension)

- Ⓐ Rhizome Ⓑ Tuber
Ⓒ Bulbil Ⓒ Phyloclad



- 15.** Features of this modified stem —. (Comprehension)
 i. they have micropiles
 ii. they have axial buds
 iii. they have turgidity
Which one is correct?
b @ i & ii @ ii & iii @ i & iii @ i, ii & iii
■ Read the passage and answer the following question numbers 16 and 17 :
 We use onion and garlic as spices but they have great medicinal value. Garlic reduces blood cholesterol and ensures sound functioning of the cardiovascular system. The French people eat garlic even with chicken roast.
- 16.** In respect to bud, onion and garlic are comparable to —. (Application)
 i. tubers
 ii. phloclads
 iii. stolon
Which one is correct?
b @ i & ii @ i & iii @ ii & iii @ i, ii & iii
17. Which one of the following is applicable to onion and garlic? (Comprehension)
 @ Grafting @ Cutting
 @ Normal vegetative reproduction
c @ Layering
18. By which does the reproduction of sweet potato occur? (Knowledge) [D.B.-'19]
 @ Spore @ Stem
d @ Leaf @ Root
19. 'From each eye an individual plant grows'— Which one of the following is that plant? (Application) [J.B.-'19]
 @ Potato @ Ginger
a @ Pudina @ Garlic
20. Vegetative reproduction of plants means— (Higher Ability) [J.B.-'19]
 i. reproduction by segmentation of plants
 iii. reproduction through root
 iii. reproduction without reproductive cell
 Which one is correct?
d @ i & ii @ i & iii @ ii & iii @ i, ii & iii
21. The reproduction of which occurs through offset? (Comprehension) [CB '19]
 @ Spirodela @ Mint
a @ Onion @ Guava
22. Which one is stolon? (Knowledge) [CtgB '19]
 @ Ginger @ Garlic
d @ Potato @ Pudina
23. By which one the reproduction of segun plant is occurred? (Knowledge) [BB '19]
 @ Through root @ Segmentation
a @ Through stem @ Through leaves
24. Which one is rhizome? (Comprehension) [DjB '19]
 @ Potato @ Ginger
b @ Garlic @ Arum

- 25.** In which one reproduction through root occurs? (Comprehension) [MB '19]
 @ Ginger @ Onion
d @ Garlic @ Patol
26. Which one remains parallelly under soil? (Knowledge) [RB '18]
 @ Onion @ Potato
d @ Arum @ Ginger
27. In which plant there is stolon? (Comprehension) [CB '18]
 @ Garlic @ Potato
d @ Zinger @ Mint
28. Through the increasing of branches, which of the following plant produces new plant? (Comprehension) [CB '18]
 @ Kochu @ Onion
c @ Water hyacinth @ Ginger
29. Mitosis cell division —. (Higher Ability) [CtgB '18]
 i. is seen in the mango buds
 ii. occurs during asexual reproduction of plants
 iii. occurs nerve cells of the nervous tissue
Which one of the following is correct?
a @ i & ii @ i & iii @ ii & iii @ i, ii & iii
30. In which process the asexual reproduction of sweet potato is performed? (Knowledge) [CtgB '18]
 @ Tuber @ Rhizome
d @ Segmentation @ Root
31.

- Figure-A**
- What type of modified stem of figure A is?** (Comprehension) [SB '18]
- b** @ Tuber @ Bulb
 @ Rhizome @ Stolon
- 32.** Through which does reproduction occur in garlic? (Knowledge) [BB '18]
 @ Tuber @ Rhizome
c @ Bulb @ Stolon
- 33.** In which of the plant, reproduction occurs through stolon? (Knowledge) [DjB '18]
 @ Pudina @ Ginger
a @ Garlic @ Potato
- 34.** Which one is the example of bulb? (Comprehension) [RB '17]
 @ Ginger @ Garlic
b @ Arum @ Mint (Pudina)
- 35.** In which plant new plants originate from the buds created in leaves edge? (Comprehension) [JB '17]
 @ Rubble @ Sweet potato
a @ Ginger @ Colocasia
- 36.** Which one is the reproductive organ of colocasia? (Comprehension) [JB '17]
 @ Bulb @ Stolon
b @ Rhizome @ Offset

37. Which of the following causes reproduction through root? (Knowledge) [CtgB '17]
a Ⓛ patol Ⓜ potato Ⓝ garlic Ⓞ mint
 38. Which one is the example of stolon? (Comprehension) [BB '17]
a Ⓛ Patol Ⓜ Mint
b Ⓛ Sweet potato Ⓜ Spirodela
 39. Which one is the modified stem? [DB '16]
a Ⓛ Sweet potato Ⓜ Stone clips
c Ⓛ Onion Ⓜ Rose tree
 40. Which one is true about the hormone called florigen? (Comprehension) [CtgB '16]
 i. It is produced in leaves.
 ii. It is transferred in leaf base (stalk).
 iii. Transforms buds into flower buds.
Which one is correct?
d Ⓛ i & ii Ⓜ i & iii Ⓝ ii & iii Ⓞ i, ii & iii
 41. Which one is an offset plant? (Comprehension) [SB '16]
a Ⓛ Arum Ⓜ Mint
c Ⓛ Water hyacinth Ⓜ Garlic
 42. Which one of the following plants is grown from root? (Comprehension) [Rajuk Uttara Model College, Dhaka]
a Ⓛ Segun Ⓜ Spirogyra
a Ⓛ Potato Ⓜ Ginger
 43. Which one of the following reproduces through stolon? (Comprehension) [Rajuk Uttara Model College, Dhaka]
a Ⓛ Onion Ⓜ Spirogyra
c Ⓛ Patol Ⓜ Pudina
 44. Which one reproduces by formation of conidia? (Knowledge) [Ideal School & College, Dhaka]
a Ⓛ Mucor Ⓜ Conidium
c Ⓛ Penicillium Ⓜ Plasmodium
 45. Which one is very small stem? (Comprehension) [Ideal School & College, Dhaka]
a Ⓛ Tube Ⓜ Bulb
b Ⓛ Rhizome Ⓜ Stolon

Lesson 4 : Sexual reproduction

► Textbook Page 38

46. Petals may be joint in which of the flower? (Comprehension) [DjB '18]
a Ⓛ China rose Ⓜ Dhatura
b Ⓛ Mustard Ⓜ Shimul
 47. What is called the outermost whorl of a flower? (Knowledge) [CB '17]
d Ⓛ Stamen Ⓜ Carpel Ⓝ Petal Ⓞ Sepal
 48. The other male gamete which does not united with the egg, develops into what? (Knowledge) [SB '17]
a Ⓛ Fruit Ⓜ Ovule
c Ⓛ Cereal grains Ⓜ Fluid of seed
 49. How many parts does a complete flower have? (Knowledge) [CB '16]
b Ⓛ 6 Ⓜ 5 Ⓝ 4 Ⓞ 3
 50. Which one is the second whorl of the flower? (Knowledge) [Ideal School & College, Dhaka]
a Ⓛ Stamens Ⓜ Petals
b Ⓛ Sepals Ⓜ Carpels

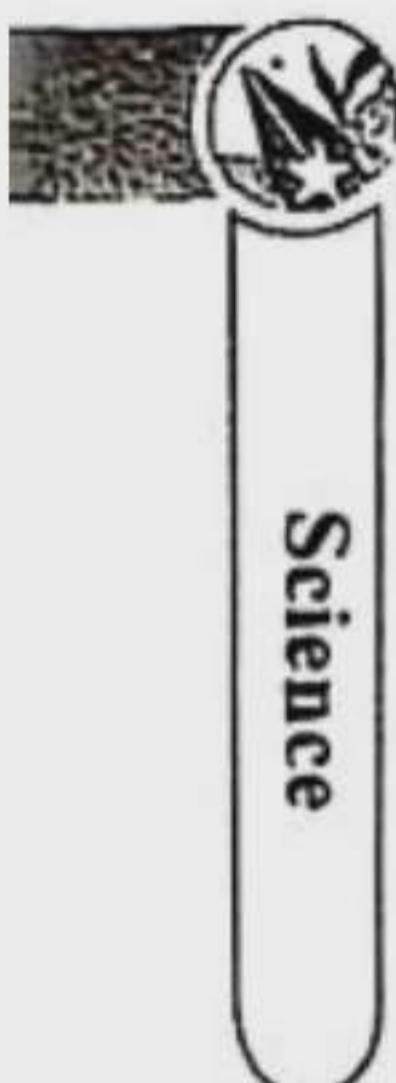
-  **Lesson 5 - 6 : Pollination** ► Textbook Page 39
51. Features of entomophilous flowers —. (Knowledge)
 i. they are small in size
 ii. they have nectar glands
 iii. their stigma is sticky
Which one is correct?
b Ⓛ i & ii Ⓜ ii & iii Ⓝ i & iii Ⓞ i, ii & iii
 52. Features of anemophilous flowers —. (Knowledge)
 i. they do not have any nectar gland
 ii. they are colourful
 iii. their stigma is sticky
Which one is correct?
a Ⓛ i & ii Ⓜ ii & iii Ⓝ i & iii Ⓞ i, ii & iii
 53. Features of zoophilous flowers —. (Knowledge)
 i. neither big nor tiny
 ii. may or may not have fragrance
 iii. arranged in inflorescence
Which one is correct?
d Ⓛ i & ii Ⓜ ii & iii Ⓝ i & iii Ⓞ i, ii & iii
Read the passage and answer to the following question numbers 54 to 58 :

The house Jitu lives in is very large. There are a few china rose trees and silk-cotton trees along with other species of trees. She grows gourd, pumpkin and other vegetables. Flowers bloom and they wither away at a certain time. In the field, her father grows paddy and mustard. She looks at the flowers with much interest.

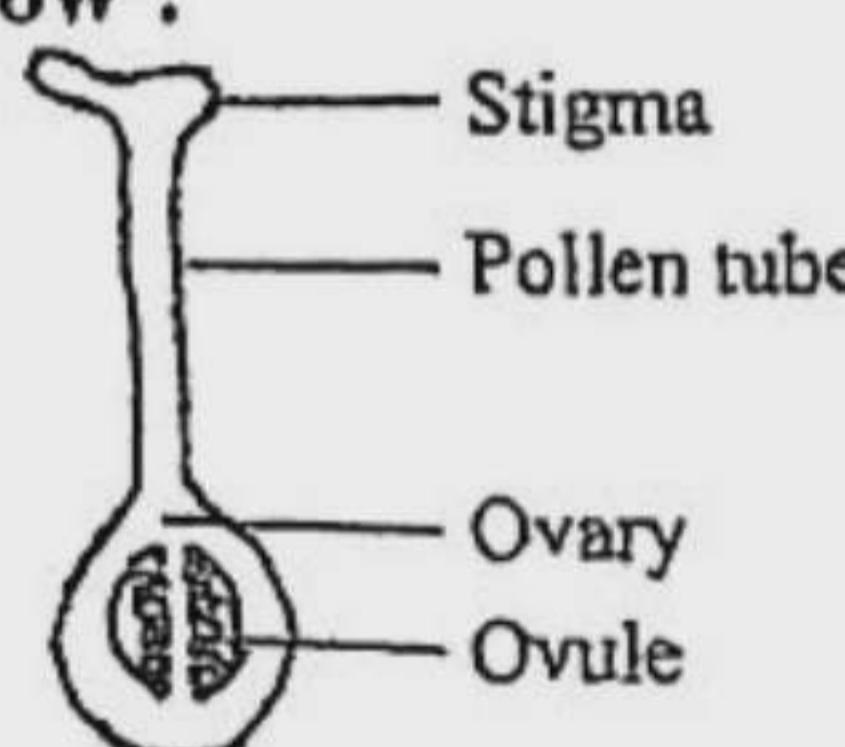
54. Which plant gives medium size flowers?
a Ⓛ Mustard Ⓜ Gourd
c Ⓛ Silk cotton Ⓜ Pumpkin
 55. Types of flowers Jitu sees —.
 i. entomophilous
 ii. anemophilous
 iii. zoophilous
Which one is correct?
d Ⓛ i & ii Ⓜ ii & iii Ⓝ i & iii Ⓞ i, ii & iii
 56. Which flowers grow in aquatic plants?
a Ⓛ Hydrophilous Ⓜ Zoophilous
c Ⓛ Anemophilous Ⓜ Entomophilous
 57. The calyx tells which flower is male and which one is female. In what case does it happen?
a Ⓛ Anemophilous flowers Ⓜ Entomophilous flowers
c Ⓛ Hydrophilous flowers Ⓜ Zoophilous flowers
 58. Flowers having nectar glands and sticky stigmas —.
 i. zoophilous
 ii. anemophilous
 iii. entomophilous
Which one is correct?
b Ⓛ i & ii Ⓜ ii & iii Ⓝ i & iii Ⓞ i, ii & iii
 59. Which plant gives medium size flowers? (Knowledge)
a Ⓛ Mustard Ⓜ Gourd
c Ⓛ Silk cotton Ⓜ Pumpkin



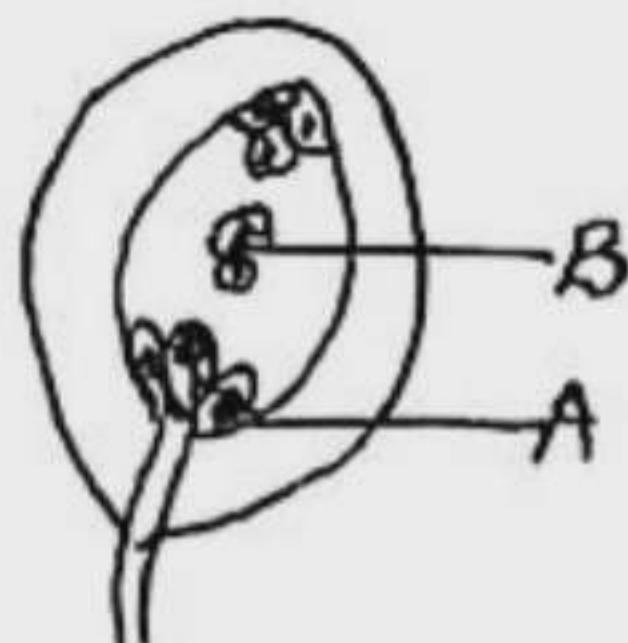
- 60. Types of flowers Jitu sees —. (Application)**
- entomophilous
 - anemophilous
 - zoophilous
- Which one is correct?
- (a) (i) & (ii) (b) (ii) & (iii) (c) (i) & (iii) (d) (i), (ii) & (iii)
- 61. Which flowers grow in aquatic plants? (Knowledge)**
- (a) Hydrophilous (b) Zoophilous
 (c) Anemophilous (d) Entomophilous
- 62. The calyx tells which flower is male and which one is female. In what case does it happen? (Knowledge)**
- (a) Anemophilous flowers
 (b) Entomophilous flowers
 (c) Hydrophilous flowers
 (d) Zoophilous flowers
- 63. Flowers having nectar glands and sticky stigmas —. (Comprehension)**
- zoophilous
 - anemophilous
 - entomophilous
- Which one is correct?
- (a) (i) & (ii) (b) (ii) & (iii) (c) (i) & (iii) (d) (i), (ii) & (iii)
- 64. Which flower does not have coloured petals and sticky stigmas? (Knowledge) [DB '19]**
- (a) Mustard (b) Shimul
 (c) Arum (d) Paddy
- 65. Pumpkin is— (Knowledge) [RB '19]**
- large flower and petals with nectars
 - pollen grains and stigmas are sticky
 - coloured and scented petals
- Which one is correct?
- (a) (i) & (ii) (b) (i) & (iii) (c) (ii) & (iii) (d) (i), (ii) & (iii)
- 66. Which of the following flowers is large in size and has attractive colour? (Comprehension) [CB '19]**
- (a) Paddy (b) China rose
 (b) Shimul (d) Mustard
- 67. Which of the following plants occur cross pollination in? (Comprehension) [CtgB '19]**
- (a) Mustard (b) Pumpkin
 (c) Datura (d) Shimul
- 68. In case of pumpkin flower—. (Comprehension) [SB '19]**
- it is big in size
 - It's pollen grains is sticky
 - it has scented petals with nectars
- Which one is correct?
- (a) (i) & (ii) (b) (i) & (iii) (c) (ii) & (iii) (d) (i), (ii) & (iii)
- 69. Which one is the animal-pollinated flower? (Knowledge) [BB '19]**
- (a) China rose (b) Shimul
 (b) Mustard (d) Pumpkin
- 70. Which pollination occurs through wind? (Knowledge) [DJB '19]**
- (a) Rice (b) Mustard
 (a) Shimul (d) Pumpkin
- 71. Which one is cross pollinated flower? (Comprehension) [MB '19]**
- (a) Shimul (b) Mustard
 (a) Pumpkin (d) Dhutura
- 72. Which one is an animal pollinated flower? (Comprehension) [MB '19]**
- (a) Paddy (b) Shimul
 (b) China-rose (d) Mustard
- 73. Which of the following is nectar glandless flower? (Knowledge) [CtgB '19]**
- (a) Kadom (b) Paddy
 (b) Arum (d) Shimul
- 74. Cross pollination occurs on which of the following? (Comprehension) [DB '18]**
- (a) Mustard (b) Pumpkin
 (c) Datura (d) Shimul
- 75. After the transfer of the pollen grains to stigmas, they —. (Knowledge) [DB '18]**
- swell up
 - burst open
 - dry up
- Which one of the following is correct?
- (a) (i) & (ii) (b) (i) & (iii)
 (a) (c) (ii) & (iii) (d) (i), (ii) & (iii)
- 76. Which one is wind-pollinated flower? (Knowledge) [RB '18; JB '18; DjB '17]**
- (a) Jaba (b) Mustard
 (d) Pumpkin (d) Paddy
- 77. For pollination which one help where the plant's flower stigmas are sticky and feathery? (Higher Ability) [CB '18]**
- (a) Man (b) Bat
 (d) Bird (d) Air
- 78. Which one of the following is insect pollinated flower? (Comprehension) [DB '17]**
- (a) China rose (b) Kadom
 (a) Arum (d) Paddy
- 79. In which flower does cross-pollination take place? (Knowledge) [DB '17]**
- (a) Mustard (b) Pumpkin
 (d) Datura (d) Shimul
- 80. The cause of being insect pollinated flower of mustard flower is —. (Comprehension) [CtgB '17]**
- flower is large and has nectars
 - pollen grain's and stigmas are sticky
 - flower is coloured
- Which one is correct?
- (a) (i) & (ii) (b) (i) & (iii) (c) (ii) & (iii) (d) (i), (ii) & (iii)
- 81. The cause of being insect-pollinated flower of pumpkin flower is —. (Comprehension) [BB '17]**
- flower is big and has nectars
 - pollen grains and stigmas are sticky
 - flower is coloured
- Which one is correct?
- (a) (i) & (ii) (b) (i) & (iii) (c) (ii) & (iii) (d) (i), (ii) & (iii)
- 82. Examples of insect-pollinated flowers are —. (Comprehension) [RB '16]**
- China rose
 - Pumpkin
 - Paddy
- Which one is correct?
- (a) (i) & (ii) (b) (i) & (iii) (c) (ii) & (iii) (d) (i), (ii) & (iii)



83. In which flower does self-pollination take place? (Knowledge) [CB '16]
 ⓐ Shimul ⓑ Paddy ⓒ Pumpkin ⓓ Papaya
84. The characteristic of wind-pollinated flowers —. (Knowledge) [CB '16]
 i. pollen grains are light
 ii. stigmas are sticky
 iii. flowers are scentless
Which one is correct?
 ⓐ Ⓛ i & ii ⓑ Ⓛ i & iii ⓒ Ⓛ ii & iii ⓓ Ⓛ i, ii & iii
85. The characteristics of insect-pollinated flower are —. (Knowledge) [SB '16]
 i. Flowers are large.
 ii. Do not have nectar.
 iii. Stigmas are sticky.
Which one is correct?
 ⓐ Ⓛ i & ii ⓑ Ⓛ i & iii ⓒ Ⓛ ii & iii ⓓ Ⓛ i, ii & iii
86. Cross pollination occurs in which plant? (Comprehension) [Rajuk Uttara Model College, Dhaka]
 ⓐ Mustard ⓑ Pumpkin
 ⓒ Datura ⓓ Papaya
87. Features of water-pollinated flower— (Knowledge) [Rajuk Uttara Model College, Dhaka]
 i. don't have scent
 ii. brightly colored
 iii. light-weight
Which one is correct?
 ⓐ Ⓛ i & ii ⓑ Ⓛ i & iii ⓒ Ⓛ ii & iii ⓓ Ⓛ i, ii & iii
-  **Lesson 7 and 8 : Fertilization and fruit formation** → Textbook Page 40
88. In which case the ovary turns into fruit? (Knowledge)
 ⓐ Mango ⓑ Apple ⓒ Banana ⓓ Grape
89. Which one is a aggregate fruit? (Comprehension)
 ⓐ Mango ⓑ Grape ⓒ Pineapple ⓓ Plum
90. Which one is a multiple fruit? (Comprehension)
 ⓐ Apple ⓑ Wood apple
 ⓒ Pineapple ⓓ Champa
91. Which is aggregate fruit? (Comprehension) [DB '19]
 ⓐ Akanda ⓑ Jackfruit
 ⓒ Black berry ⓓ Banana
92. What type of fruit is banana? (Knowledge) [RB '19]
 ⓐ Dry fruit ⓑ Aggregate fruit
 ⓒ Multiple fruit ⓓ Fleshy fruit
93. Which one is fleshy fruit? (Knowledge) [JB '19]
 ⓐ Bean ⓑ Lady's finger
 ⓒ Mango ⓓ Mustard
94. Which of the following is fleshy fruits? (Knowledge) [CtgB '19]
 ⓐ Custard apple ⓑ Banana
 ⓒ Pineapple ⓓ Jackfruit
95. Which one is the dry fruit? (Knowledge) [SB '19]
 ⓐ Mango ⓑ Custard apple
 ⓒ Mustard ⓓ Akanda

96. What kind of fruit is mango? (Knowledge) [DB '18]
 ⓐ Dry fruit ⓑ Fleshy fruit
 ⓒ Aggregate fruit ⓓ Multiple fruits
97. Which one leads to fruit after fertilization? (Knowledge) [RB '18]
 ⓐ Ovule ⓑ Gynoecium
 ⓒ Pollen grains ⓓ Pollen tube
98. Which of the following is a multiple fruit? (Comprehension) [CtgB '18, '16]
 ⓐ Akanda ⓑ Custard apple
 ⓒ Lady's finger ⓓ Jackfruit
99. Which does help to ripen fruits? (Knowledge) [CtgB '18]
 ⓐ Auxin ⓑ Zibbereline
 ⓒ Cytokinin ⓓ Ethylene
100. Which of the following turns fruit after fertilization? (Comprehension) [DjB '17]
 ⓐ Ovule ⓑ Ovary
 ⓒ Pollen grain ⓓ Pollen tube
101. Which is multiple fruit? (Comprehension) [DB '16]
 ⓐ Mango ⓑ Banana ⓒ Jackfruit ⓓ Akanda
102. The fruits which have thick and succulent pericarps are known as what? (Knowledge) [RB '16]
 ⓐ Dry fruits ⓑ Aggregate fruit
 ⓒ Multiple fruit ⓓ Fleshy fruits
103. Which one of the following is the example of multiple fruit? (Comprehension) [RB '16]
 ⓐ Pineapple ⓑ Bean
 ⓒ Banana ⓓ Custard apple
-  **Answer questions No. 104 & 105 from the figure below :**
- 
104. Figure of the stem takes part in which process of plant? (Comprehension) [JB '16]
 ⓐ Photosynthesis ⓑ Respiration
 ⓒ Fertilization ⓓ Germination
105. Ovule in the figure —. (Knowledge) [JB '16]
 i. develops into fruit ii. develops into seed
 iii. helps in reproduction
Which one is correct?
 ⓐ Ⓛ i & ii ⓑ Ⓛ i & iii ⓒ Ⓛ ii & iii ⓓ Ⓛ i, ii & iii
106. Which one is a multiple fruit? (Comprehension) [CtgB '16]
 ⓐ Jackfruit ⓑ Mango
 ⓒ Banana ⓓ Blackberry
107. Which one is correct about a multiple fruit? (Comprehension) [CtgB '16]
 ⓐ A whole inflorescence turns into a fruit
 ⓑ Every single ovary turns into a fruit
 ⓒ There are many ovaries
a ⓑ Succulent is very thin

Answer to the questions No. 108 and 109 according to the stem.



[Ideal School & College, Dhaka]

108. What is the name of the labeled part 'B'? (Comprehension)

- Ⓐ Egg Ⓑ Ovum
- Ⓒ Secondary nucleus Ⓒ Antipodals

109. 'A' part of the figure— (Knowledge)

- i. form embryo
- ii. Produce fruits
- iii. forms coating

Which one is correct?

- Ⓐ Ⓐ i Ⓑ ii Ⓒ i & iii Ⓓ ii & iii

Lesson 9 -10 : Structure of seeds and its germination ▶ Textbook Page 42

110. What does germination belong to? (Knowledge)

- Ⓐ Flower Ⓑ Root Ⓒ Stem Ⓓ Seed

111. Which one of the following is an example of epigeal germination? (Comprehension)

- Ⓐ castor Ⓑ Pumpkin
- Ⓒ Tamarind Ⓒ All the above

112. In what seeds will you find cotyledon? (Comprehension)

- Ⓐ Tamarind Ⓑ Gourd
- Ⓒ Pumpkin Ⓒ All the above

113. Micropile belongs to —. (Knowledge)

- Ⓐ a flower Ⓑ a seed
- Ⓑ a leaf Ⓒ a tender stem

114. Micropile is a —. (Knowledge)

- Ⓐ tiny pore Ⓑ tiny gland
- Ⓒ tiny bud Ⓒ tiny embryo

115. A seed is covered with —. (Knowledge)

- i. testa
- ii. seed vessel
- iii. tegmen

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii

116. Sprouting necessitates —. (Comprehension)

- i. air
- ii. water
- iii. heat

Which one is correct?

- Ⓓ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii

117. Hypogea germination occurs in case of —. (Knowledge)

- i. paddy
- ii. gram
- iii. castor-oil seed

Which one is correct?

- Ⓐ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii

118. Epigeal germination occurs in case of —. (Knowledge)

- i. castor-oil seed
- ii. chick-pea
- iii. tamarind

Which one is correct?

- Ⓒ Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii

119. Which one has soil based germination? (Knowledge) [JB '18]

- Ⓐ Gram Ⓑ Pumpkin
- Ⓒ Redhi Ⓒ Tamarind

120. In the germination of paddy —. (Comprehension) [BB '18]

- i. plumule comes out of the soil
- ii. cotyledons remain under ground
- iii. cotyledons come out of the soil

Which one of the following is correct?

- Ⓐ Ⓐ i & ii Ⓑ i & iii Ⓒ ii & iii Ⓓ i, ii & iii

121. In which epigeal germination occurs? (Comprehension) [RB '16]

- Ⓐ Paddy Ⓑ Gram
- Ⓒ Pumpkin Ⓒ Mustard

122. The upper apex of the embryonal axis is known as what? (Knowledge)

[Ideal School & College, Dhaka]

- Ⓐ Hypocotyle Ⓑ Plumule
- Ⓒ Micropyle Ⓒ Seed coat



Short Q/A



Designed as per topic



► Reproduction in Plants

▶ Textbook Page 35

Question 1. What is asexual reproduction? Explain.

Ans. Asexual reproduction is the process by which reproduction is accomplished without the union of two different types of gametes. It usually occurs in unicellular organisms and some multicellular organisms. However, the tendency of asexual reproduction is higher in lower graded organisms. It occurs through spore production and vegetative reproduction.

Question 2. How many types of asexual reproduction are there and what are they?

Ans. There are two types of asexual reproduction. Namely:

1. Spore production and
2. Vegetative reproduction

Question 3. Give two examples of organisms that reproduce through spores.

Ans. Mainly lower graded plants reproduce through spore production. Two such examples are:

1. *Mucor* and
2. *Penicillium*

Question 4. What is a sporangium? Explain.

Ans. The tendency to preserve the lineage by producing spores or conidia is mostly seen in lower graded plants. Plant cells are modified to form a spore-bearing organ. This is called sporangium. A sporangium usually contains numerous spores. However, sometimes a sporangium may contain a single spore.

Question 5. Briefly describe vegetative reproduction.

Ans. Vegetative reproduction is the type of reproduction that occurs when a part of the body is fragmented or an organ is transformed without the creation of any kind of asexual spore or gamete. When this type of reproduction occurs naturally or spontaneously, it is called natural vegetative reproduction. On the other hand, when vegetative reproduction is done artificially, it is called artificial vegetative reproduction.

Question 6. How many types of vegetative reproduction are there and what are they?

Ans. Vegetative reproduction can be divided into two types. Namely:

1. Natural vegetative reproduction
2. Artificial vegetative reproduction

Question 7. What is meant by natural vegetative reproduction?

Ans. If vegetative reproduction occurs naturally or spontaneously, it is called natural vegetative reproduction. This type of vegetative reproduction is seen in various ways naturally, such as: fragmentation of the body, through roots or transformed stems, etc.

Question 8. How does *Spirogyra* reproduce?

Ans. *Spirogyra* reproduces through fragmentation of its body. This type of reproduction is usually seen in lower graded plants. In this method, if the plant body is fragmented for any reason, each fragment starts living as an independent plant. The body of *Spirogyra* is fragmented naturally and each fragment creates a new *Spirogyra*.

Question 9. What is a transformed stem? Explain.

Ans. The shape and position of the stem changes to perform different types of functions in addition to the usual functions of the plant. This type of transformed stem is called a transformed stem. For example: tuber, rhizome, bulb, stolon, etc.

Question 10. Why is a tuber called an eye?

Ans. In some plants, the underground stem becomes swollen due to the storage of food at the tip of the stem and creates a tuber. In the future, this tuber functions in reproduction. There are small holes on the surface of the tuber. These are called eyes because they look like eyes.

Question 11. Write two characteristics of a rhizome.

Ans. Two characteristics of a rhizome are:

1. Rhizomes are located underground, parallel to the ground.
2. Like stems, they have distinct nodes and internodes.

Question 12. Write the names of two bulb crops.

Ans. Two bulb crops are:

1. Onion
2. Garlic

Question 13. Mention two characteristics of a bulb or corm.

Ans. Two characteristics of a bulb or corm are:

1. They are very small stems.
2. Their axillary and terminal buds give rise to new plants.

Question 14. How does stone-chips (*Bryophyllum*) reproduce?

Ans. Stone-chips (*Bryophyllum*) reproduces through leaves. When the leaves of stone-chips fall on the ground, buds are created on the edges of the leaves. Later, each bud grows into a separate stone-chips plant.

Question 15. Mention two advantages of vegetative reproduction.

Ans. Two advantages of vegetative reproduction are :

1. The produced plant has the same qualities as the mother plant.
2. The number of plants increases rapidly.

Question 16. Write two disadvantages of vegetative reproduction.

Ans. Two disadvantages of vegetative reproduction are:

1. No new characteristics are introduced.
2. The offspring plants are very easily attacked by various viruses, bacteria and fungi.

Question 17. How is grafting done?

Ans. To make a graft, first, the bark of a healthy plant's young and fresh branch is slightly cut at a suitable place and a mixture of soil and cow dung is applied there. The area should be kept moist by watering regularly. If kept like this for a few days, roots will grow in that place. Then, this part of the branch with roots is cut from the mother plant and planted in the soil to grow as a new plant.

Question 18. Write two differences between natural vegetative reproduction and artificial vegetative reproduction.

Natural vegetative reproduction	Artificial vegetative reproduction
1. The offspring plant is exactly like the mother plant.	1. The offspring plant is not exactly like the mother plant.
2. New characteristics cannot be introduced.	2. New characteristics can be introduced.

Question 19. Write two differences between sexual reproduction and asexual reproduction.

Ans. Two differences between sexual reproduction and asexual reproduction are :

Sexual reproduction	Asexual reproduction
1. Occurs through the union of gametes.	1. Occurs without the union of gametes.
2. Occurs in higher grade plants.	2. Occurs in lower grade plants.



► Lesson 4: Sexual Reproduction

► Textbook Page 38

Question 20. Give an idea about flowers.

Ans. A flower is a special type of shoot transformed for the purpose of reproduction. An ideal flower has 5 parts. A flower that has all 5 parts is called a complete flower. And a flower that lacks one or two of the 5 parts is called an incomplete flower. Fruits develop from flowers and seeds develop from fruits. And new plants are born from seeds.

Question 21. How many parts does a flower have? Write their names.

Ans. A flower usually has five parts. Their names are:

1. Receptacle
2. Calyx
3. Petal or corolla
4. Stamen or androecium and
5. Carpel or gynoecium

Question 22. Why is Datura called a complete flower?

Ans. A complete flower has five essential parts. Namely: receptacle, calyx, corolla, androecium and gynoecium. A flower that has all five of these parts is called a complete flower. Datura flower is called a complete flower because it has all five of these parts.

Question 23. Write two differences between stalked flowers and unstalked flowers.

Ans. Two differences between stalked flowers and unstalked flowers are :

Stalked flower	Unstalked flower
1. The flower has a stalk.	1. The flower does not have a stalk.
2. Example : Datura, China rose.	2. Example : Arum.

Question 24. What is a calyx? Write its function.

Ans. The outermost whorl of a flower is called the calyx. The calyx protects the other parts of the flower, especially in the bud stage, from sun, rain and insects. If the calyx is green, it helps in food production by carrying out photosynthesis.

Question 25. Write two characteristics of the calyx.

Ans. Two characteristics of the calyx are :

1. The calyx is the outermost whorl of the flower.
2. They are usually green.

Question 26. Write two differences between calyx and sepal.

Ans. Two differences between calyx and sepal are :

Calyx	Sepal
1. The calyx is the outermost whorl of the flower.	1. A sepal is each part of the calyx.
2. The calyx acts as a protective covering for the flower.	2. Sepals play a role in the structure of the flower.

Question 27. Why is the calyx necessary for flowers?

Ans. The calyx is useful for flowers and plants in various ways. If the calyx is green, it helps the plant to prepare food. The calyx protects the inner parts of the flower from sun, storm, rain and insects. If the calyx is colorful, it attracts insects, which results in pollination. For these reasons, the calyx is necessary for flowers.

Question 28. Why are the androecium and gynoecium called the essential whorls of the flower?

Ans. The androecium and gynoecium are very important for reproduction. Because they directly participate in the process of reproduction. The male gamete is produced from the androecium and the female gamete is produced from the gynoecium. Fertilization occurs through the union of the two gametes and fruits and seeds are produced. This is why the androecium and gynoecium are called the essential whorls of the flower.

Question 29. How does the corolla function?

Ans. The corolla is the second whorl of the flower from the outside. Each part or petal protects the inner parts of the flower from sun and rain. If the corolla is bright, colorful and fragrant, it attracts humans, birds and insects. As a result, pollination of the flower occurs.

Question 30. How many parts does a carpel have? Write their names.

Ans. A carpel has three parts. Namely:

1. Ovary
2. Style
3. Stigma

Question 31. Give an idea about syncarpous.

Ans. When a gynoecium is formed from several carpels that are completely united with each other, it is called syncarpous. For example: turmeric, tomato, datura, etc. Pollination of these flowers is easy.

Question 32. Briefly describe the anther.

Ans. The rod-shaped part of the stamen is called the filament and the sac-like part at the top is called the anther. Pollen grains are produced in the anther. It carries the male gametes of the plant and plays an important role in plant reproduction through pollination.

Question 33. Write the names of the accessory whorls and essential whorls of the flower.

Ans. The accessory whorls of the flower are:

1. Calyx and
2. Corolla

On the other hand, the essential whorls of the flower are:

1. Androecium and
2. Gynoecium

Question 34. What is meant by irregular inflorescence?

Ans. The branch of a plant that bears flowers is called an inflorescence. If the growth of this branch of the plant is unlimited, it is called an irregular inflorescence. For example: the inflorescence of mustard, tuberose, etc.

Lesson 5 and 6 : Pollination ➤ Textbook Page

Question 35. What is pollination? Write its types.

Ans. Pollination is the process of transferring pollen grains from the anther of a flower to the stigma of the same flower or to the stigma of another flower of the same species. There are two types of pollination; namely:

1. Self-pollination and
2. Cross-pollination

Question 36. What is meant by agent of pollination?

Ans. In most cases, pollen transfer is done through an agent. The carrier that carries the pollen to the stigma is called the agent of pollination. For example: air, water, insects, birds, bats, snails, and even humans act as agents of pollination.

Question 37. How does pollination occur through agents?

Ans. Air, water, insects, birds, bats, snails, and even humans act as agents or carriers of pollination. Insects or birds fly from flower to flower in search of nectar or attracted by their beautiful colors. At this time, pollen grains stick to the bodies of the carriers. When these carriers go to another flower of the same species, the pollen grains stick to the stigma of that flower. In this way, pollination occurs unknowingly through the carriers.

Question 38. Why is cross-pollination important in plants?

Ans. During cross-pollination, pollination or pollen transfer occurs between the flowers of two different plants of the same species. This results in the creation of new characteristics in the plant, the rate of seed germination increases, the seeds become more viable, and new species are created. This is why cross-pollination is important in plants.

Question 39. How is diversity created in plants through cross-pollination?

Ans. In cross-pollination, pollination occurs between the flowers of two different plants of the same species. Therefore, the seeds that are produced have new characteristics, and the plants that grow from these seeds also have new characteristics. In this way, diversity is created in plants through cross-pollination.

Question 40. Write two differences between self-pollination and cross-pollination.

Ans. Two differences between self-pollination and cross-pollination are as follows :

Self-pollination	Cross-pollination
1. Self-pollination is the transfer of pollen between flowers on the same plant.	1. Cross-pollination is the transfer of pollen between flowers on different plants of the same species.
2. No carrier is required.	2. A carrier is required.

Question 41. What is an insect-pollinated flower? Give examples.

Ans. Flowers that mainly depend on insects for pollination are called insect-pollinated flowers. These flowers are large, colorful, have nectaries, and are fragrant. Their pollen grains and stigma are sticky. Examples: China rose, pumpkin, mustard, etc.

Question 42. Mention two characteristics of wind-pollinated flowers.

Ans. Two characteristics of wind-pollinated flowers are :

1. The flowers have no color, fragrance or nectaries.
2. The pollen grains are light, numerous and small in size.

Lesson 7 and 8 : Fertilization and Fruit Formation ➤ Textbook Page 40

Question 43. Write two differences between true fruit and false fruit.

Ans. Two differences between true fruit and false fruit are :

True fruit	False fruit
1. When only the ovary develops into a fruit, it is called a true fruit.	1. When parts of the flower other than the ovary develop into a fruit, it is called a false fruit.
2. Example: Mango, Jackfruit.	2. Example: Apple, Dillenia (Chalta).

Question 44. Mention two differences between fleshy fruits and dry fruits.

Ans. Two differences between fleshy fruits and dry fruits are :

Fleshy fruits	Dry fruits
1. The pericarp is thick.	1. The pericarp is thin.
2. The pericarp does not split open when the fruit ripens.	2. The pericarp splits open when the fruit ripens.

Lesson 9 and 10: Structure of Seed and its Germination ➤ Textbook Page 42

Question 45. Give an idea about hypogea germination.

Ans. When the epicotyl emerges above the ground, but the cotyledon remains underground, it is called hypogaea germination. For example: gram, paddy, etc.

Question 46. What is germination? Explain.

Ans. Germination is the process of a seedling developing from a seed. There are two types of germination. Namely :

1. Hypogaea and
2. Epigeal

When the epicotyl emerges above the ground, but the cotyledon remains underground, it is called hypogaea germination. For example: gram, paddy. On the other hand, when the plumule emerges above the ground along with the cotyledon, it is called epigeal germination. For example: pumpkin, tamarind, etc.

Question 47. Why is tamarind called an epigeal plant?

Ans. When the plumule emerges above the ground along with the cotyledon during seed germination, it is called epigeal germination. During the germination of tamarind seeds, the plumule emerges above the ground along with the cotyledon. This is why tamarind is called an epigeal plant.





Creative Q/A

Designed as per learning outcomes

Ques. 01 Look at the diagram carefully and answer to the following questions.

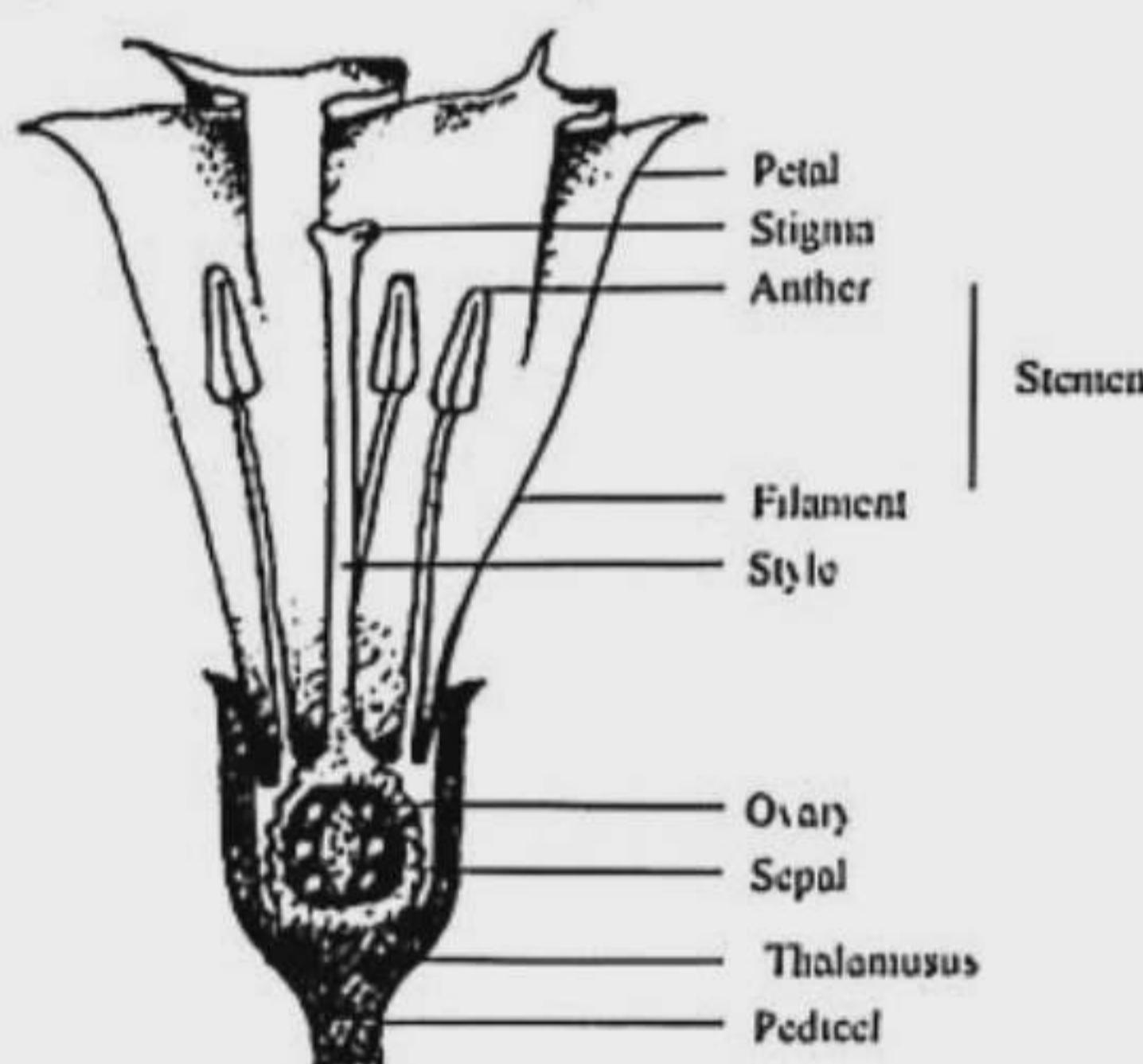


- What type of pollination this flower belongs? 1
- How can you differentiate between entomophilous and anemophilous flowers? 2
- Label the different parts of the flower. 3
- In which part does fertilization take place? "The significance of fertilization is great." Evaluate the statement. 4

Answer to Question No. 01 :

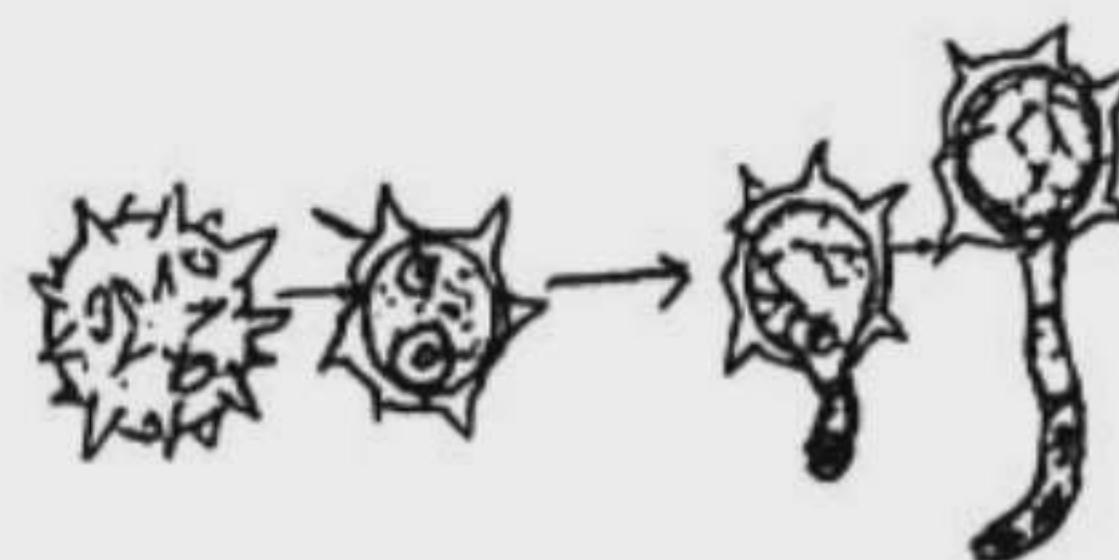
- a This flower belongs to self pollination.
- b Flowers in which pollination takes place through insects are known as entomophilous flowers. On the other hand, flowers in which pollination takes place through wind are called anemophilous flowers. Mustard, orchids roses, etc. are entomophilous flowers while paddy, wheat, maize, palm, etc. are anemophilous flowers.

c



- d As a result of fertilization the ovary of a flower develops to a fruit and ovules to seeds. Seeds maintain and increase generation by reproduction. If there were no seed, the plant would probably have perished. Again, animal kingdom especially humans live on fruits and seeds of plants. If there were no fertilization, neither seeds nor fruits would have grown. No animal life could exist without the food produced by plants. So the significance of fertilization is unlimited.

Ques. 02



- Name five agents of pollination. 1
- In what way cross pollination differs from self pollination? 2
- Represent the consequences of any interruption of the process shown in the stem. 3
- Reproduction of plant life does not depend on this process only. Do you agree? Support your opinion. 4

Answer to Question No. 02 :

- a Five agents of pollination : air, water, birds, insects, animals.
- b Self pollination refers to the transfer of pollens from anthers to stigmas in the same flower or between flowers of the same plant. On the other hand, cross pollination is the transfer of pollens from anthers of a plant to the stigmas of another plant belonging to the same species.
- c The process shown in the stem indicates different stages of the development of male gametophyte. Any interruption of this process means pollination failure. A pollen is the first cell of a gametophyte. Soon after becoming mature harbouring in the pollen sac, it starts to germinate. But germination will not take place if the pollen cannot reach maturity owing to any reason. Pollination failure will also take place if there arises any obstruction to cell division process of the pollen or of forming of gamets.
- d Yes, I agree that reproduction of plant life does not depend on this process only. The process shown in the stem refers to gamet formation which belongs to pollination. Pollination means sexual reproduction. But reproduction also take place through formation of spores, segmentation, roots, modified stem, grafting, cutting, etc. Formation of spores applies to mainly lower graded plants. Vegetative reproduction are of two types- natural vegetation and artificial vegetation. Sexual reproduction (pollination) belongs to natural vegetation while grafting, cutting, layering, etc. belong to artificial vegetative reproduction.

Ques. 03

Paddy	Champa, Akanda	Pineapple, Jackfruit
(i)	(ii)	(iii)

a. What is called reproduction? 1
 b. Why "Pata shayola" is called water-pollinated flower? 2
 c. Describe how the germination of (i) in the stem occurs. 3
 d. (ii) and (iii) of above stem are produced from the various parts of fertile flower- Analyze. 4

Answer to Question No. 03 :

a Reproduction is a natural phenomenon as well as a complex process by which an organism produces its offsprings.

b For being an water-pollinated flower, following characteristic are required-

- Flowers are small, light weight and can float in water. Flowers do not have scent.
- Female flowers have long stalks whereas male flowers are with short stalks.
- Matured male flowers get detached from stalks and float on water.

'Pata shayola' has the above characteristics. So, 'Pata shayola' is called water-pollinated flower.

c (i) of the stem is paddy. Hypogea germination occurs in paddy.

The development of a seedling from a seed is called germination. In order to germinate, seed requires water, warmth and air. The germination in which the epicotyle grows up rapidly and as a result, the plumule comes out of the soil leaving the cotyledons underground, is known as hypogea germination. This type of germination takes place in gram, paddy, mango etc.

d (ii) of the stem represents champa and akanda which are aggregate fruits.

Aggregate fruit: When the fruit develops from the merger of several ovaries with many free carpels of a flower, it is known as aggregate fruit. The number of fruitlets formed corresponds with the number of carpels present in the gynoecium of the flower. A cluster of fruitlets is produced at a time and placed on a single stalk. For example - Custard apple, Champa, Nayantara, Akanda etc.

On the other hand, (iii) of the stem represents pineapple, jackfruit which are multiple fruits.

Multiple fruit: When all the flowers of an inflorescence together form a fruit, it is known as multiple fruit.

Examples of such fruits are- pineapple, jackfruit etc.

So, (ii) and (iii) of the above stem are produced from the various parts of fertile flower.

Ques. 04

- What is reproduction? 1
- How the new plants are produced in Yam? 2
- Explain the germination process that is indicated in the figure-'Z'. 3
- Analyze the role of the agents for the pollination of figure-'X' and figure- 'Y'. 4

Answer to Question No. 04 :

a Reproduction is a complex process by means of which an organism produces its offsprings.

b The new plants are produced in Yam through bulbil. The improper development of auxiliary buds of some plants forms round-shaped structure called bulbil. After sometimes, bulbil is separated from the plant and drops on soil and finally produces new plants.

c In the figure- 'Z' of the stem, germination of gram seed is shown.

Here hypogea germination takes place. In this type of germination plumule comes out of the soil leaving the cotyledons underground. Excess growth of epicotyle is responsible for this. Gram is a non-endospermic dicot seed. After sowing gram seeds and soil is supplied with required quantity of water, temperature and air, they germinate and come out of the soil in 3-4 days. Firstly, the seeds swell up by absorbing water and radicle comes out through micropile. Gradually, it develops into tap root. In second step plumule comes out of the soil. In this case the two cotyledons remain under the soil. Initially, embryo gets nourished by the food stored in the cotyledons.

d Figure- 'X' and figure- "Y" of the stem represent self pollination and cross pollination. Pollination is the transfer of pollen grains from anthers to stigmas. Pollination is of two types-self pollination and cross pollination.

Self pollination: Self pollination is the transfer of pollens from anthers to stigmas in the same flower or between flowers on the same plant. Examples-Mustard, Pumpkin, datura etc.

Cross pollination : Cross pollination is the transfer of pollens from one plant to the stigmas on another plant of the same species. Shimul, Papaya etc. show cross pollination.

In most cases the transfer of pollen occurs through an agent. The carrier that carries pollen up to stigmas is known as agents for pollination.



Wind, water, insects, birds, snails as well as man also act as agents of pollination.

Insects and birds fly from flowers to flowers in search of nectar or in attraction of their brilliant colours. During this act pollen grains get stuck to the body of the carrier. As insects and birds do this, they transfer pollen from one flower to another unknowingly.

To get the help of pollinating media some structural modifications are seen in flowers. These modifications are known as adaptation.

Ques. 05

- | | |
|--|---|
| A special process of pumpkin flower (P) | Pumpkin (Q) and Pumpkin seed (R) |
| → | |
| a. What is vegetative reproduction? 1
b. Why potato is called the modified stem? Explain. 2
c. Explain the process 'R' mentioned in above stem for the production of plants. 3
d. How 'Q' is formed by 'P'? Analyze it. 4 | |

Answer to Question No. 05 :

a] Reproduction that takes place by vegetative organ is called vegetative reproduction. It usually takes places by organs like root, stem and leaf.

b] In some cases stem are modified, some of these modified stem have no resemblance with true stem for their appearance and positions. In case of potato, stem tubers are formed by out growths from the lowest auxiliary buds which turn down wards into the soil. Eventually the tip of the underground stem fills with starch and swells rapidly to form a tubers. That's why potato is called the modified stem.

c] 'R' of the stem is pumpkin seed. For the production of new plants from pumpkin seed, it requires to germinate. The development of a seedling from a seed is called germination.

In order to germinate, seed requires water, warmth and air. In case of pumpkin, epigeal germination, plumule with cotyledons come out of the soil. Tamarind, castor, pumpkin etc. show this type of germination.

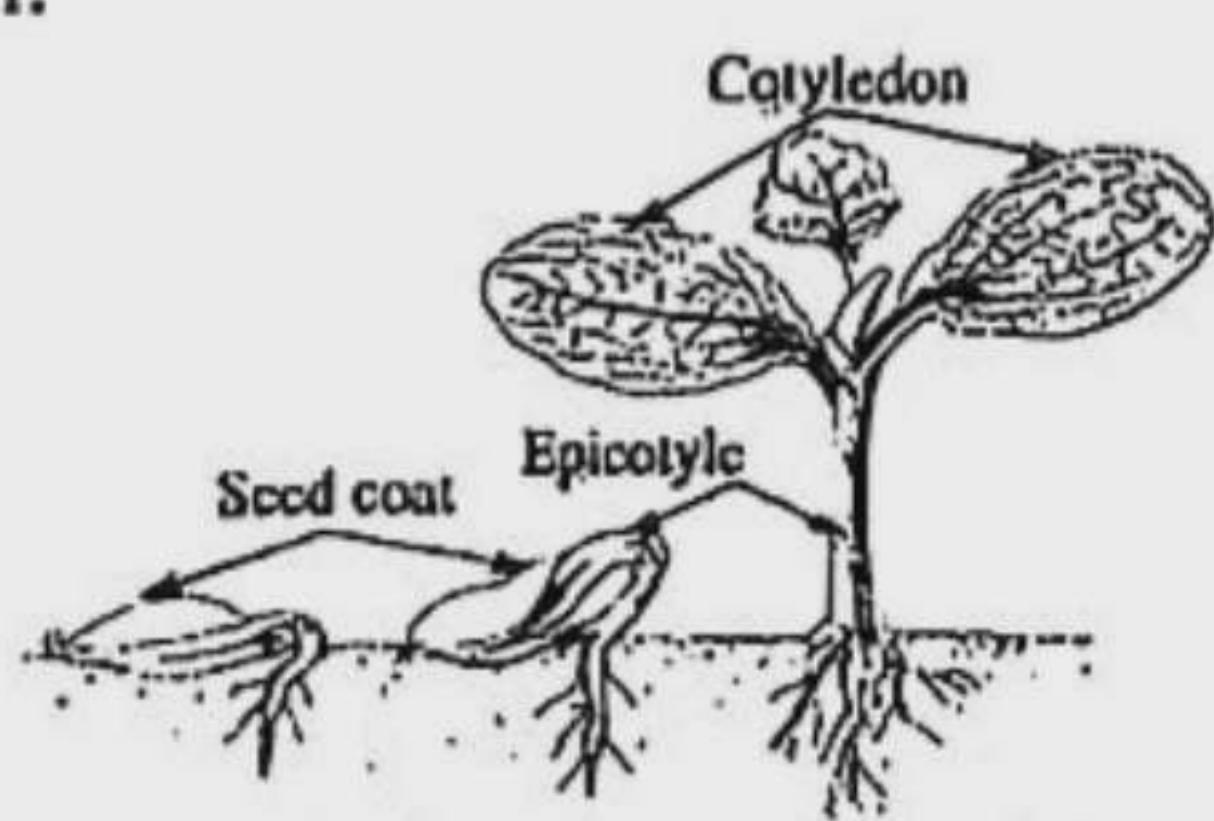


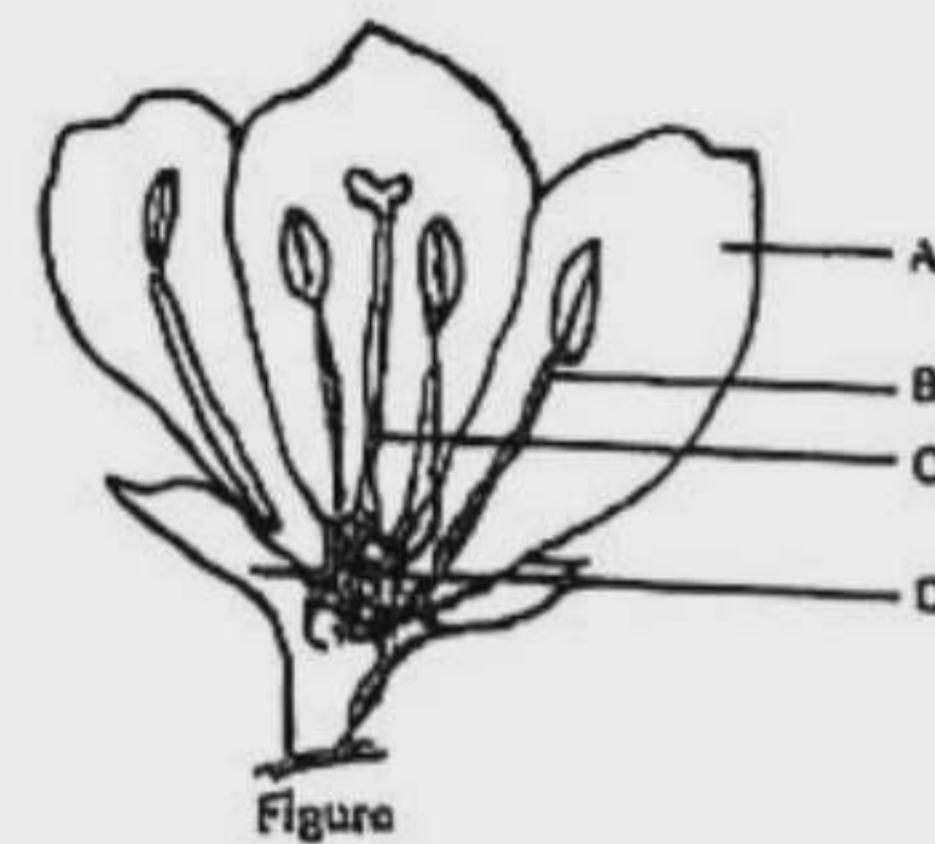
Fig. Epigeal germination

d] 'Q' of the stem is pumpkin and 'P' is a special process of pumpkin flower. That is self pollination process. Self pollination is the transfer of pollens from anthers to stigmas in the same flower or between flowers on the same plant.

Pollen grains are transferred to the stigma by pollination. The stigma produces a sticky fluid which nourishes the pollen grains and stimulates each other to burst open and develop a long, hollow, tubular outgrowth known as pollen tube. This tube pushes its way between cells of the style and grows towards the ovule and finally reaches the embryo sac. By this time, two male gametes are formed inside the pollen tube. The apex of the pollen tube ruptures (bursts open) releasing male gametes. Ovule contains embryo sac. Female gamete or ovum develops inside embryo sac. One of the two male gametes discharged from the pollen tube unites and fertilizes the egg.

The process of growing fruit starts by the transformation of ovaries of gynoecium of flower. The transformation occurs in the ovary after pollination and fertilization. After fertilization, the ovary alone or in combination with other floral parts turns into fruits. Thus 'Q' or pumpkin is formed by 'P' or self pollination process.

Ques. 06



Figure

- What is reproduction? 1
- Pineapple is a multiple fruit— explain. 2
- Why 'A' and 'D' is called helping whorl of sepals of flower? Explain it. 3
- Analyze the role of 'B' and 'C' in production of fruits and seeds that mentioned in the stem. 4

Answer to Question No. 06 :

a] The complex process by which an organism produces its offsprings is known as reproduction.

b] Pineapple is a multiple fruit because all the flower of an inflorescence together from this fruit.

c] 'A' and 'D' in the stem refer to petals and sepals respectively.

They are known as accessory whorl of a flower for the following reasons :

The outermost whorl of flower is sepal. The ring of sepals is known as calyx which is generally green. sepals may be segmented or joined. They enclose and protect the central region of the flower from sunlight, rain and insects at the time of budding stage.

Again in most of the flowers the reproductive organs are surrounded by a whorl of petals. The petals are collectively known as corolla of flowers. Petals may be of various colours and scents. Coloured and scented petals attract insects for collecting nectar and thus they transfer pollen from flowers to flowers helping pollination of flowers.

Besides, petals help to protect different parts of flowers from sunlight, rains, dusts, etc. From the above discussion, it is clear that sepals and petals of a flower play very important role in many ways. So, they are known as accessory whorl of a flower.

d Here 'B' represents the 3rd whorl named stamen of flowers. Stamens are the male reproductive organs which consists of stalks and anthers. Each anther is made up of four pollen sacs in which pollen grains are formed where pollen grains contains the male gametes for taking part in reproduction directly. On the other hand, 'C' represents carpel, known as female reproductive organs. It consists of ovary and stigma. The stigma receives pollen grain from anther during pollination. Each ovary consists of ovule(s) contain female sex cells. When male gametes and female gametes unite together in ovules of ovary after pollination, fruits are produced. Thus reproduction of plants takes place in flowering plants.

So, it can be said that the given 'B' and 'C' parts of a flower play important role in "Productions of fruits and seeds".

Ques. 07

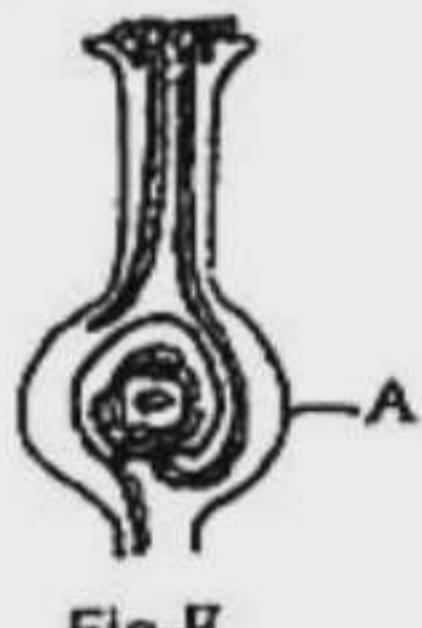


Fig-F



Fig-R

- a. What is called asexual reproduction? 1
- b. What type of fruit Pineapple is and why? 2
- c. Explain the pollination process of figure 'R'. 3
- d. How does 'A' of figure-F turns into fruit? — Analyze with figure. 4

Answer to Question No. 07 :

a Asexual reproduction is a mode of reproduction by which offspring arise from a single parent and inherit the genes of that parent only.

b Pineapple is a multiple fruit because all the flowers of an inflorescence together form this fruit.

c Figure R refers to self pollination process. Pollinations is the transfer of pollen grains from anthers to stigmas. Self pollination is the transfer of pollens from anthers to stigmas in the same flower or between flowers on the same plant. For example mustard, pumpkin and dutara etc.

d 'A' of Figure-F refers to ovary. How ovary turns into fruit, it is explained below—

Formation of fruits : Mango, Jackfruit, Litchi, Banana, Grape, Apple, Guava, Safeda etc. are considered as fruits. These fruits may be eaten without cooking. Vegetables like Gourd, Pumpkin, Ribbed gourd (jhinga), Palwal (patol) etc. that we eat after cooking are also fruits. In fact these all are fruits. The process of growing these fruits start by the transformation of ovaries of gynoecium of flower. The transformation occurs in the ovary after pollination and fertilization. The ovules transform into seeds. After fertilization, the ovary alone or in combination with other floral parts turns into fruits.

Ques. 08 There are tall Shimul trees in Mr. Kalu's garden. In the gaps there are pumpkin plant which has been flowered. He tried to catch a butterfly that sat on the flower. While trying that, yellow-colour powder stuck to his hand from the stamen of the flower.

- a. What is germination? 1
- b. Why Yam is called Bulbil? Explain. 2
- c. How mother cell is produced with the powders stuck to Mr. Kalu's hand? Explain. 3
- d. Will the pollination of the trees of Mr Kalu's garden be done by same agent? Give opinion with logic. 4



Answer to Question No. 08 :

a Germination refers to the process of sprouting out of a seed. In other words, that a seed develops a child plant is called germination. The process depends on a congenial environment which includes space, water, light and air. Without favorable environment, no seedling can grow big.

b The improper development of axial buds of some plants forms round-shaped structure called bulbil. After sometimes, bulbil is separated from the plant and drops on soil and finally produces new plants. For this reason, Yam is called Bulbil.

c The powder stuck to Mr Kalu's hand is pollen grain. Pollen grains are transferred to the stigma by pollination. The stigma produces a sticky fluid which nourishes the pollen grains and stimulates each other to burst open and develop a long, hollow, tubular outgrowth known as pollen tube. This tube pushes its way between cells of the style and grows towards the ovule and finally reaches the embryo sac.

By this time, two male gametes are formed inside the pollen tube. The apex of the pollen tube ruptures (bursts open) releasing male gametes. Ovule contains embryo sac. Female gamete or ovum develops inside embryo sac. One of the two male gametes discharged from the pollen tube unites and fertilizes the egg. The other male nucleus (gamete) unites and fuses with secondary diploid nucleus and develops into cereal grains.

d The pollination of the trees of Mr Kalu's garden will not be done by same agent.

In most cases, the transfer of pollen occurs through an agent. The carrier that carries pollen up to stigmas is known as agents of pollination.

Wind, water, insects, birds, snails as well as man also act as agents of pollination. Insects and birds fly from flowers to flowers in search of nectar or in attraction of their brilliant colours. During this act pollen grains get stuck to the body of the carrier. As insects and birds do this, they transfer pollen from one flower to another unknowingly.

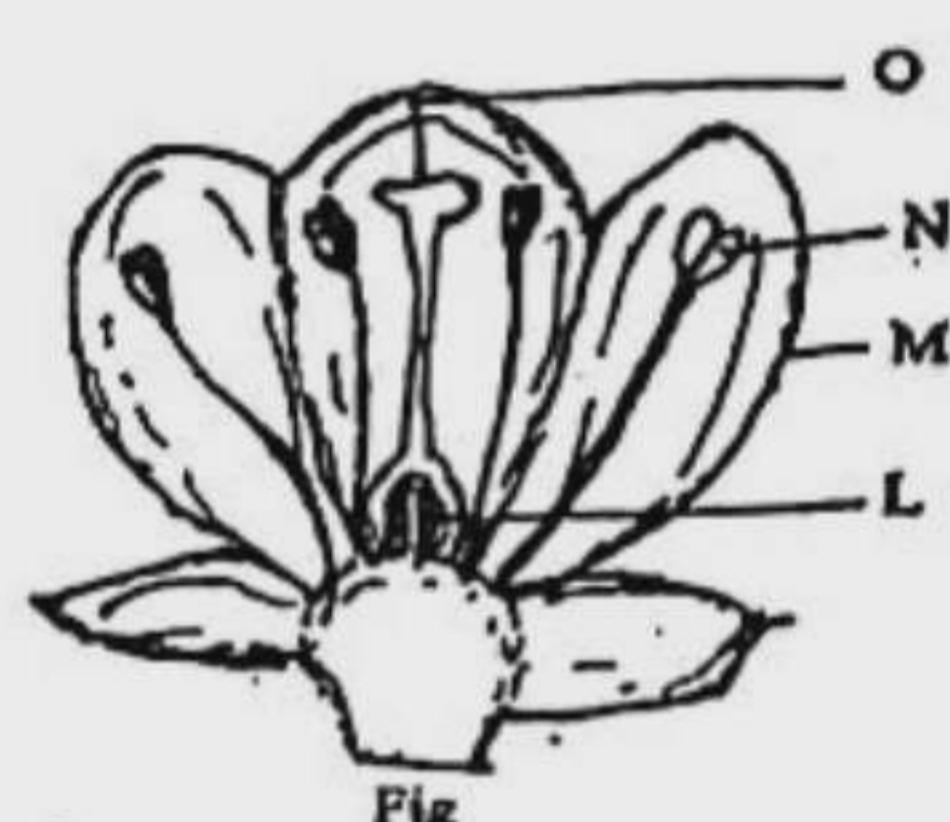
To get the help of pollinating agents some structural modifications are seen in flowers. These modifications are known as adaptation. The adaptations are different for various pollinating agents.

The adaptations are as follows :

Adaptation of insect-pollinated flowers: Flowers, large, brightly coloured and scented petals with nectars. Pollen grains and stigmas are sticky. Example- Pumpkin.

Adaptation of animal-pollinated flowers: These flowers are moderately large. If small they arranged in inflorescence. Brightly coloured, may have scent or not. Example- kadom, shimul, arum etc.

Ques. 09



- What is called reproduction? 1
- Why mossleaf is called adaptation of water-pollinated flower? 2
- How ovules produce by the part of 'L' marked that mentioned in the figure? 3
- Between O and M which one is directly involved pollination? Give your opinion with comparative analysis. 4

Answer to Question No. 09 :

a The process by which a plant gives rise to grow a similar new plant is called plant reproduction.

b Mossleaf is called adaptation of water pollinated flower because these flowers are small, light-weight and can float in water. These flowers do not have scent. Female flowers have long stalk whereas male flowers are with short stalks. Matured male flowers get detached from stalks and float on water.

c 'L' makred part of the stem is ovary. How ovum is created inside the ovary is described below :

Near the micropyle, being nourished in the nucellus of an ovule, a cell starts to become larger. Its protoplasm is dense and the nucleus is comparatively large. The cell divides into four haploid cells through meiotic division. Every cell, except the smallest one, gets disintegrated. Growing gradually, the larger cell matures into an embryo sac. The nucleus of the cell is haploid. The nuclei are evolved as the nucleus divides. These two nuclei take positions in two opposing poles. Next, these two nuclei consecutively divide twice and result in four nuclei.

In the next stage, two nuclei from the two poles come to the middle of the cell and get fused to cause the emergence of two haploid secondary nuclei. The nuclei in the two poles turn into cells with some amount of cytoplasm. Collectively, the combined structure of the three cells near the micropyle is called the egg apparatus. In between the cells, the one occupying the middle place is the ovum which is a little larger. This is called an egg cell and the other two are called synergid cells. The cells in the opposite pole to the egg apparatus are called antipodal cells. This is how the process of developing the embryo sac is done.

d 'O' marked part of the figure in the stem is stigma and 'M' makred part is petal. Both stigma and petal take part in pollination.

In most of the flowers the reproductive organs are surrounded by a whorl of petals. Petals are known collectively as the corolla of the flower. Petals may be joined as in datura or may remain separated, eg, china rose. Some flowers have different coloured and scented petals. Petals of this type attract insects which come to collect the nectar and by doing so transfer pollens from flowers to flowers. This is the second whorl of the flower.

Stigma : The pointed, flattened or sculpted region of carpel is called stigma. The stigma receives pollen grains from the same or another flower during pollination. Like stamen, it take part in reproduction directly. From the above discussion, it can be said that, between petal and stigma, stigma take part in pollination directly.

Ques. 10



Fig-A



Fig-B



Fig-C

- What is osmosis? 1
- Why does cell wall absorb water? 2
- How is the figure A produced? Describe. 3
- Are the systems of transfer of pollen grains of figure-B and C different? Give logic to your answer. 4

Answer to Question No. 10 :

a Osmosis is a kind of diffusion wherein the gradual passing of a liquid through a membrane on account of difference of liquid substances on either side of the membrane.

b Cell wall absorbs water because it is a permeable membrane. The membrane through which molecule of both solute and solvent can pass easily is called permeable membrane. Cell wall absorbs water through osmosis process.

c Fig-A of the stem is custard apple. It is one kind of aggregate fruit. The process of growing fruits start by the transformation of ovaries of gynoecium of flower. The transformation occurs in the ovary after pollination and fertilization. The ovules transform into seeds. After fertilization, the ovary alone or in combination with other floral parts turns into fruits.

When the fruit develops from the merger of several ovaries with many free carpels of a flower, it is known as aggregate fruit. The number of fruitlets formed corresponds with the number of carpels present in the gynoecium of the flower. A cluster of fruitlets is produced at a time and placed on a single stalk. For example -Custard apple, Champa, Nayantara, Akanda etc.

d Fig-B of the stem is papaya and fig-C is pumpkin. The system of transferring of pollen grains of papaya and pumpkin are different. Transfer of pollen grain is known as pollination. Pollination is the transfer of pollen grains from anthers to stigmas. Pollination is of two types— self pollination and cross pollination. In papaya, self pollination occurs. On the other hand, in pumpkin cross pollination occurs.

Self pollination: Self pollination is the transfer of pollens from anthers to stigmas in the same flower or between flowers on the same plant. Example- Mustard, Pumpkin, datura etc.

Cross pollination: Cross pollination is the transfer of pollens from one plant to the stigmas on another plant of the same species. Shimul, Papaya etc. show cross pollination.

Ques. 11

Figure-1



Figure-2

- | | |
|--|---|
| a. What is spores? | 1 |
| b. What do you mean by Tuber? | 2 |
| c. Explain the formation of figure no.-2 | 3 |
| d. Compare the germination between two figures that are mentioned in the stem. | 4 |

Answer to Question No. 11 :

a Spores are created in some lower class plants through which asexual reproduction is accomplished. The modified somatic cells of the plant body that develop into new plants are known as spores.

b Tuber is one kind of modified stem. Stem tubers are formed by outgrowth from the lowest axillary buds which turn downwards into the soil. Eventually the tip of the underground stem fills with starch and swells rapidly to form a tuber. Tubers are distinguished by their origin and the presence on their surfaces of scale leaves and axillary buds, which form the eyes. From each eye an individual plant grows. For example- Potato.

c Figure-2 of the stem is a mango which is a fruit.

Formation of fruits: Mango, jackfruit, litchi, banana, grape, apple, guava, safeda etc. are considered as fruits. These fruits may be eaten without cooking. Vegetables like gourd, pumpkin, ribbed gourd (jhinga), palwal (patol) etc. that we eat after cooking are also fruits. In fact these all are fruits. The process of growing these fruits start by the transformation of ovaries of gynoecium of flower. The transformation occurs in the ovary after pollination and fertilization. The ovules transform into seeds. After fertilization, the ovary alone or in combination with other floral parts turns into fruits. When only the ovary turns into fruit, it is known as true fruit, eg, mango, jackfruit etc. When the fruits are developed from different floral parts other than the ovary, they are called false fruit, eg. apple, dellenia (chalta) etc.

d Figure-1 of the stem is pumpkin and figure-2 is mango. Mango seed shows hypogea germination while pumpkin seed shows epigeal germination. The development of a seedling from a seed is called germination. In order to germinate, seed requires water, warmth and air. The germination in which the epicotyle grows up rapidly and as a result, the plumule comes out of the soil leaving the cotyledons underground, is known as hypogea germination. This type of germination takes place in gram, paddy, mango etc. Sometimes plumule with cotyledons come out of the soil, it is called epigeal germination. Tamarind, castor, pumpkin etc. shows this type of germination.

Ques. 12 Though there were many plum trees in the home of Purobi. There were not good kind of plum of tree's in any plum trees were less productivity. However, she gets for good outcome in the Ranu's house good grafts good kinds of plum trees in their own plum tree's—through vegetative reproduction. Then she gets her expected productivity.

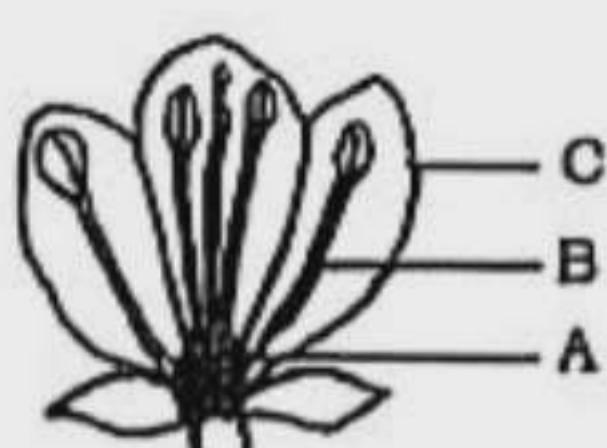
- | | |
|---|---|
| a. What kinds of reproduction? | 1 |
| b. What do you mean tuber? | 2 |
| c. How does Purobi graft vegetative reproduction? | 3 |
| d. Verify the reason of Purobi's relating vegetative reproduction. Analyze. | 4 |



Answer to Question No. 12 :

- a** Reproduction is of two types. One is sexual reproduction while another is called asexual reproduction.
- b** Tubers are formed by outgrowth from the lowest axillary buds which turn downwards into the soil. Eventually the tip of the underground stem fills with starch and swells rapidly to form a tuber. Tubers are distinguished by their origin and the presence on their surfaces of scale leaves and axillary buds, which form the eyes'. From each eye an individual plant grows. For example- Potato.
- c** Purobi accomplished the vegetative reproduction through grafting. The process by which a straight, young and fresh stem develops root and thus enables the stem to live individually is known as grafting. A cut is made in the bark of the stem where roots to be developed. Now the cut is to be covered by soil and cowdung, and finally with the help of cellophene tape or polythene to protect the fall off soil and cow dung. This part of the stem should be kept moist by regular watering. If kept in this condition, root will grow in a couple of days. The stem with root, separated from the mother plant, grows into new plant after planting.
- d** There were many plum trees in the home of Purobi. But their quality was not so good, and productivity was low. That's why Purobi grafted a part of plum tree of good quality with their trees. This is known as artificial vegetative reproduction. In many plants vegetative reproduction is a normal process to reproduce in nature. Again, by artificial process vegetative reproduction can be achieved. Plants produced from seeds sometimes show less productivity and inferior quality. In these plants artificial vegetative propagation is a useful tool to restore the parental quality. Grafting, cutting etc. are the process of artificial vegetative reproduction. Through artificial vegetative reproduction it is possible to have good variety of mango, orange, lemon, guava, rose etc.

So, it can be said that, the process of vegetative reproduction selected by Purobi to get a good variety of plum tree was logical and effective.

Ques. 13

- What is called fruit? 1
- What is meant by inflorescence? 2
- How to produce egg in the stem mentioned A—Explain. 3
- Analyze the function of B and C in pollination. 4

Answer to Question No. 13 :

- a** The part of plant that consists of one or more seeds and flesh which can be eaten as food and usually tastes sweet is known as fruit.
- b** The mode of arrangement of flowers on the floral axis is known as inflorescence. The inflorescence is of two types. For example—
1. Recemose—The growth of the floral axis is unlimited.
2. Cymose—The growth of the floral axis is limited. Inflorescence is very important for pollination.
- c** 'A' marked part of the stem is ovary of a flower. Ovum or egg is produced in it.

Near the micropyle being nourished in the nucellus of an ovule, a cell starts to become larger. Its protoplasm is dense and the nucleus is comparatively larger. The cell divides into four haploid cells through meiotic division. Every cell except the smallest one, gets disintegrated. Growing gradually the larger cell matures into an embryo sac. The nucleus of the cell is haploid. The nuclei are evolved as the nucleus divides. These two nuclei take position in two opposing poles. Next, these two nuclei consecutively divide twice and result in four nuclei. In the next stage, two nuclei form the two poles coming at the middle of the cell get fused and cause the emergence of two haploid secondary nuclei. The nuclei in the two poles turn into cells with some amount of cytoplasm. Collectively, the combined structure of the three cells near the micropyle is called egg apparatus. In between the cells, the one occupying the middle place is the ovum, which is little larger. This is called an egg cell and the other two are called synergid cells. The cells in the opposite pole to the egg apparatus are called antipodal cells. This way the process of developing embryo sac is ultimately done.

d B-marked part of the stem is gynoecium and C-marked part is androecium. Their role in pollination is given below—
Gynoecium— Carpels are situated at the centre of the receptacle and are known collectively as the gynoecium or pistil. Carpels are the female reproductive organs. Each carpel consists of an expanded hollow base called ovary, above which there is a narrow region called the style which ends in a pointed, flattened, or sculpted region called the stigma. The stigma receives pollen grains from the same or another flower during pollination. Within the ovary there are varying number of ovules. An ovule contains the female sex cell. Like stamens, they also take part in reproduction directly. Some plants have several separate carpels, but in many flowers there are a number of carpels fused together. Sepals and petals are known as the accessory whorls while the stamens and carpels are known as the essential whorls of a flower.

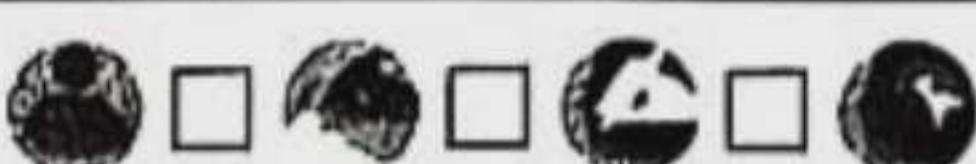
Androecium— Stamens are known collectively as androecium. These are the male reproductive organs. A stamen consists of a stalk (filament) bearing an anther. Each anther is made up of four pollen sacs in which pollen grains are formed. Pollen grains contain the male gametes. They take part in reproduction directly. This is the third whorl of the flower.



Knowledge & Comprehension-based Q/A



Designed as per topic



Preparatory Knowledge-based Q/A

Question 1. What is reproduction?

Ans. Reproduction is a complex process by means of which an organism produces its offsprings.

Question 2. How many categories are there in reproduction?

Ans. There are two categories in reproduction.

Question 3. What is grafting?

Ans. The process by means of which a straight, young and fresh stem develops root and thus enables the stem to live individually is known as grafting.

Question 4. How many parts are there in an ideal flower?

Ans. There are five parts in an ideal flower.

Question 5. How many parts are there in a typical flower?

Ans. There are five parts in a typical flower.

Question 6. What are the types of pollination?

Ans. The types of pollination are self-pollination and cross pollination.

Question 7. What is true fruit?

Ans. When only the ovary turns into fruit, it is known as true fruit.

Question 8. What is false fruit?

Ans. When fruits are developed from any floral parts other than ovary, they are known as false fruit.

Question 9. What is embryo?

Ans. Radicle, plumule and cotyledon are collectively known as embryo.

Question 10. What is testa?

Ans. The hard and thick outermost layer of seed coat is known as testa.

Question 11. What are the factors essential for germination?

Ans. The factors like water, warmth and air are essential for germination.

Question 12. What is called the germination taken place in gram, paddy, mango, etc.?

Ans. The germination that is found to be taken place in gram, paddy, mango, etc. is known as hypogeous germination.

Question 13. What are the types of fruits?

Ans. There are three types of fruits namely simple fruits, aggregate fruits and multiple fruits.

Question 14. How many types are of germination?

Ans. Germination are of two types.

Preparatory Comprehension-based Q/A

Question 1. What are the characteristics of asexual reproduction?

Ans. The characteristics of asexual reproduction are mentioned below :

- Offsprings arise from a single parent.
- Offsprings inherit the genes of the parent only.
- Asexual reproduction is mostly found in lower graded living beings.

Question 2. What do you mean by vegetative reproduction?

Ans. Reproduction that takes place by vegetative structure i.e. without formation of spore or gamete is known as vegetative reproduction. In many plants vegetative reproduction is a normal process to reproduce in nature. Vegetative reproduction can also be achieved by artificial process.

Question 3. Why we do grafting?

Ans. Grafting is an artificial process by means of which a straight, young and fresh stem develops root and enables the stem to live individually. It is practically observed that plants produced from seeds sometimes show less productivity and inferior quality. In order to achieve more productivity and superior quality, we adopt the process of artificial vegetative reproduction of good variety of plants by grafting.

Question 4. What are the main classes of fruits developed on the basis of their origin and nature?

Ans. The part of a plant that consists of one or more seeds and flesh is known as fruit of the plant. The main classes of fruits formed/ developed on the basis of their origin and nature are simple fruit, aggregate fruit and multiple fruit.

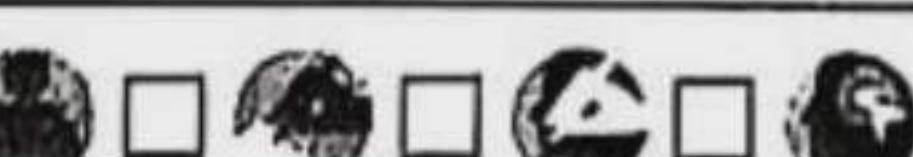




Solutions to Textual Activities



Along with textual reference



Solutions to Activities of Exercise

Task 01 Collect gourd, pumpkin, datura, brinjal, kolke flower, china rose and bean flower and examine which of these flowers have five parts.

► Textbook Page 46

Solution : We collected gourd, pumpkin, datura, brinjal, kolke flower, china rose and bean flower and observed which flowers have five parts. After observing the above flowers, we only noticed the presence of receptacle, calyx, corolla, androecium and gynoecium in the datura and china rose flowers. Therefore, among the above flowers, only the datura and china rose flowers have 5 parts. That is why they are called complete flowers.

Task 02 Take a tamarind seed and examine its germination. Note down the changes.

► Textbook Page 46

Solution : From the experiment of germination of a tamarind seed, we observed the following changes and recorded them in our notebook, which are as follows :

1. The plumule emerges above the ground along with the cotyledon.
2. The seed coat gradually develops into the epicotyl and then into the cotyledon.

3. The germinated cotyledon develops into a green cotyledon.
4. The complete plant has pinnate compound leaves and a root system.

Solutions to Topic Related Activity

Task 03 Show how vegetative reproduction occurs from potato and ginger.

► Textbook Page 36

Solution : The students of the class will collect potato and ginger on their own initiative and keep them in a favorable environment in the classroom according to the teacher's instructions to demonstrate how vegetative reproduction occurs.

Task 04 Take a rose stem and show how stem grafting or cutting is made.

► Textbook Page 37

Solution : The students will collect rose branches on their own initiative and prepare stem grafting or cutting in the classroom according to the teacher's instructions.



Super Suggestions



Super Suggestions with 100% preparatory questions selected by the Master Trainer Panel

Dear learners, important multiple choice, short, creative, knowledge & comprehension-based questions of this chapter selected by Master Trainer Panel for Half-Yearly and Annual Exams are presented below. Learn the answers to the mentioned questions well to ensure 100% preparation.

Question Pattern	7★	5★
● MCQs with Answers	Learn each MCQs in this chapter thoroughly.	
● Short Q/A	1, 2, 5, 8, 12, 17, 21, 29, 35, 38, 41, 45	3, 6, 9, 13, 18, 20, 24, 30, 32, 37, 43, 47
● Creative Q/A	1, 2, 5, 7, 9, 10	3, 6, 7, 8
● Knowledge-based Q/A	1, 3, 5, 9, 10, 12	2, 4, 7, 13
● Comprehension-based Q/A	1, 2, 4	3

Exclusive Tips ► Master the solutions to all the activities in this chapter along with exercise and other Q/A to develop the creative thinking and assess your talent.





Assessment & Evaluation



A question bank presented in the form
of a class test to assess the preparation

Class Test

Time : 3 hours

Science

Class : Eight

Full marks : 100

Multiple Choice Questions (Each question carries 1 mark)

$1 \times 30 = 30$

[N.B. : Answer all the questions. Each question carries one mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct/best answer in the "Answer Sheet" for Multiple Choice Question Type Examination.]

1. How many kinds of spores are there?
Ⓐ 2 Ⓑ 3 Ⓒ 4 Ⓓ 5
 2. Ways of normal vegetative reproduction —.
i. segmentation
ii. root
iii. grafting
Which one is correct?
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
 3. In which of the plant, reproduction occurs through stolon?
Ⓐ Pudina Ⓑ Ginger Ⓒ Garlic Ⓓ Potato
 4. In which plant new plants originate from the buds created in leaves edge?
Ⓐ Rubble Ⓑ Sweet potato
Ⓑ Ginger Ⓒ Colocasia
 5. Which one of the following plants is grown from root?
Ⓐ Segun Ⓑ Spirogyra Ⓒ Potato Ⓓ Ginger
 6. Which one is very small stem?
Ⓐ Tube Ⓑ Bulb Ⓒ Rhizome Ⓓ Stolon
 7. What is called the outermost whorl of a flower?
Ⓐ Stamen Ⓑ Carpel Ⓒ Petal Ⓓ Sepal
 8. Which of the following is nectar glandless flower?
Ⓐ Kadom Ⓑ Paddy Ⓒ Arum Ⓓ Shimul
 9. Which of the following is a multiple fruit?
Ⓐ Akanda Ⓑ Custard apple
Ⓑ Lady's finger Ⓒ Jackfruit
 10. Which is multiple fruit?
Ⓐ Mango Ⓑ Banana Ⓒ Jackfruit Ⓓ Akanda
 11. Which one is a aggregate fruit?
Ⓐ Mango Ⓑ Grape Ⓒ Pineapple Ⓓ Plum
 12. Which one is fleshy fruit?
Ⓐ Bean Ⓑ Lady's finger
Ⓑ Mango Ⓒ Mustard
 13. A seed is covered with —.
i. testa
ii. seed vessel
iii. tegmen
Which one is correct?
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
 14. In the germination of paddy —.
i. plumule comes out of the soil
ii. cotyledons remain under ground
iii. cotyledons come out of the soil
Which one of the following is correct?
Ⓐ i & ii Ⓑ i & iii Ⓒ ii & iii Ⓓ i, ii & iii
 15. In what seeds will you find cotyledon?
Ⓐ Tamarind Ⓑ Gourd
Ⓑ Pumpkin Ⓒ All the above
 16. What kind of fruit is mango?
Ⓐ Dry fruit Ⓑ Fleshy fruit
Ⓑ Aggregate fruit Ⓒ Multiple fruits
- Read the passage and answer the following question numbers 17 and 18 :
Ginger is a popular spice. Ginger with honey cures cold and cough. It is a good expectorant.

17. What type of modified stem is ginger?
Ⓐ Rhizome Ⓑ Tuber Ⓒ Bulbil Ⓓ Phyloclad
 18. Features of this modified stem —.
i. they have micropiles
ii. they have axial buds
iii. they have turgidity
Which one is correct?
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
 19. Through the increasing of branches, which of the following plant produces new plant?
Ⓐ Kochu Ⓑ Onion
Ⓑ Water hyacinth Ⓒ Ginger
 20. In which one reproduction through root occurs?
Ⓐ Ginger Ⓑ Onion Ⓒ Garlic Ⓓ Patol
 21. How many parts does a complete flower have?
Ⓐ 6 Ⓑ 5 Ⓒ 4 Ⓓ 3
 22. Pumpkin is—
i. large flower and petals with nectars
ii. pollen grains and stigmas are sticky
iii. coloured and scented petals
Which one is correct?
Ⓐ i & ii Ⓑ i & iii Ⓒ ii & iii Ⓓ i, ii & iii
- Read the passage and answer the following question numbers 23 and 24 :
The great English poet Dylan Thomas composed a masterpiece named 'Fern Hill'. The great Bengali novelist Bivutivusan also mentioned this plant in his compositions.
23. What type of plant is fern?
Ⓐ Sporal Ⓑ Conidia Ⓒ Flowering Ⓓ Stolon
 24. Features of this plant —.
i. they do not produce any gamete
ii. they belong to vegetative reproduction
iii. they produce conidia
Which one is correct?
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
 25. Which one remains parallelly under soil?
Ⓐ Onion Ⓑ Potato Ⓒ Arum Ⓓ Ginger
 26. Which one is the reproductive organ of colocasia?
Ⓐ Bulb Ⓑ Stolon Ⓒ Rhizome Ⓓ Offset
 27. Which one is the example of stolon?
Ⓐ Patol Ⓑ Mint
Ⓑ Sweet potato Ⓒ Spirodela
 28. Which one is the modified stem?
Ⓐ Sweet potato Ⓑ Stone clips
Ⓑ Onion Ⓒ Rose tree
 29. The other male gamete which does not unite with the egg, develops into what?
Ⓐ Fruit Ⓑ Ovule
Ⓑ Cereal grains Ⓒ Fluid of seed
 30. Which one is the second whorl of the flower?
Ⓐ Stamens Ⓑ Petals Ⓒ Sepals Ⓓ Carpels

Answer Sheet ▶ Multiple Choice Questions

1	Ⓐ	2	Ⓑ	3	Ⓐ	4	Ⓑ	5	Ⓐ	6	Ⓑ	7	Ⓐ	8	Ⓑ	9	Ⓐ	10	Ⓒ	11	Ⓓ	12	Ⓒ	13	Ⓒ	14	Ⓐ	15	Ⓓ
16	Ⓓ	17	Ⓐ	18	Ⓓ	19	Ⓒ	20	Ⓐ	21	Ⓓ	22	Ⓐ	23	Ⓐ	24	Ⓐ	25	Ⓐ	26	Ⓓ	27	Ⓓ	28	Ⓒ	29	Ⓒ	30	Ⓓ



Short-Answer Question (Each question carries 2 marks)**Answer any 10 of the following questions :** $2 \times 10 = 20$

1. How many types of asexual reproduction are there and what are they?
2. Briefly describe vegetative reproduction.
3. How does Spirogyra reproduce?
4. Why is a tuber called an eye?
5. Mention two characteristics of a bulb or corm.
6. Write two disadvantages of vegetative reproduction.
7. Write two differences between sexual reproduction and asexual reproduction.
8. How many parts does a flower have? Write their names.

9. Write two characteristics of the calyx.
10. Why are the androecium and gynoecium called the essential whorls of the flower?
11. Give an idea about syncarpous.
12. What is meant by irregular inflorescence?
13. How does pollination occur through agents?
14. Write two differences between self-pollination and cross-pollination.
15. Give an idea about hypogeous germination.

Creative Question (Each question carries 10 marks)**Answer any 5 of the following questions :** $10 \times 5 = 50$

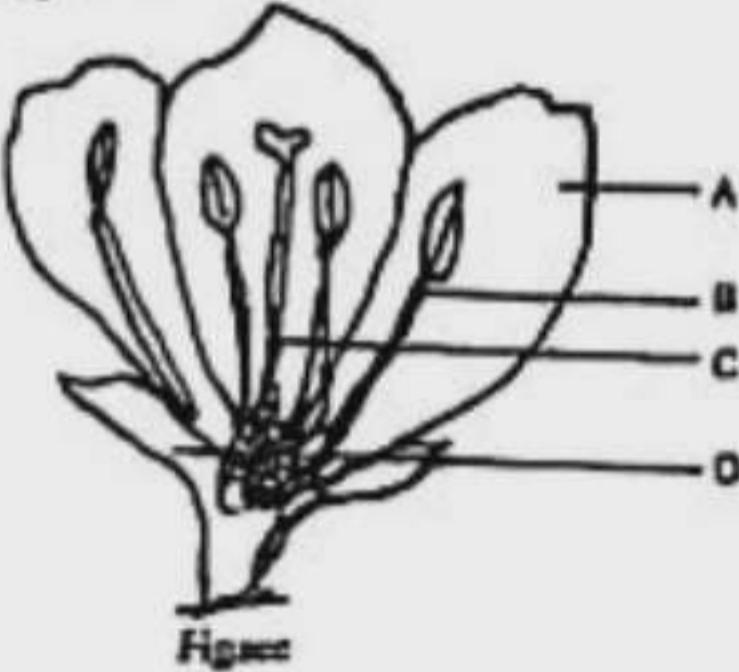
1. Look at the diagram carefully and answer to the following questions.



- a. What type of pollination this flower belongs? 1
- b. How can you differentiate between entomophilous and anemophilous flowers? 2
- c. Label the different parts of the flower. 3
- d. In which part does fertilization take place? "The significance of fertilization is great." Evaluate the statement. 4

2. 

 - a. What is reproduction? 1
 - b. How the new plants are produced in Yam? 2
 - c. Explain the germination process that is indicated in the figure-'Z'. 3
 - d. Analyze the role of the agents for the pollination of figure-'X' and figure-'Y'. 4

3. 
 - a. What is reproduction? 1
 - b. Pineapple is a multiple fruit—explain. 2
 - c. Why 'A' and 'D' is called helping whorl of sepals of flower? Explain it. 3
 - d. Analyze the role of 'B' and 'C' in production of fruits and seeds that mentioned in the stem. 4
4. There are tall Shimul trees in Mr. Kalu's garden. In the gaps there are pumpkin plant which has been flowered. He tried to catch a butterfly that sat on the flower. While trying that, yellow-colour powder stuck to his hand from the stamen of the flower.
 - a. What is germination? 1
 - b. Why Yam is called Bulbil? Explain. 2

5. 
 - a. What is spores? 1
 - b. What do you mean by Tuber? 2
 - c. Explain the formation of figure no.-2 3
 - d. Compare the germination between two figures that are mentioned in the stem. 4
6. Though there were many plum trees in the home of Purobi. There were not good kind of plum of tree's in any plum trees were less productivity. However, she gets for good outcome in the Ranu's house good grafts good kinds of plum trees in their own plum tree's— through vegetative reproduction. Then she gets her expected productivity.
 - a. What kinds of reproduction? 1
 - b. What do you mean tuber? 2
 - c. How does Purobi graft vegetative reproduction? 3
 - d. Verify the reason of Purobi's relating vegetative reproduction. Analyze. 4

7. 

 - a. What is osmosis? 1
 - b. Why does cell wall absorb water? 2
 - c. How is the figure A produced? Describe. 3
 - d. Are the systems of transfer of pollen grains of figure-B and C different? Give logic to your answer. 4

8.

A special process of pumpkin flower (P)	→	Pumpkin (Q) and Pumpkin seed (R)
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 - a. What is vegetative reproduction? 1
 - b. Why potato is called the modified stem? Explain. 2
 - c. Explain the process 'R' mentioned in above stem for the production of plants. 3
 - d. How 'Q' is formed by 'P'? Analyze it. 4

✓ Answering Reference ► Short-Answer Questions

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|--------------------------------|--------------------------------|
| 1 ► See this Chapter, Ques. 02 | 5 ► See this Chapter, Ques. 13 |
| 2 ► See this Chapter, Ques. 05 | 6 ► See this Chapter, Ques. 16 |
| 3 ► See this Chapter, Ques. 08 | 7 ► See this Chapter, Ques. 19 |
| 4 ► See this Chapter, Ques. 10 | 8 ► See this Chapter, Ques. 21 |

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|---------------------------------|---------------------------------|
| 9 ► See this Chapter, Ques. 25 | 13 ► See this Chapter, Ques. 37 |
| 10 ► See this Chapter, Ques. 28 | 14 ► See this Chapter, Ques. 40 |
| 11 ► See this Chapter, Ques. 31 | 15 ► See this Chapter, Ques. 45 |
| 12 ► See this Chapter, Ques. 34 | |

✓ Answering Reference ► Creative Questions

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|--------------------------------|--------------------------------|
| 1 ► See this Chapter, Ques. 01 | 3 ► See this Chapter, Ques. 06 |
| 2 ► See this Chapter, Ques. 04 | 4 ► See this Chapter, Ques. 08 |

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|--------------------------------|--------------------------------|
| 5 ► See this Chapter, Ques. 11 | 7 ► See this Chapter, Ques. 10 |
| 6 ► See this Chapter, Ques. 12 | 8 ► See this Chapter, Ques. 05 |