

SAMPLE CONTENT

Absolute

NEET-UG

BIOLOGY Vol - II

For all Medical Entrance Examinations held across India.

2971 MCQs with Hints

As per
latest syllabus
issued by
NMC

Insect Pollination:

When bees visit flowers for collecting nectar, their bodies get a coating of pollengrains. When these bees carrying pollengrains come in contact with the receptive stigma, it brings about pollination.

Dr. M. Gangakhedkar
M.Sc., PhD., D.H.E.

Ms. Krupa Devani
M.Sc. (Biotechnology)

Mr. Amit Patil
M.Sc. (Biochemistry)

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Absolute NEET (UG) Biology Vol. II

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techniques

Updated as per latest syllabus prescribed for
NEET (UG) 2024 issued by NMC on 6th October, 2023

Salient Features

- ☞ Comprehensive theory for every topic
- ☞ Subtopic-wise segregation of MCQs for efficient practice
- ☞ Exhaustive coverage of questions including questions from previous years' NEET (UG) and other competitive examinations till year 2023:
 - 2971 MCQs
 - Solutions to the questions are provided for better understanding
- ☞ Multiple study techniques to enhance understanding and problem solving
- ☞ Quick Review provided at the end of every chapter to facilitate quick revision
- ☞ Topic Test with answer keys provided in each chapter for self-assessment
- ☞ Neat and labelled authentic diagrams
- ☞ Includes Question Papers and Answer Keys (Solutions through Q.R. code) of:
 - NEET (UG) 2022
 - NEET (UG) 2023
 - NEET (UG) 2023 (Manipur)
- ☞ Q.R. codes provide:
 - Video links for boosting conceptual retention
 - Solutions to Topic Tests and previous exam papers of year 2022 and 2023
- ☞ Separate list of questions excluded from the NEET (UG) 2024 syllabus

Scan the adjacent QR code in *Quill - The Padhai App* to access solutions/hints to Topic Test.



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PREFACE

Target's "**Absolute Biology Vol – II**" is a complete guidebook, extremely handy for the preparation of various competitive examinations like NEET (UG). This edition provides an unmatched comprehensive amalgamation of theory with MCQs. The chapters are compiled according to the notified syllabus for NEET-UG. The content of this book is framed after reviewing the format of NCERT textbook. The book provides the students with scientifically accurate context, several study techniques and relevant supporting details essential for a better understanding of biology.

The sections of **Theory, Quick Review, MCQs and Topic Test** form the backbone of every chapter and ensure adequate revision.

In this book the Theoretical Concepts are presented elaborately along with diagrams that enable better preparation of the basics of topics for any competitive examination.

The Multiple Choice Questions in each chapter are a mix of questions based on higher order thinking, theory and multiple concepts. The level of difficulty of these questions is at par with that of various competitive examinations like CBSE, AIIMS, CPMT, AFMC, JIPMER, TS EAMCET (Med. and Engg.), BCECE, AP EAMCET (Med. and Engg.), AP EAPCET (Agri. and Pharma.) and likes.

Previous Years' Question Papers:

Question Papers and Answer Keys of **NEET (UG) 2022, 2023 and 2023 (Manipur)** have been provided to offer students glimpse of the complexity of questions asked in entrance examination. Solutions are also provided through a separate Q.R. code.

The papers have been split topic-wise to let the students know which of the topics were more relevant in the latest examination.

Topic Test has been provided at the end of each chapter to assess the level of preparation of the student on a competitive level.

Considering the latest modifications in the syllabus of NEET (UG) examinations, a list of questions based on the concepts excluded from the syllabus is provided. The purpose of providing these questions is to display various question types and their level of difficulty that have been asked in previous examinations.

All the features of this book pave the path of a student to excel in their examinations. The features are designed keeping the following elements in mind: Time management, easy memorization or revision and non-conventional yet simple methods for MCQ solving.

We are confident that this book will cater to needs of students across a varied background and effectively assist them to achieve their goal.

We hope the book benefits the learner as we have envisioned.

A book affects eternity; one can never tell where its influence stops.

Publisher

Edition: Seventh

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on: mail@targetpublications.org

Disclaimer

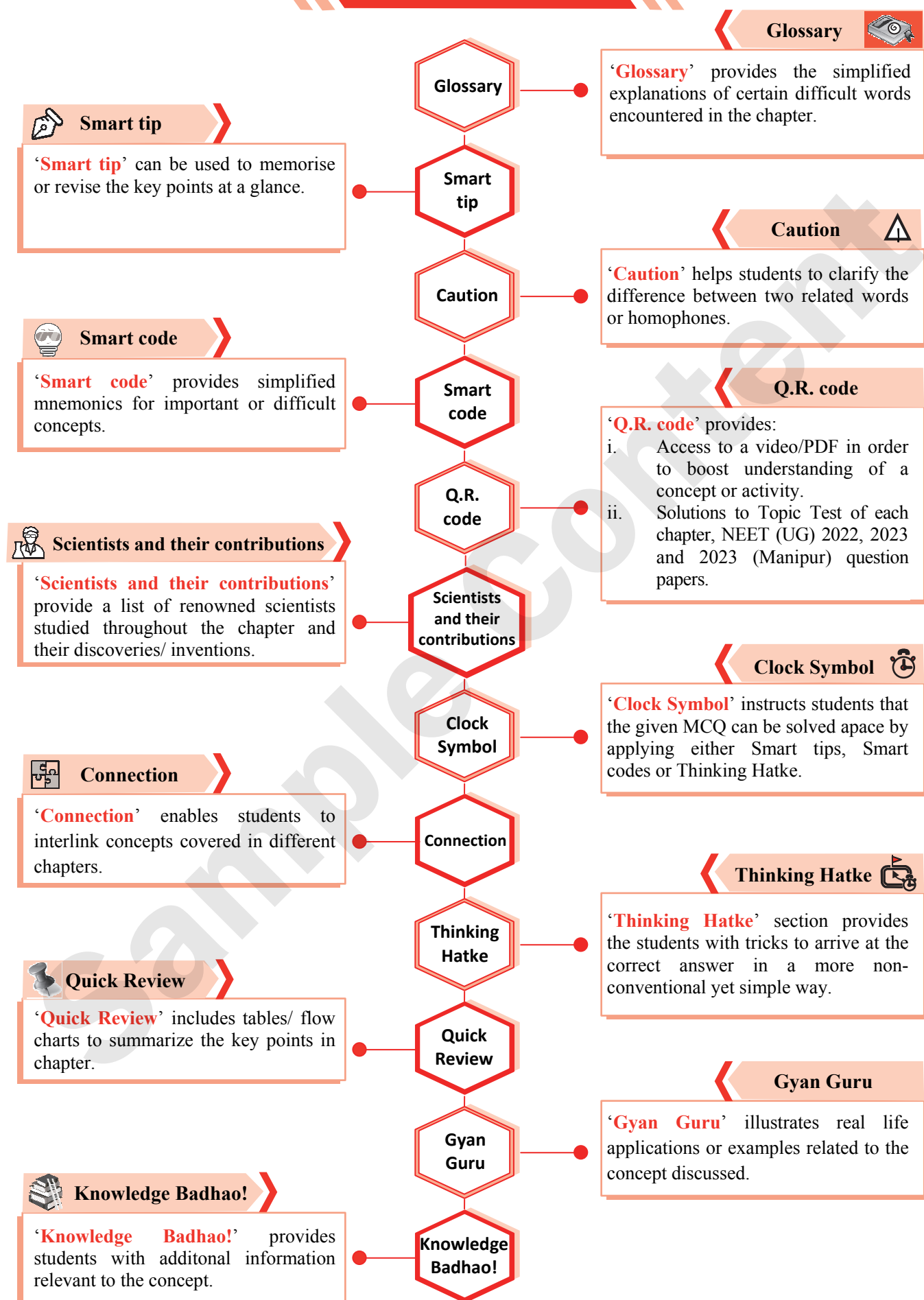
This reference book is based on the NEET-UG syllabus prescribed by National Testing Agency (NTA). We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

This work is purely inspired upon the course work as prescribed by the National Council of Educational Research and Training (NCERT). Every care has been taken in the publication of this reference book by the Authors while creating the contents. The Authors and the Publishers shall not be responsible for any loss or damages caused to any person on account of errors or omissions which might have crept in or disagreement of any third party on the point of view expressed in the reference book.

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KEY FEATURES



Frequently Asked Questions

➤ **Why Absolute Series?**

Gradually, every year the nature of competitive entrance exams is inching towards conceptual understanding of topics. Moreover, it is time to bid adieu to the stereotypical approach of solving a problem using a single conventional method.

To be able to successfully crack the NEET (UG) examinations, it is imperative to develop skills such as data interpretation, appropriate time management, knowing various methods to solve a problem, etc. With Absolute Series, we are sure, you'd develop all the aforementioned skills and take a more holistic approach towards problem solving. The way you'd tackle advanced level MCQs with the help of Hints, Smart tips, Smart codes and Thinking Hatke would give you the necessary practice that would be a game changer in your preparation for the competitive entrance examinations.

➤ **What is the intention behind the launch of Absolute Series?**

The sole objective behind the introduction of Absolute Series is to cater to needs of students across a varied background and effectively assist them to successfully crack the NEET (UG) examinations. With a healthy mix of MCQs, we intend to develop a student's MCQ solving skills within a stipulated time period.

➤ **What do I gain out of Absolute Series?**

After using Absolute Series, students would be able to:

- assimilate the given data and apply relevant concepts with utmost ease.
- tackle MCQs of different pattern such as match the columns, diagram based questions, multiple concepts and assertion-reason efficiently.
- garner the much needed confidence to appear for competitive exams.
- apply easy and time saving methods to tackle tricky questions which will help ensure that time consuming questions do not occupy more time than you can allot per question.

➤ **How to derive the best advantage of the book?**

To get the maximum benefit of the book, we recommend :

- Go through the detailed theory at the beginning of a chapter for concept clarity. Commit Smart Tips and Smart Codes into memory and pay attention to Caution.
- Using subtopic wise segregation as a leverage, complete MCQs in each subtopic at your own pace. Questions from exams such as NEET-UG are tagged and placed along the flow of subtopic. Mark these questions specially to gauge the trends of questions in various exams.
- Be extra receptive to Thinking Hatke and application of Smart Tips and Smart Codes. Assimilate them into your thinking.

Best of luck to all the aspirants!

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Note: ☒ Complete chapter excluded from the NEET (UG) 2024 syllabus (in index)

● Part of the chapter excluded from the NEET (UG) 2024 syllabus (in index)

Ⓔ Symbol after a word in theory indicates that the meaning of the word is provided in the glossary section.

Questions based on the concepts excluded from the NEET (UG) 2024 Syllabus

Chapter Name	Sub-topic Name	Questions excluded from NEET (UG) 2024 Syllabus	Page No.
1. Reproduction in Organisms	Entire Chapter Deleted		1 to 20
9. Strategies for Enhancement in Food Production	Entire Chapter Deleted		282 to 304
13. Organisms and Populations	13.2 Population and Ecological Adaptations	All Questions	Theory - 371 and 372 MCQs - 382 and 383
	Topic Test	1, 2, 5, 8	MCQs - 395
14. Ecosystem	14.6 Ecological Succession 14.7 Nutrient Cycling 14.8 Ecosystem Services	All Questions	Theory - 402 and 403 MCQs - 412 to 414
			Theory - 404 and 405 MCQs - 414 and 415
			Theory - 405 MCQs - 415
16. Environmental Issues	Topic Test	1, 3, 4, 12, 13	MCQs - 418 and 419
NEET (UG) 2022	Entire Chapter Deleted		440 to 466
	Section A (Biology – Botany)	15	468
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	Section A (Biology – Zoology)	40	483
	Section B (Biology – Zoology)	45, 48	483 and 484

Note: i. The above table contains the list of chapters/subtopics/question numbers that are excluded from the latest syllabus of NEET (UG) 2024.
 ii. These questions are covered to give an idea about the variety and difficulty levels of questions asked in the examination over the years.

Solving previous year papers is the best way to work on your strength, weaknesses, and time management.

Scan the adjacent QR Code to know more about our **"36 Years NEET Biology PSP (Previous Solved Papers)"** book for the NEET UG Entrance examination.



Get an overall idea of the type of questions that are asked in the NEET UG Examination. Scan the adjacent QR Code to know more about our **"Previous 11 Years NEET solved papers with Solutions"** book for the NEET UG Entrance examination.



Practice test Papers are the only way to assess your preparedness for the Exams. Scan the Adjacent QR code to know more about our **"NEET (UG) Biology Test Series with Answer Keys & Solutions"** book for the NEET UG Entrance examination.



Do you want to improve your score of NEET-UG Examination? Scan the Adjacent QR code to know more about our **"NEET UG 10 Full Syllabus Mock Tests"** book.



1

Reproduction in Organisms

1.0 Introduction

1.1 Asexual Reproduction

1.2 Vegetative Propagation in Plants

1.3 Sexual Reproduction

1.0 INTRODUCTION

➤ **Reproduction: A characteristic feature of all organisms for continuation of species.**

- The ability of living organism to give rise to the young ones of its own kind is called **reproduction**.
- It is an essential life process which not only helps in survival but also helps in continuity of species.
- Reproduction is a process of organic evolution by transmitting advantageous variations to the offsprings.
- The period from birth to the natural death of an organism is called **life span**.
- Life span of organisms cannot be correlated with the sizes. e.g. Size of Crow and Parrot is almost same, however their life spans show a wide difference.



Connections

In chapter 5 Principles of Inheritance and Variation, you will study how genetic variations are created and inherited during reproduction.

- **Types of Reproduction:** Depending on whether there is involvement of one parent or two in the process of reproduction it is of two types:
- Asexual Reproduction:** Offspring produced by a single parent with/without gamete formation.
 - Sexual Reproduction:** Offspring produced by two parents (of opposite sex) and fusion of male and female gamete is involved.

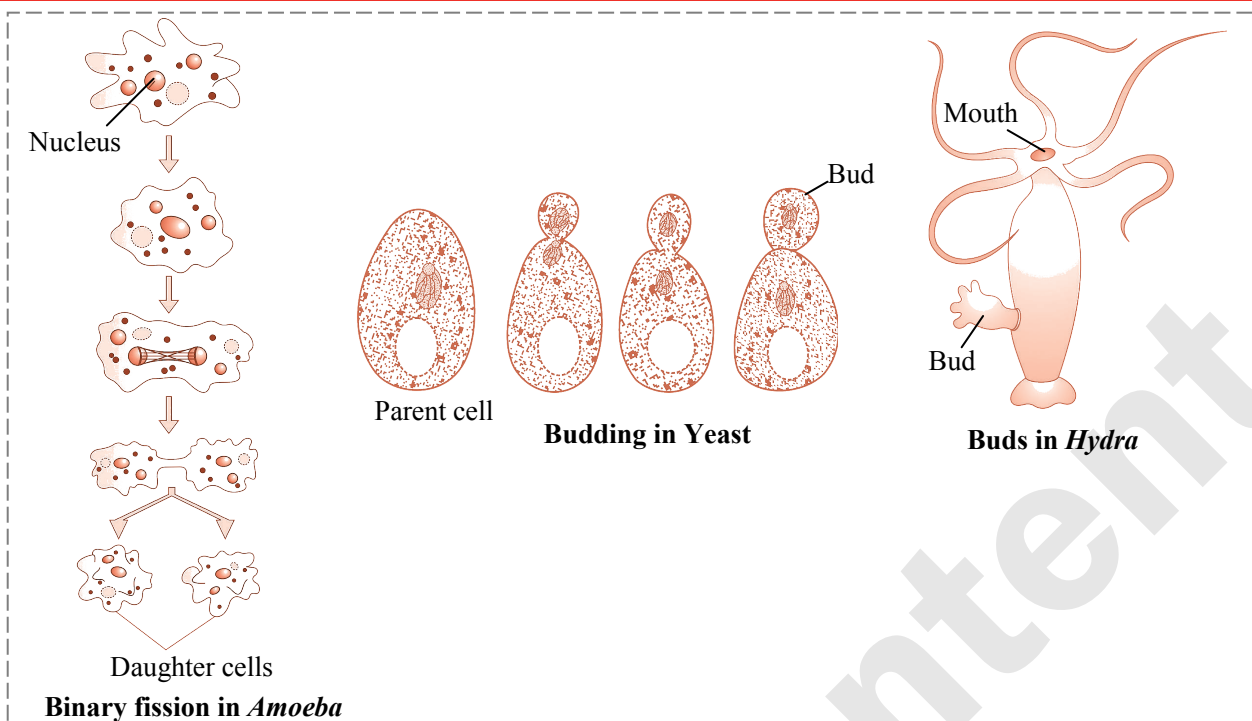
1.1 ASEQUAL REPRODUCTION

Characteristics:

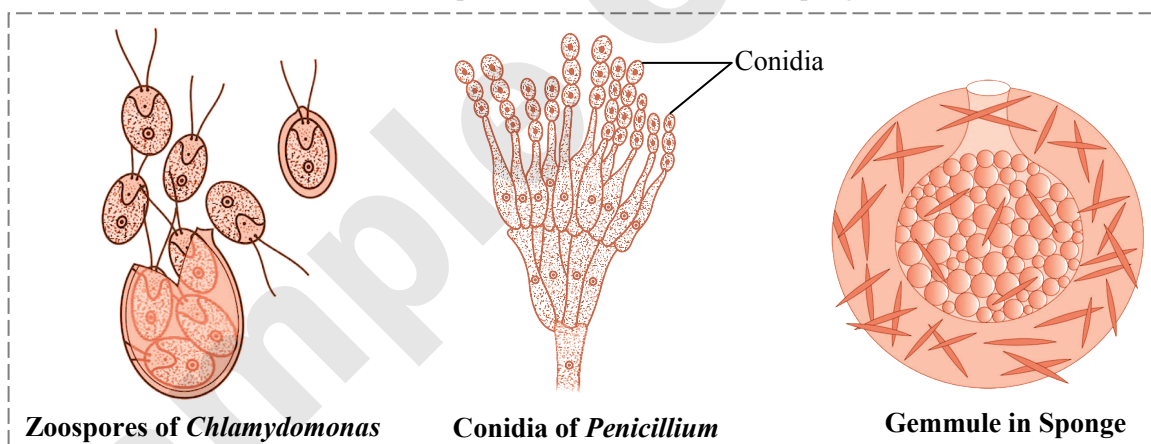
- Single parent (individual) is involved in producing the offspring.
- Offsprings produced are identical to one another.
- They are exact copies of their parents.
- They are **clones**, i.e. morphologically and genetically similar individuals.
- It is common among single-celled organisms and in plants and animals having relatively simple organizations.

➤ **Types of Asexual Reproduction:**

- Binary fission:** Parental cell divides into two halves and each grows rapidly into an adult. e.g. *Amoeba*, *Paramecium*.
- Sporulation:** Under unfavourable condition *Amoeba* shows **encystation**[®], in which *Amoeba* withdraws its pseudopodia and secretes a three layered hard covering or cyst around itself. When conditions are favourable, the encysted *Amoeba* divides by multiple fission producing many minute *Amoebae* or pseudopodiospores. Cyst wall bursts out releasing the spores in the surrounding medium. These spores grow up into many *Amoebae*. This is known as sporulation.
- Budding:** In budding, unequal division takes place. Small buds are produced which initially remain attached to the parent cell, but later get separated and mature into new organisms (cells), e.g. Yeast, *Hydra*



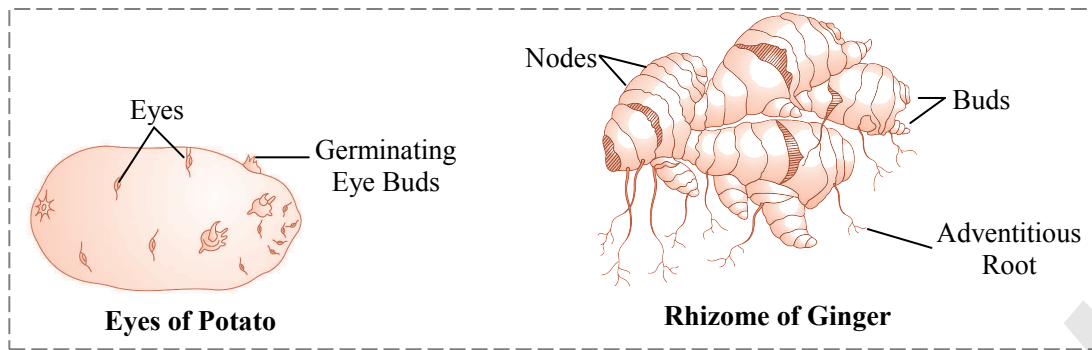
- iv. **Zoospore formation:** Members of Kingdom Fungi and simple plants like algae reproduce asexually by this method. Zoospores are microscopic motile structures. This type of asexual reproduction is seen in *Chlamydomonas*.
- v. **Conidia:** Conidia are asexual reproductive structures seen in *Penicillium*.
- vi. **Gemmules[®]:** Gemmules are asexual reproductive structures seen in Sponges.



- vii. **Fragmentation:** In this, body breaks up into fragments and each fragment grows into adult which is capable of producing offspring. This mode of asexual reproduction is called as fragmentation. It is found in filamentous algae, *Hydra*, sponges, some flatworms, etc.

1.2 VEGETATIVE PROPAGATION IN PLANTS

- **Vegetative Propagation:** Vegetative propagation is an asexual mode of reproduction as only a single parent is involved. It is a process of reproduction seen in plants in which a portion of the plant body functions as a propagule and gives rise to a new plant.
- **Vegetative propagules:** These are units of vegetative propagation which are capable of giving rise to new offspring.
- **Some of the vegetative propagules in Angiosperms are:**
 - i. **Eyes of potato:** Small plantlets emerge from the eyes (buds) of potato tuber.
 - ii. **Rhizome:** Small plantlets develop from rhizome of ginger.

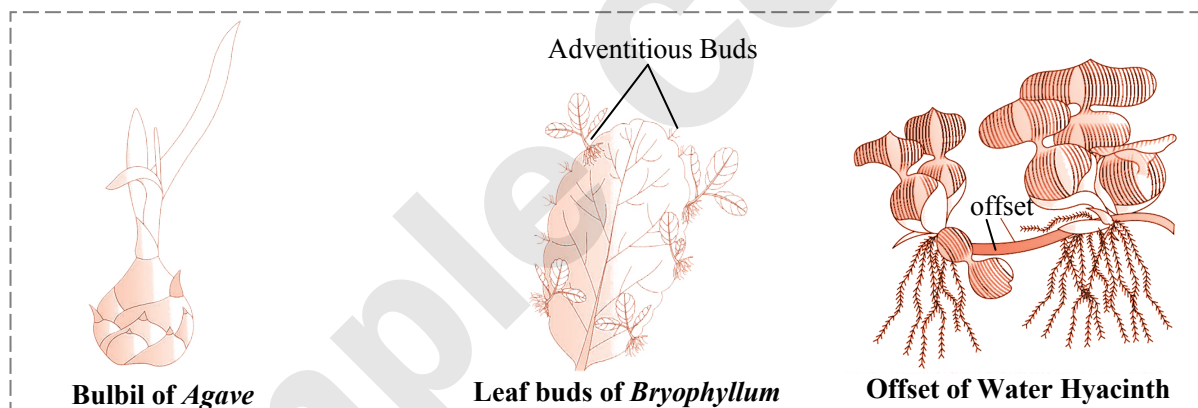


- iii. **Bulbil:** A vegetative propagule seen in *Agave*. Bulbils are modified vegetative or floral buds, propagative in function. Bulbils on maturation get detached from the plant and fall on the ground. Under favourable condition, it develops into new plant.
- iv. **Leaf buds:** In *Bryophyllum*, leaves are notched along the margin. Adventitious buds arise from the notches on the leaves. These buds are capable of giving rise to a new plant.
- v. **Offset:** It is found in Water Hyacinth, an aquatic plant which can propagate vegetatively at a rapid rate and spread over the standing water body in a relatively short time. Water Hyacinth drains oxygen from water, resulting in death of fishes. It is also called 'Scourge of water bodies' or 'Terror of Bengal'.



Connections

In chapter 15 Biodiversity and Conservation and 16 Environmental Issues, you will study about how invasive weed like Water Hyacinth cause decline or extinction of indigenous species.



1.3 SEXUAL REPRODUCTION

- i. **Sexual reproduction:** Production of offsprings by formation and fusion of gametes.
Characteristics:
 - a. Male and female gametes are produced.
 - b. Gametes are produced either by the same individual or by different individuals of opposite sex.
 - c. Gametes fuse to form zygote which develops into the new organism.
 - d. In comparison to asexual reproduction, it is a slow, elaborate and more complex process.
 - e. Offsprings produced are not identical to the parents or amongst themselves.
- ii. Before organisms can reproduce sexually, they have to reach a certain stage of growth and maturity. This period is called the juvenile phase in animals. In plants, it is called vegetative phase. This phase has variable durations in different organisms.
- iii. The reproductive phase begins after the end of juvenile/vegetative phase. Flowering in higher plants marks the beginning of the reproductive phase. Few plants exhibit unusual flowering phenomenon:
For e.g.
 - a. Bamboo species flower only once in their lifetime, generally after 50–100 years, produce numerous fruits and die.
 - b. *Strobilanthes kunthiana* (Neelakurinji) flowers once in 12 years.



- iv. Females of placental mammals exhibit cyclic changes in the activities of ovaries and accessory ducts as well as hormones in the reproductive phase.
- Oestrus cycle:** Takes place in non-primate mammals like dogs, cows, sheep, rats, tiger, deers, etc.
 - Menstrual cycle:** Takes place in primates (monkey, ape and human beings).
 - Seasonal breeders:** Many mammals, which live in wild exhibit the reproductive cycles only during favourable seasons.
 - Continuous breeders:** Many other mammals are reproductively active throughout their reproductive phase.



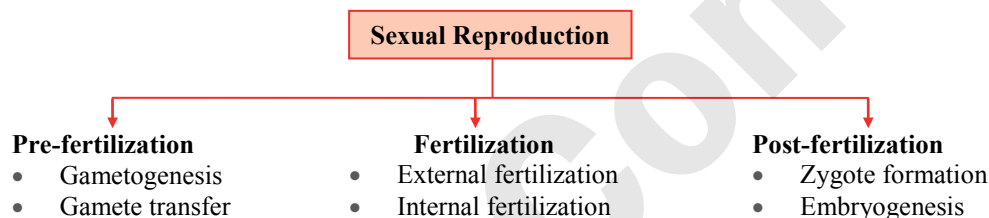
Knowledge Badhao!

➤ Difference between Oestrus cycle and Menstrual cycle:

Difference between Oestrus cycle and Menstrual cycle is that animals having oestrus cycles resorb the endometrium if conception does not occur during that cycle whereas, animals having menstrual cycles shed the endometrium through menstrual cycle.

Another difference is sexual activity. Females with Oestrus cycle are generally sexually active during the oestrus phase of their cycle. This is also referred to as being 'in heat.' In contrast, females of species with menstrual cycles can be sexually active at any time in their cycle.

➤ Events in Sexual Reproduction:



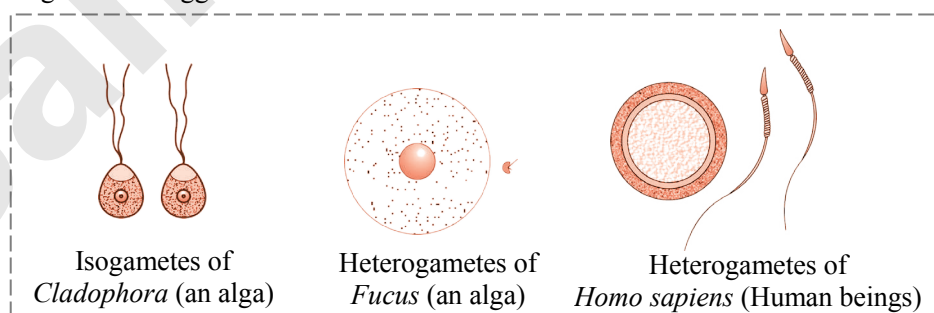
➤ Pre-fertilization Events:

These include the events taking place in sexual reproduction prior to the fusion of gametes.

These events are: Gametogenesis and gamete transfer

i. Gametogenesis[®]:

- It involves formation of two types of haploid gametes, i.e. male and female.
- In some algae, the two gametes are similar in appearance. Such gametes are called homogametes (Isogametes).
- In majority of sexually reproducing organisms, the two gametes are morphologically distinct types, i.e. Heterogametes.
Male gamete → Antherozoid/sperm
Female gamete → Egg/Ovum



d. Sexuality in Plants:

Bisexual (Monoecious): Both male and female reproductive structures are present on the same plant. e.g. Cucurbits, Coconuts

Unisexual (Dioecious): Male and female reproductive structures are present on different plants. e.g. Papaya, Date Palm

- In many plants and fungi, the terms homothallic/monoecious are used to denote the bisexual condition, while the terms heterothallic and dioecious are used to denote unisexual condition.



- f. In flowering plants,
Unisexual male flowers are called **Staminate** (Bearing stamens) and
Unisexual female flowers are called **Pistillate** (Bearing pistils)



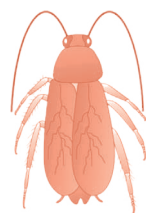
Smart tip - 1

Homothallic OR Monoecious plants denote **Bisexual** condition → Male and female reproductive structures on same plant → e.g. Cucurbits, Coconuts

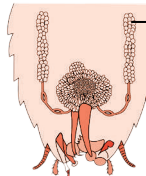
Heterothallic OR Dioecious plants denote **Unisexual** condition → Male and female reproductive structures on separate plants → e.g. Papaya, Date Palm

g. **Sexuality in Animals:**

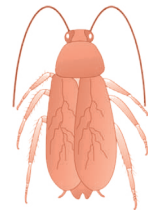
1. **Unisexual:** Male and female sex organs are present in different individuals e.g. Cockroach.
2. **Bisexual (Hermaphrodite):** Male and female sex organs are present in the same individual.
e.g. Earthworm, leech, sponge, tapeworm



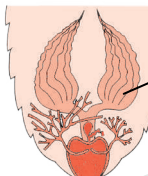
Male



Testis



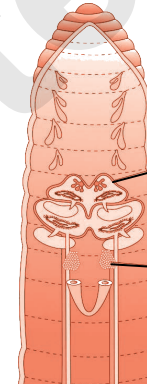
Female



Ovary

Cockroach: Unisexual animal

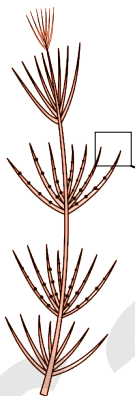
Clitellum



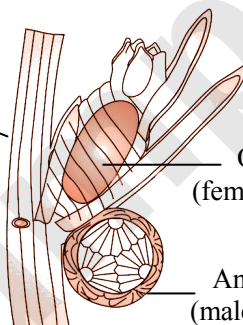
Testis sac
with testis

Ovary

Earthworm: Bisexual animal



Chara: Monoecious plant



Oogonium
(female sex organ)

Antheridium
(male sex organ)

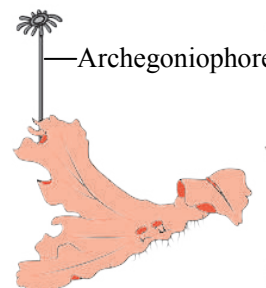


Female thallus

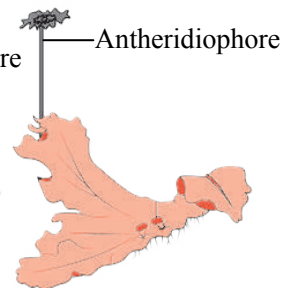


Male thallus

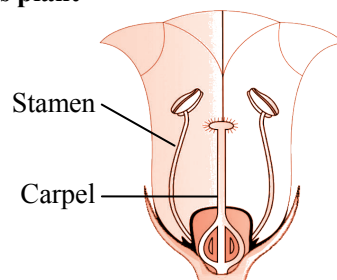
Marchantia: Dioecious plant



Archegoniophore



Antheridiophore



Stamen

Carpel

Sweet potato: Bisexual flower
Diversity of sexuality in organisms

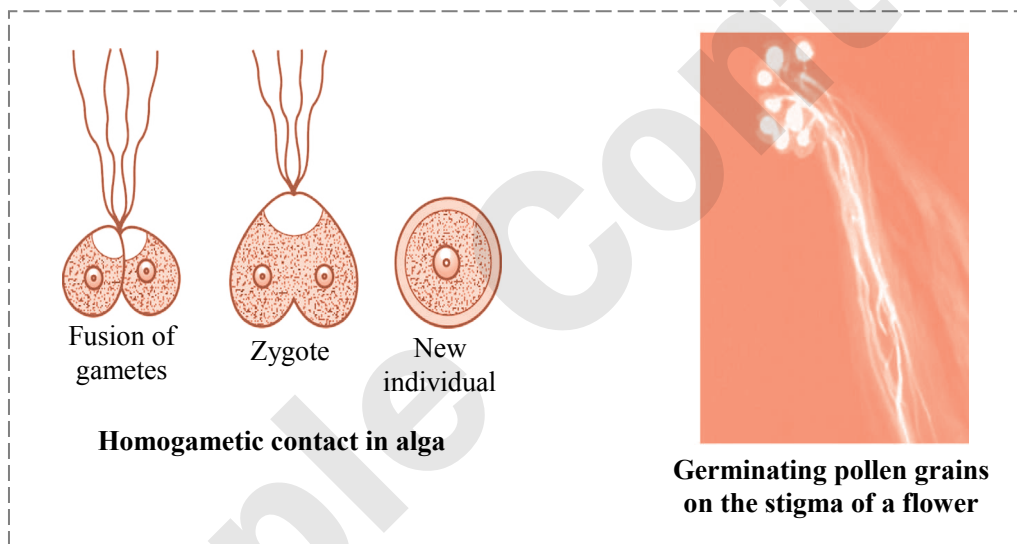


➤ **Cell division during gamete formation:**

- In all heterogametic species gametes are of two types: Male and Female gametes
- Haploid parent plant body produces gametes by mitosis.
- In diploid parent plant body, meiocytes[®] (2n) undergo meiotic cell division to form haploid gametes (n).

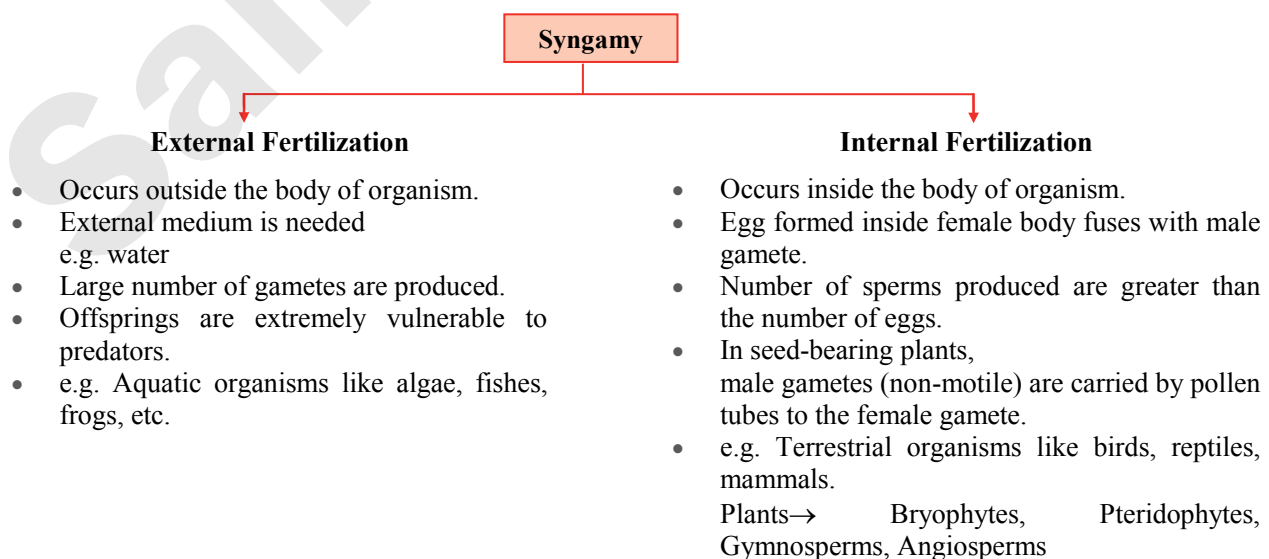
iv. **Gamete Transfer:**

- In most organisms, male gamete is motile, while the female gamete is non-motile. Exceptions to this are few fungi and algae, in which both gametes are motile.
- Male gametes require a medium for movement.
- In algae, bryophytes and pteridophytes, water serves as the medium for gamete transfer.
- A large number of male gametes fail to reach female gametes. To compensate this, the number of male gametes produced is more than the female gametes.
- In seed-bearing plants, pollen grains produced in anthers are carriers of male gametes and ovule has the egg.
- In self-fertilizing plants like pea, transfer of pollen grains from anther to stigma is relatively easy as they are located in close proximity.
- In cross pollinating plants (including dioecious plants), **pollination** takes place which involves transfer of pollen grains to the stigma.
- Successful transfer and fusion of gametes is essential for Fertilization.



➤ **Fertilization:**

Fertilization is the complete and permanent fusion of two haploid gametes to form a diploid zygote. It is also known as **Syngamy**.

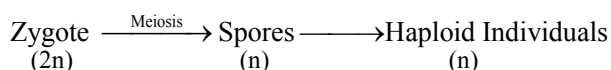




- **Parthenogenesis:** Development of an egg into a complete individual without fertilization is known as parthenogenesis. It is found in many non-vertebrates such as bees, rotifers and even some lizards and birds (turkey).
- **Post – fertilization Events:** These include the events which take place after zygote formation in sexual reproduction.

i. Zygote formation:

- a. Formation of diploid zygote takes place in all sexually reproducing organisms.
- b. After a zygote is formed, its development depends on the type of life cycle of the organism and the environment to which it is exposed.
- c. In fungi and algae, zygote develops a thick wall which is resistant to desiccation and damage. It germinates after a period of rest.
- d. In organisms having haplontic life cycle:



- e. **Zygote** is a vital link between organisms of one generation and the next.

ii. Embryogenesis:

- a. It is the process of development of embryo from zygote.
- b. During embryogenesis, zygote undergoes cell division (mitosis) and cell differentiation.
- c. **Cell division (Mitosis)** in zygote increases the number of cells in developing embryo.
- d. **Cell differentiation** helps in modification of certain groups of cells to form specialized tissue and organs to form an organism.

➤ **Oviparous and viviparous animals:**

	Oviparous Animals	Viviparous Animals
i.	Development of zygote takes place outside the female's body.	Development of zygote takes place inside the female's body.
ii.	They lay eggs which are covered by hard calcareous shell.	Zygote develops into young one.
iii.	They lay eggs in a safe place in the environment, but chances of survival of young one is less.	They give birth directly to young ones and their chances of survival are more due to proper embryonic care and protection.
iv.	E.g. Birds, reptiles	E.g. Majority of mammals including humans.

➤ **Post- fertilization changes in flowering plants:**

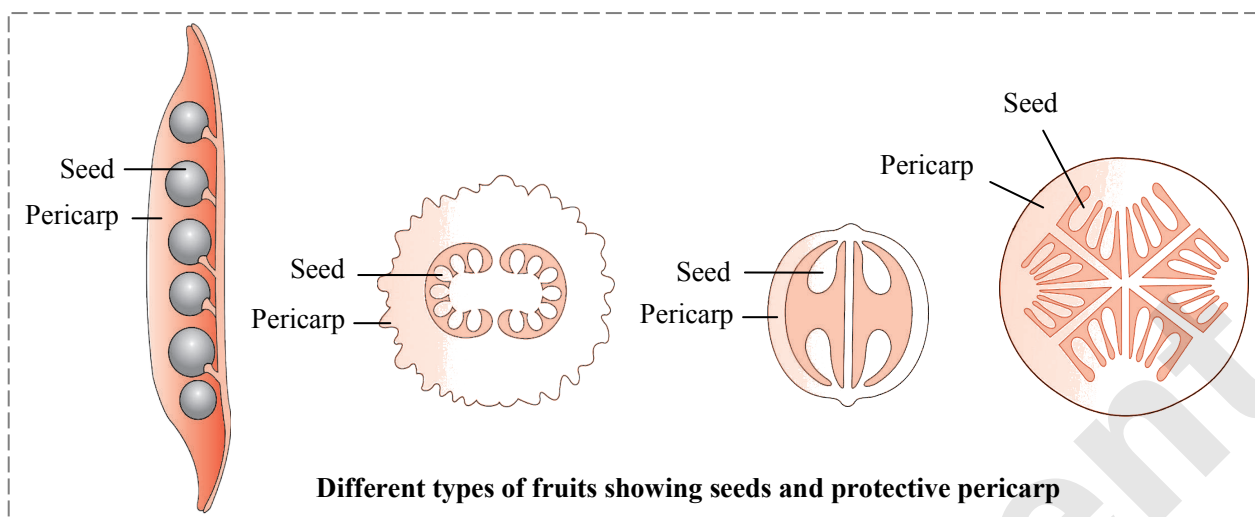
Before fertilization	After fertilization
Sepals, petals, stamens	Wither and fall off
Zygote	Embryo
Ovules	Seeds
Ovary	Fruit
Ovary wall	Pericarp



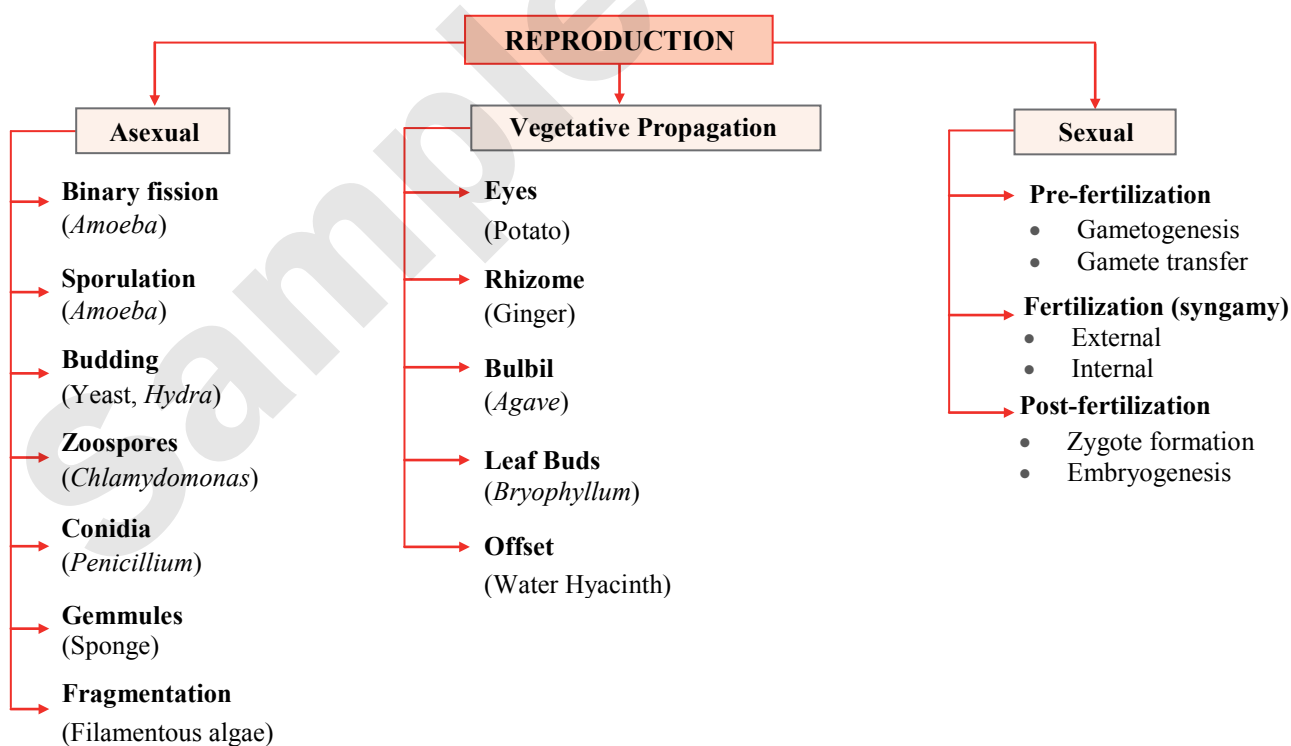
Knowledge Badhao!

Persistent Calyx:

Calyx (made up of sepals) protects the flower in bud condition and generally fall off after fertilization. However in some plants, sepals remain attached even after fertilization. Such calyx is called as Persistent Calyx.

**Glossary**

Word	Meaning
Encystation	The process of formation of a cyst or becoming enclosed in a capsule
Gemmule	Gemmules are internal buds found in sponges and are involved in asexual reproduction
Gametogenesis	The process in which cell undergo meiotic division to form gametes
Meiocytes	Gamete mother cell / A cell that divides by meiosis to produce haploid spores.

**Quick Review**

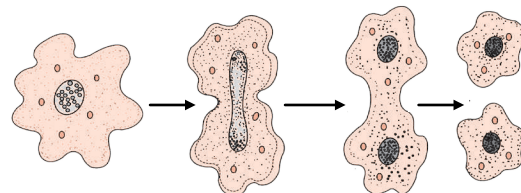
**Multiple Choice Questions****1.0 INTRODUCTION**

- The period from birth to the natural death of an organism is called as
(A) regeneration (B) life span
(C) metamorphosis (D) reproduction
- Assertion:** Reproduction enables continuity of species, generation after generation.
Reason: Reproduction is a biological process in which an organism gives rise to young ones like itself.
(A) Both assertion and reason are true and reason is the correct explanation of assertion.
(B) Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) Assertion is true but reason is false.
(D) Both assertion and reason are false.
- _____ is a life process that is not essential for an individual's survival but for survival of the species. **[NCERT Exemplar]**
(A) Growth (B) Reproduction
(C) Respiration (D) Nutrition

1.1 ASEXUAL REPRODUCTION

- Production of offsprings by a single parent without fusion of gametes is called
(A) asexual reproduction
(B) sexual reproduction
(C) amphimixis
(D) encystation
- Which of the following statements regarding asexual reproduction are correct?
i. It is uniparental.
ii. The offsprings produced are genetically identical to the parent.
iii. Production and fusion of gametes is necessary.
iv. The offsprings produced show genetic variation.
(A) i and ii are correct
(B) iii and iv are correct
(C) ii and iii are correct
(D) i and iv are correct
- Asexual reproduction involves
(A) only meiosis
(B) only mitosis
(C) both mitosis and meiosis
(D) either mitosis or meiosis
- A clone is a group of individuals obtained through
(A) self-pollination
(B) hybridization
(C) vegetative propagation
(D) cross pollination

- Assertion:** Clones are produced as a result of asexual reproduction.
Reason: Clones are morphologically and genetically similar individuals.
(A) Both assertion and reason are true and reason is the correct explanation of assertion.
(B) Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) Assertion is true but reason is false.
(D) Both assertion and reason are false.
- Select the correct statement from the following regarding asexual reproduction.
i. It is slower than sexual reproduction.
ii. It involves a single parent.
iii. It produces progeny that are genetically identical with the parent.
iv. Clones are the progeny of asexual reproduction. **[EAM CET 2016]**
(A) i, ii, iii, iv (B) i, ii, iv
(C) i, ii, iii (D) ii, iii, iv
- Asexual reproduction takes place in
(A) monera (B) protists
(C) sponges (D) all of these
- Methods of asexual reproduction in lower organisms include
(A) binary fission and budding
(B) fertilization and syngamy
(C) porogamy and autogamy
(D) geitonogamy and xenogamy
- A type of asexual reproduction in unicellular organisms in which parent cell divides to produce two equal cells which develop into two new individuals is called
(A) budding (B) binary fission
(C) sporulation (D) fragmentation
- Identify the mode of asexual reproduction shown in the diagram given below.



- Fragmentation
 - Binary fission
 - Budding
 - Gemmule formation
- Gemmule formation in sponges are useful in
(A) asexual reproduction
(B) sexual reproduction
(C) parthenogenesis
(D) parthenocarpy



12. The phenomenon in which *Amoeba* forms a cyst around itself during unfavourable condition is called as

(A) sporulation (B) encystation
(C) guttation (D) heterocyst

13. Multiple fission in *Amoeba* is called

[TS EAMCET 2021]

(A) Schizogony (B) Gametogony
(C) Sporogony (D) Sporulation

14. *Amoeba* is immortal because [KCET 2017]

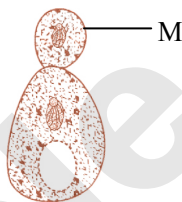
(A) it is multicellular
(B) it is microscopic
(C) it reproduces by sexual method only
(D) parental body is distributed among the offsprings during binary fission

15. Which of the following statements is INCORRECT about process of sporulation in *Amoeba*?

(A) During unfavourable condition, *Amoeba* forms a three layered hard covering (cyst) around itself.
(B) The encyst *Amoeba* divides by multiple fission to produce pseudopodiospores.
(C) The cyst wall of *Amoeba* burst to release spores which grow up into many *Amoeba*.
(D) Sporulation occurs when favourable conditions return.

16. Identify the asexual reproductive structure 'M' in the following diagram.

[KCET 2019]



(A) Zoospore (B) Bud
(C) Gemmule (D) Conidium

17. Yeast reproduce by

(A) fragmentation (B) budding
(C) binary fission (D) conidia

18. Complete the given analogy.

Budding : Yeast :: _____ : *Chlamydomonas*

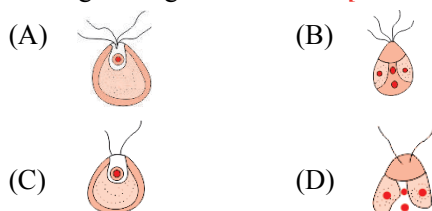
(A) Binary fission (B) Conidia
(C) Zoospores (D) Gemmules

19. Motile zoospores are produced by

[MHT CET 2017]

(A) *Chlamydomonas* (B) *Penicillium*
(C) Bacteria (D) *Amoeba*

20. Which is the motile zoospore of *Chlamydomonas* in the given figure? [GUJ CET 2017]



21. *Penicillium* produce non-motile spores called

(A) zoospores (B) conidia
(C) fragments (D) buds

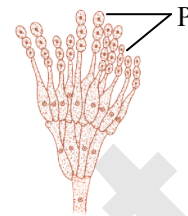
22. Identify the asexual reproductive structure 'P' in the diagram given below.

(A) Conidia

(B) Gemmules

(C) Buds

(D) Zoospores



23. Asexual method of reproduction by binary fission is common to which of the following?

i. Some eukaryotes ii. All eukaryotes
iii. Some prokaryotes iv. All prokaryotes

[NCERT Exemplar]

(A) i and ii (B) ii and iii
(C) i and iii (D) iii and iv

24. Gemmule formation in sponges is helpful in

(A) parthenogenesis
(B) sexual reproduction
(C) encystation
(D) asexual reproduction

25. Asexual reproduction through formation of gemmule occurs in [MHT CET 2016]

(A) Ascidian (B) *Hydra*
(C) Planaria (D) *Spongilla*

26. In these, reproduction involves formation of gemmule [BCECE 2016]

(A) *Sycon* (B) *Planaria*
(C) *Hydra* (D) *Monocystis*

27. Fragmentation is a mode of asexual reproduction seen in

(A) *Penicillium* (B) *Amoeba*
(C) *Hydra* (D) *Paramecium*

28. Identify the INCORRECT statement.

[NCERT Exemplar]

(A) In asexual reproduction, the offspring produced are morphologically and genetically identical to the parent.

(B) Zoospores are sexual reproductive structures.

(C) In asexual reproduction, a single parent produces offspring with or without the formation of gametes.

(D) Conidia are asexual structures in *Penicillium*.

29. Which of the following match pair is the correct one? [GUJ CET 2020]

(A) *Hydra*: Pseudopodiospores

(B) *Amoeba*: Gemmules

(C) Sponges: Zoospores

(D) *Penicillium*: Conidia



30. Considering mode of asexual reproduction, match the Column I with II and select the correct option.

	Column I		Column II
i.	Yeast	a.	Fragmentation
ii.	<i>Penicillium</i>	b.	Zoospores
iii.	Filamentous algae	c.	Budding
iv.	<i>Chlamydomonas</i>	d.	Conidia

[MHT CET 2015]

- (A) i – c, ii – d, iii – a, iv – b
 (B) i – b, ii – c, iii – a, iv – d
 (C) i – d, ii – c, iii – b, iv – a
 (D) i – c, ii – b, iii – a, iv – d
31. Choose an odd pair from the following.
 [MHT CET 2019]
- (A) Conidia- Basidiomycetes
 (B) Zoospores- *Chlamydomonas*
 (C) Fragmentation- Filamentous algae
 (D) Budding- Yeast

1.2 VEGETATIVE PROPAGATION IN PLANTS

1. The most significant value of vegetative propagation is that,
 (A) it is a means of producing a large population of individuals genetically identical to the parent
 (B) it produces new variety
 (C) it is an ancient practice
 (D) it enables rapid production of genetic variation
2. A process of multiplication in which a portion of fragment of plant body functions as propagule and develops into new individual is called
 (A) vegetative propagation
 (B) sexual propagation
 (C) gametogenesis
 (D) parthenocarpy
3. Identify the ODD one out.
 (A) Offset (B) Bulbil
 (C) Rhizome (D) Conidia
4. **Assertion:** The process involved in vegetative propagation is asexual.
Reason: Formation of vegetative propagules does not involve two parents.
 (A) Both assertion and reason are true and reason is the correct explanation of assertion.
 (B) Both assertion and reason are true but reason is not the correct explanation of assertion.
 (C) Assertion is true but reason is false.
 (D) Both assertion and reason are false.
5. Which one of the following is NOT true about vegetative propagation? [MHT CET 2018]
 (A) Easy and cheaper method
 (B) Rapid propagation

- (C) Production of genetically similar plants
 (D) Production of genetically dissimilar plants

6. 'Terror of Bengal' multiplies vegetatively by
 (A) offset (B) runners
 (C) bulb (D) rhizomes
7. Read the following statements about 'Terror of Bengal' and select the correct ones.
 i. 'Terror of Bengal' is the name given to water hyacinth (*Eichhornia*), an algae.
 ii. *Eichhornia* was introduced in India due to its aesthetic value.
 iii. *Eichhornia* drains oxygen from the water which leads to death of fishes.
 [NCERT Exemplar]
- (A) i and ii (B) i and iii
 (C) ii and iii (D) i, ii and iii
8. The aquatic weed which is popularly called terror of Bengal is [EAM CET 2016]
 (A) *Erythroxylum* (B) *Eichhornia*
 (C) *Echinus* (D) *Echidna*
9. With respect to *Eichhornia*,
Statement X: It drains off oxygen from water and is seen growing in standing water.
Statement Y: It is an indigenous species of our country. [KCET 2015]
 (A) Only statement X is correct and Y is wrong.
 (B) Both the statements X and Y are correct.
 (C) Only statement Y is correct and X is wrong.
 (D) Both the statements X and Y are wrong.
10. In ginger vegetative propagation occurs through [AIPMT 2015]
 (A) rhizome (B) offsets
 (C) bulbils (D) runners
11. The 'eyes' of potato are located at the [MHT CET 2018]
 (A) root apex (B) leaf apex
 (C) nodes (D) internodes
12. Appearance of vegetative propagules from the nodes of plants such as sugarcane and ginger is mainly because [NCERT Exemplar]
 (A) nodes are shorter than internodes
 (B) nodes have meristematic cells
 (C) nodes are located near the soil
 (D) nodes have non-photosynthetic cells.
13. In which pair both the plants can be vegetatively propagated by leaf pieces? [AP EAMCET 2020]
 (A) *Agave* and *Kalanchoe*
 (B) *Bryophyllum* and *Kalanchoe*
 (C) *Chrysanthemum* and *Agave*
 (D) *Asparagus* and *Bryophyllum*



14. One of the plants using 'Foliar adventitious buds' as method for vegetative propagation is
(A) Banana (B) Ginger
(C) *Bryophyllum* (D) *Colocasia*
15. Which of the following is propagated by a bulbil?
(A) *Agave* (B) *Bryophyllum*
(C) Onion (D) *Bougainvillea*
16. Vegetative propagule in *Agave* is termed as
[NEET (UG) P-II 2020]
(A) Bulbil (B) Offset
(C) Eye (D) Rhizome
17. Which vegetative propagule is shown by the arrow marked in the diagram given below?
(A) Adventitious buds
(B) Offset
(C) Bulbil
(D) Rhizome
18. Offsets are produced by **[NEET (UG) 2018]**
(A) meiotic divisions (B) mitotic divisions
(C) parthenocarpy (D) parthenogenesis
19. Identify the diagram given below.
(A) Offset of water Hyacinth
(B) Eyes of potato
(C) Rhizome of ginger
(D) Bulbil of *Agave*
20. Match the Column I (Plant) and Column II (Vegetative Propagule) and choose the correct option.

	Column I (Plant)		Column II (Vegetative Propagule)
i.	Banana	a.	Leaf buds
ii.	Potato	b.	Rhizome
iii.	<i>Bryophyllum</i>	c.	Offset
iv.	Water Hyacinth	d.	Eyes

- (A) i - d, ii - c, iii - b, iv - a
(B) i - b, ii - d, iii - a, iv - c
(C) i - b, ii - d, iii - c, iv - a
(D) i - b, ii - a, iii - c, iv - d

21. Match the vegetative propagules listed under Column-I with the plants given under Column II.

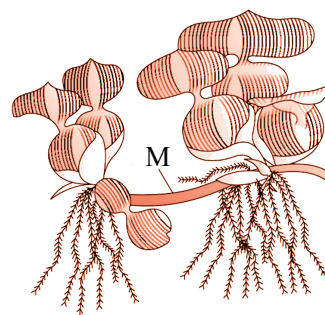
	Column I		Column II
i.	Rhizome	a.	<i>Chrysanthemum</i>
ii.	Offset	b.	<i>Bryophyllum</i>
iii.	Bulbil	c.	Ginger
iv.	Leaf buds	d.	<i>Agave</i>
		e.	<i>Eichhornia</i>

- (A) i - c, ii - d, iii - a, iv - b
(B) i - d, ii - e, iii - b, iv - c
(C) i - c, ii - e, iii - d, iv - b
(D) i - b, ii - a, iii - e, iv - d

22. Potato is multiplied vegetatively with the help of
(A) bulb
(B) rhizome
(C) eyes (buds) on tubers
(D) offset
23. In the given options, which one cannot propagate by vegetative means? **[KCET 2018]**
(A) A marginal piece of *Bryophyllum* leaf
(B) A middle piece of sugarcane internode
(C) A piece of potato tuber with eyes
(D) A piece of ginger rhizome
24. Which of the following pairs is NOT correctly matched? **[AIPMT Re-test 2015]**

	Mode of reproduction	Example
(A)	Conidia	<i>Penicillium</i>
(B)	Offset	Water Hyacinth
(C)	Rhizome	Banana
(D)	Binary fission	<i>Sargassum</i>

25. Which one of the following statements is NOT correct? **[NEET P-II 2016]**
(A) Water Hyacinth growing in the standing water, drains oxygen from water that leads to the death of fishes.
(B) Offspring produced by the asexual reproduction are called clone.
(C) Microscopic, motile, asexual reproductive structures are called zoospores.
(D) In potato, banana and ginger, the plantlets arise from the internodes which are present in the modified stem.
26. Identify the vegetative propagule 'M' in the following diagram: **[KCET 2020]**



- (A) Bulbil (B) Offset
(C) Rhizome (D) Runner

1.3 SEXUAL REPRODUCTION

1. Sexual reproduction is characterized by
(A) fertilization of male and female gametes
(B) zygote formation
(C) embryogenesis
(D) all of these



2. **Assertion:** Offsprings produced in sexual reproduction are not identical to the parents or amongst them.
Reason: Sexual reproduction involves fusion of male and female gametes.
(A) Both assertion and reason are true and reason is the correct explanation of assertion.
(B) Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) Assertion is true but reason is false.
(D) Both assertion and reason are false.
3. The term 'clone' cannot be applied to offspring formed by sexual reproduction because **[NCERT Exemplar]**
(A) offspring do not possess exact copies of parental DNA.
(B) DNA of only one parent is copied and passed on to the offspring.
(C) Offsprings are formed at different times.
(D) DNA of parent and offspring are completely different.
4. The stage at which organism develops the capacity to reproduce is called _____ phase.
(A) maturity (B) senescence
(C) juvenile (D) ageing
5. Before all organisms can reproduce sexually, they have to reach a stage of growth and maturity. This period of growth is called
(A) juvenile phase
(B) vegetative phase
(C) reproductive phase
(D) Both (A) and (B)
6. Plants in juvenile phase do not bear flowers, because
(A) they are weak
(B) of absence of cambium
(C) they are physiologically immature
(D) they are at senescent phase
7. Which of the following flowers only once in its life-time? **[NEET (UG) 2018]**
(A) Mango (B) Jackfruit
(C) Bamboo species (D) Papaya
8. Mass flowering of _____ transforms large tracks of hilly areas in Kerala, Karnataka and Tamil Nadu into blue stretches after every 12 years.
(A) *Chara* (B) *Ophioglossum*
(C) Neelakurinji (D) Marigold
9. Which statement is INCORRECT about sexual reproduction?
(A) It is a rapid process.
(B) Offsprings show variation
(C) Meiosis takes place
(D) It is biparental process.
10. Product of sexual reproduction generally generates **[NEET 2013]**
(A) longer viability of seeds
(B) prolonged dormancy
(C) new genetic combination leading to variation
(D) large biomass
11. Identify from the following group of animals, which exhibit oestrus cycle. **[KCET 2016]**
(A) Monkey, ape, man and elephant
(B) Lion, deer, dog and cow
(C) Lion, dog, monkey and ape
(D) Cow, monkey, elephant and ape
12. Menstrual cycle is seen in
(A) Humans (B) Rats
(C) Sheep (D) All of these
13. The end of _____ phase can be considered as one of the parameters of senescence (old age).
(A) Vegetative (B) juvenile
(C) Zygotic (D) reproductive
14. Which one of the following is NOT a Pre-fertilization event?
(A) Gametogenesis (B) Gamete transfer
(C) Embryogenesis (D) Both (A) and (B)
15. Pre-fertilization events include which of the following?
I. Gametogenesis
II. Zygotic embryogenesis
III. Gamete transfer
IV. Homogametic union
V. Heterogametic union
The correct combination is: **[TS EAM CET 2019]**
(A) II, V (B) I, II, IV
(C) III, IV, V (D) I, III
16. The gametes which are similar in appearance making it impossible to categorise them into male and female gametes are called
(A) isogametes (B) heterogametes
(C) pistillate (D) staminate
17. In heterogametes, the male gamete is (i) and the female gamete is (ii).
(A) i – Pistil; ii – Antherozoid
(B) i – Antherozoid; ii – Egg
(C) i – Pistil; ii – Anther
(D) i – Ovum; ii – Antherozoid
18. In many fungi and plants, which of the following term/s is/are used to denote the unisexual condition?
(A) Monoecious (B) Homothallic
(C) Heterothallic (D) Both (A) and (B)



19. Complete the analogy.
Monoecious plant : Coconut :: Dioecious plant :

(A) Papaya (B) Date palm
(C) Cucurbits (D) Both (A) and (B)

20. In Papaya plant, flowers are
(A) hermaphrodite (B) unisexual
(C) monoecious (D) homothallic
21. When both types of reproductive organs are present in separate parents, such animals are called
(A) dioecious (B) monoecious
(C) hermaphrodite (D) both (B) and (C)
22. Choose the correct statement from amongst the following. **[NCERT Exemplar]**
(A) Dioecious (hermaphrodite) organisms are seen only in animals.
(B) Dioecious organisms are seen only in plants.
(C) Dioecious organisms are seen in both plants and animals.
(D) Dioecious organisms are seen only in vertebrates.

23. **Assertion:** In flowering plants, both male and female flowers may be present on the same individual, called 'dioecious' or present on separate individuals, called 'monoecious'.

Reason: In flowering plants, the unisexual male flower is staminate, i.e. bearing stamens, while the female is pistillate, i.e. bearing pistils.

[TS EAM CET 2019]

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

24. *Marchantia* is considered as a heterothallic plant because it is _____. **[KCET 2014]**

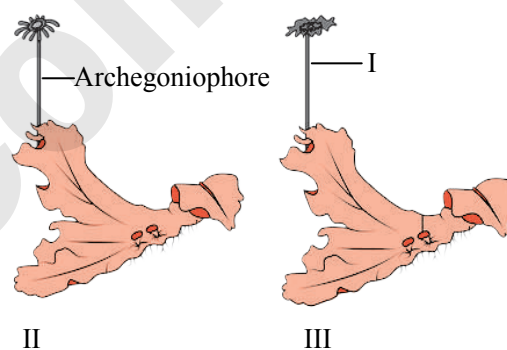
(A) Heterogametic (B) Bisexual
(C) Monoecious (D) Dioecious

25. Choose the correct matching.

	List-I		List-II
i.	Dioecious plant with archegoniophore	a.	Papaya
ii.	Monoecious plant with Oogonium	b.	<i>Chara</i>
iii.	Homothallic plants	c.	Fungi
iv.	Dioecious plant with pistillate flowers	d.	Maize
		e.	<i>Marchantia</i>

	i.	ii.	iii.	iv.
(A)	e.	b.	d.	a.
(B)	e.	c.	b.	a.
(C)	e.	d.	c.	a.
(D)	e.	a.	b.	c.

26. Monoecious plant of *Chara* shows occurrence of _____ **[NEET 2013]**
(A) antheridiophore and archegoniophore on the same plant
(B) stamen and carpel on the same plant
(C) upper antheridium and lower oogonium on the same plant
(D) upper oogonium and lower antheridium on the same plant
27. Which of the following is a unisexual animal?
(A) Cockroach (B) Earthworm
(C) Leech (D) Tapeworm
28. Identify I, II and III in the given figure of *Marchantia*.



	I	II	III
(A)	Antheridiophore	Staminode	Stamen
(B)	Female stalk	Female thallus	Male thallus
(C)	Antheridiophore	Female thallus	Male thallus
(D)	Male stalk	Male thallus	Female thallus

29. Organisms belonging to _____ have a diploid plant body.
(A) Pteridophytes (B) Gymnosperms
(C) Angiosperms (D) All of these
30. The statements given below describe certain features that are observed in the pistil of flowers.
i. Pistil may have many carpels.
ii. Each carpel may have more than one ovule.
iii. Each carpel has only one ovule.
iv. Pistils have only one carpel.
Choose the statements that are true from the options below. **[NCERT Exemplar]**
(A) i and ii (B) i and iii
(C) ii and iv (D) iii and iv



31. Read the following statements given below and choose the correct option.

- i. A diploid parent produces P gametes by Q.
 ii. A haploid parent produces R gametes by S.

	P	Q	R	S
(A)	haploid	mitosis	haploid	mitosis
(B)	diploid	meiosis	haploid	meiosis
(C)	haploid	mitosis	haploid	meiosis
(D)	haploid	meiosis	haploid	mitosis

32. Meiosis takes place in [NEET 2013]
 (A) Meiocyte (B) Conidia
 (C) Gemmule (D) Megaspore

33. Process of fusion of haploid cells is called
 (A) cell cycle (B) meiosis
 (C) mitosis (D) syngamy

34. Which one of the following organisms shows the least chromosome number in meiocyte?
 (A) Fruit fly (B) House fly
 (C) Human being (D) Butterfly

35. In potato, the gamete has 24 chromosomes. What will be the chromosome number in its meiocyte?
 (A) 12 (B) 48
 (C) 24 (D) 36

36. The male gametes of rice plant have 12 chromosomes in their nucleus. The chromosome number in the female gamete, zygote and the cells of the seedling will be, respectively

[NCERT Exemplar]

- (A) 12, 24, 12 (B) 24, 12, 12
 (C) 12, 24, 24 (D) 24, 12, 24

37. In a majority of organisms,
 (A) male gamete is motile and female gamete is non-motile.
 (B) male gamete is non-motile and female gamete is motile.
 (C) both male and female gametes are motile.
 (D) both male and female gametes are non-motile.

38. In algae, pteridophytes and bryophytes, _____ serves as the medium for gamete transfer.
 (A) insects (B) wind
 (C) birds (D) water

39. **Assertion:** The number of male gametes produced is several thousand times the number of female gametes produced.

Reason: A large number of male gametes fail to reach the female gametes during gamete transfer.

- (A) Both assertion and reason are true and reason is the correct explanation of assertion.
 (B) Both assertion and reason are true but reason is not the correct explanation of assertion.

- (C) Assertion is true but reason is false.
 (D) Both assertion and reason are false.

40. Choose the correct pair from the given below related to the study of fertilization.

P.	Aquatic algae	Large no. of gametes released into the surrounding medium	External syngamy
Q.	Moss plants	Large no. of gametes released into air	External syngamy
R.	Seed plants	Non motile male gametes reach the egg	Internal syngamy
S.	Pteridophytes	Motile male gametes reach the egg	Internal syngamy

[AP EAMCET 2019]

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

41. Read the following statements and choose the correct option.

In seed plants,

- i. P are the carriers of male gametes.
 ii. Q has the egg.
 iii. Pollen grains are produced in R.
 iv. Before fertilization can happen, pollen grains have to be transferred to the S.

	P	Q	R	S
(A)	Antherozoid	Ovary	Anthers	Ovule
(B)	Sperms	Ovum	Anthers	Ovary
(C)	Pollen grains	Ovule	Anthers	Stigma
(D)	Anthers	Ovary	Sac	Style

42. Identify the INCORRECT statement.
 (A) Self-fertilization takes place in a pea plant.
 (B) Pollen tube discharge male gametes near the stigma.
 (C) Pollen grains germinate on the stigma.
 (D) In dioecious plants, pollination facilitates transfer of pollen grains to stigma.

43. Choose the correct statement from amongst the following. [NCERT Exemplar]

- (A) Dioecious organisms are seen only in animals.
 (B) Dioecious organisms are seen only in plants.
 (C) Dioecious organisms are seen in both plants and animals.
 (D) Dioecious organisms are seen only in vertebrates.

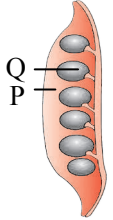


44. Which of the following situations correctly describe the similarity between an angiosperm egg and a human egg?
- Eggs of both are formed only once in a lifetime.
 - Both the angiosperm egg and human egg are stationary.
 - Both the angiosperm egg and human egg are motile.
 - Syngamy in both results in the formation of zygote.
- Choose the correct answer from the options given below. **[NCERT Exemplar]**
- (A) ii and iv (B) iv only
(C) iii and iv (D) i and iv
45. The number of chromosomes in the shoot tip cells of a maize plant is 20. The number of chromosomes in the microspore mother cells of the same plant shall be **[NCERT Exemplar]**
- (A) 20 (B) 10
(C) 40 (D) 15
46. The most vital event of sexual reproduction is
- (A) parthenogenesis (B) pollination
(C) embryogenesis (D) syngamy
47. Complete and permanent fusion of two haploid gametes to form a diploid zygote is called
- (A) chalazogamy (B) porogamy
(C) syngamy (D) misogamy
48. Given below are a few statements related to external fertilization. Choose the correct statements.
- The male and female gametes are formed and released simultaneously.
 - Only a few gametes are released into the medium.
 - Water is the medium in a majority of organisms exhibiting external fertilization.
 - Offspring formed as a result of external fertilization have better chance of survival than those formed inside an organism.
- [NCERT Exemplar]**
- (A) iii and iv (B) i and iii
(C) ii and iv (D) i and iv
49. External fertilization does NOT take place in
- (A) fishes (B) amphibians
(C) bryophytes (D) Both (A) and (B)
50. A few statements with regard to sexual reproduction are given below.
- Sexual reproduction does not always require two individuals.
 - Sexual reproduction generally involves gametic fusion.
 - Meiosis never occurs during sexual reproduction.
 - External fertilization is a rule during sexual reproduction.

Choose the correct statements from the options below. **[NCERT Exemplar]**

- (A) i and iv (B) i and ii
(C) ii and iii (D) ii and iv
51. Development of an egg into a complete individual without fertilization by a sperm is known as
- (A) pollination (B) amphimixis
(C) parthenogenesis (D) syngamy
52. Parthenogenesis occurs in
- (A) turkey (B) honeybees
(C) rotifers (D) all of these
53. Which of the following is a post-fertilization event in flowering plants? **[NCERT Exemplar]**
- (A) Transfer of pollen grains
(B) Embryo development
(C) Formation of flower
(D) Formation of pollen grains
54. Which among these is NOT a post fertilization event? **[KCET 2016]**
- (A) Fruit formation (B) Gametogenesis
(C) Seed formation (D) Embryogenesis
55. In organisms having haplontic life cycle, zygote divides by (i) to form (ii) spores that grow into (iii) individuals.
- (A) i – meiosis; ii – haploid; iii – haploid
(B) i – mitosis; ii – haploid; iii – haploid
(C) i – meiosis; ii – diploid; iii – haploid
(D) i – meiosis; ii – haploid; iii – diploid
56. Every sexually reproducing organism begins life as a
- (A) embryo (B) zygote
(C) spore (D) gamete
57. During embryogenesis, zygote undergoes
- (A) Mitosis
(B) Cell differentiation
(C) Meiosis
(D) Both (A) and (B)
58. Which of the following are oviparous animals?
- (A) Human beings (B) Mammals
(C) Reptiles (D) Both (A) and (B)
59. With reference to viviparous animals, find the CORRECT statement.
- (A) Development of zygote takes place outside the female's body.
(B) They lay eggs.
(C) Fertilized eggs are covered by hard calcareous shell.
(D) They give birth to young ones.



60. **Assertion:** In viviparous organisms, the chances of survival of young ones is greater.
Reason: Viviparous organisms show proper embryonic care and protection.
 (A) Both assertion and reason are true and reason is the correct explanation of assertion.
 (B) Both assertion and reason are true but reason is not the correct explanation of assertion.
 (C) Assertion is true but reason is false.
 (D) Both assertion and reason are false.
61. Which of the following parts of the flower wither and fall off after fertilization?
 (A) Stamens (B) Petals
 (C) Pistil (D) Both (A) and (B)
62. In the diagram given below, identify P and Q and select the correct option.
 (A) P – Ovule; Q – Seeds
 (B) P – Pericarp; Q – Seeds
 (C) P – Sepals; Q – Seeds
 (D) P – Ovary; Q – Fruit
- 
63. Select the CORRECT sequence of events.
[NEET Odisha 2019]
 (A) Gametogenesis → Gamete transfer → Syngamy → Zygote → Cell differentiation → Cell division (Cleavage) → Organogenesis
 (B) Gametogenesis → Gamete transfer → Syngamy → Zygote → Cell division (Cleavage) → Cell differentiation → Organogenesis
 (C) Gametogenesis → Gamete transfer → Syngamy → Zygote → Cell division → (Cleavage) → Organogenesis → Cell differentiation
 (D) Gametogenesis → Syngamy → Gamete transfer → Zygote → Cell division (Cleavage) → Cell differentiation → Organogenesis
64. A few statements describing certain features of reproduction are given below.
 i. Gametic fusion takes place.
 ii. Transfer of genetic material takes place.
 iii. Reduction division takes place.

- iv. Progeny have some resemblance with parents. Select the options that are true for both asexual and sexual reproduction from the options given below. **[NCERT Exemplar]**
 (A) i and ii (B) ii and iii
 (C) ii and iv (D) i and iii
65. Which of the following statements, support the view that elaborate sexual reproductive process appeared much later in the organic evolution?
 i. Lower groups of organisms have simpler body design.
 ii. Asexual reproduction is common in lower groups.
 iii. Asexual reproduction is common in higher groups of organisms.
 iv. The high incidence of sexual reproduction in angiosperms and vertebrates.
 Choose the correct answer from the options given below. **[NCERT Exemplar]**
 (A) i, ii and iii (B) i, iii and iv
 (C) i, ii and iv (D) ii, iii and iv
66. Match Column I with Column II and select the correct option.

	Column I		Column II
i.	Gemmule	a.	<i>Hydra</i>
ii.	Conidia	b.	Parthenogenesis
iii.	Budding	c.	<i>Penicillium</i>
iv.	Syngamy	d.	<i>Spongilla</i>
		e.	Sexual reproduction

- (A) i – d, ii – a, iii – e, iv – c
 (B) i – d, ii – c, iii – a, iv – e
 (C) i – a, ii – d, iii – e, iv – b
 (D) i – e, ii – d, iii – a, iv – b
67. Offspring formed by sexual reproduction exhibit more variation than those formed by asexual reproduction because **[NCERT Exemplar]**
 (A) sexual reproduction is a lengthy process.
 (B) gametes of parents have qualitatively different genetic composition.
 (C) genetic material comes from parents of two different species.
 (D) greater amount of DNA is involved in sexual reproduction.



Answers to MCQs

1.0 : 1. (B) 2. (A) 3. (B)

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



1.2 :	1. (A)	2. (A)	3. (D)	4. (A)	5. (D)	6. (A)	7. (C)	8. (B)	9. (A)	10. (A)
	11. (C)	12. (B)	13. (B)	14. (C)	15. (A)	16. (A)	17. (A)	18. (B)	19. (D)	20. (B)
	21. (C)	22. (C)	23. (B)	24. (D)	25. (D)	26. (B)				
1.3 :	1. (D)	2. (A)	3. (A)	4. (C)	5. (D)	6. (C)	7. (C)	8. (C)	9. (A)	10. (C)
	11. (B)	12. (A)	13. (D)	14. (C)	15. (D)	16. (A)	17. (B)	18. (C)	19. (D)	20. (B)
	21. (A)	22. (C)	23. (D)	24. (D)	25. (A)	26. (D)	27. (A)	28. (C)	29. (D)	30. (A)
	31. (D)	32. (A)	33. (D)	34. (A)	35. (B)	36. (C)	37. (A)	38. (D)	39. (A)	40. (C)
	41. (C)	42. (B)	43. (C)	44. (A)	45. (A)	46. (D)	47. (C)	48. (B)	49. (C)	50. (B)
	51. (C)	52. (D)	53. (B)	54. (B)	55. (A)	56. (B)	57. (D)	58. (C)	59. (D)	60. (A)
	61. (D)	62. (B)	63. (B)	64. (C)	65. (C)	66. (B)	67. (B)			



Hints to MCQs

1.1 ASEYUAL REPRODUCTION

1. Asexual reproduction is also called apomixis, whereas amphimixis means sexual reproduction.

6.



Thinking Hatke - Q. 6

Asexual reproduction is faster than sexual reproduction. Statement (i) given in the question is incorrect therefore options (A), (B) and (C) representing (i) as correct statement cannot be the answer. Hence, the correct answer is option (D).

15. In *Amoeba*, sporulation occurs when favourable conditions return. Encystation or cyst formation occurs during unfavourable conditions. Thus cyst formation is not a part of sporulation.
24. Gemmules are endogenous buds formed on inner side of parental body.
26. *Sycon* is a sponge in which asexual reproduction involves formation of gemmule.
27. Fragmentation is an asexual mode of reproduction in which the body of some organisms break into distinct pieces (fragments). Each fragment grows into an adult capable of producing an offspring.
28. Zoospores are asexual reproductive structures.
29. Hydra- Budding, Amoeba- Binary fission, Sponges - Gemmule formation
31. Conidia are asexual spores formed by members of class Ascomycetes.

1.2 VEGETATIVE PROPAGATION IN PLANTS

3. Conidia are an asexual reproductive structure, while others are vegetative propagules in plants.
6. **Offset** is a part of branch or stem by which a plant can reproduce asexually and a new plant is formed.

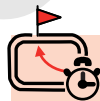
7. Water hyacinth or "Terror of Bengal" is an aquatic plant which is one of the most invading weeds that grows in the standing water. It takes oxygen from the water which causes death of fishes. Thus, also called as "blue devil".

9. *Eichhornia* or water hyacinth is an exotic species.

12. Meristematic cells are capable of dividing into new cells which can differentiate and give rise to permanent tissues.

14. Foliar (on the leaf) adventitious buds are formed at place other than nodes.

20.



Thinking Hatke - Q. 20

In the given question, it is easy to identify that *Bryophyllum* gives rise to new plant by leaf buds. Therefore answer for (iii) is (a). This combination is observed in only option (B). The probability of having answer from other options is eliminated and the correct answer is (B).

23. For vegetative propagation of sugarcane, it requires atleast the presence of one node. A middle piece of a sugarcane internode can therefore not be used for propagation by vegetative means.

24. Binary fission occurs in unicellular organisms, whereas *Sargassum* is multicellular brown algae.

25. Plantlets always arise from nodes of stem or modified stem.

1.3 SEXUAL REPRODUCTION

2. Fusion of male and female gametes during sexual reproduction results in formation of zygote which carries characters of both the parents. This causes variation, due to which Offsprings produced in sexual reproduction are not identical to the parents or amongst them.



7. Bamboo species are monocarpic (flower generally only once in its life-time after 50- 100 years).
Jackfruit, papaya and mango are polycarpic (produce flowers and fruits many times in their life-time).
10. Sexual reproduction involves mixing of gametes of parents, this result in genetic combination which results into variation.
12. Oestrus cycle is seen in rats and sheep.
14. Embryogenesis is a Post-fertilization event.
18. Monoecious and Homothallic are used to denote bisexual condition.
21. When reproductive organs are present in same parent, such animals are called monoecious or bisexual or hermaphrodite.
23. Refer **Smart tip - 1**
In flowering plants, both male and female flowers may be present on the same individual, called 'monoecious' or present on separate individuals, called 'dioecious'.
24. Refer **Smart tip - 1**
Marchantia is dioecious where the male plant bears Antheridiophore, female plant bears Archegoniophore.
27. Cockroach is a unisexual animal, while others are bisexual.
30. A pistil may have one or many carpels (monocarpellary, bicarpellary, etc.) and each carpel may have more than one ovules.
32. The cells in which meiosis takes place are called meiocytes.
- 34.
- | Organism | Chromosome Number in Meiocyte (2n) |
|-------------|------------------------------------|
| Fruit fly | 8 |
| House fly | 12 |
| Human being | 46 |
| Butterfly | 380 |
35. Gamete (n) = 24
Meiocyte (2n) = $2 \times 24 = 48$
36. Male gamete (n) $\rightarrow 12$
Female gamete (n) $\rightarrow 12$
Zygote (2n) = $2 \times 12 = 24$
Seedling (2n) = $2 \times 12 = 24$
42. Pollen tube discharge male gametes near the egg.
45. Shoot tip cells and microspore mother cells both are diploid in maize plant.
49. Internal fertilization is seen in Bryophytes.
50. During sexual reproduction, meiosis occurs for the production of haploid gametes. External fertilization is not a rule during sexual reproduction, it can occur internally also.
58. Humans and mammals are viviparous.
64. Reproduction is a biological process in which an organism produces young ones (offspring) similar to itself. In both sexual and asexual reproduction, transfer of genetic material is involved and offsprings have some resemblance with parents.

Topic Test

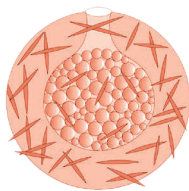
1. A mature seed contains _____, which is the progenitor of the next generation.
(A) zygote (B) ovary
(C) embryo (D) ovule
2. Identify the ODD one out.
(A) Syngamy (B) Gametogenesis
(C) Zygote (D) Zoospores
3. The diagram of a monoecious plant *Chara* is given below. Identify (1) and (2).
-
- (A) 1 – Antheridium; 2 – Oogonium
(B) 1 – Oogonium; 2 – Antheridium
(C) 1 – Carpel; 2 – Stamen
(D) 1– Antheridiophore; 2 –Archegoniophore
4. Which one of the following is NOT a vegetative propagule?
(A) Gemmule
(B) Rhizome
(C) Offset
(D) Runner
5. *Strobilanthes kunthiana* flowers once in _____ years.
(A) 6
(B) 12
(C) 35
(D) 50-100



6. Match Column I (Name of Organism) and Column II (Life span) and choose the correct option.

	Column I (Name of organism)		Column II (Life span)
i.	Crow	a.	1-2 weeks
ii.	Butterfly	b.	100-150 years
iii.	Parrot	c.	15 years
iv.	Tortoise	d.	140 years

- (A) i – c, ii – b, iii – a, iv – d
 (B) i – c, ii – a, iii – b, iv – d
 (C) i – c, ii – a, iii – d, iv – b
 (D) i – c, ii – d, iii – a, iv – b
7. Identify the INCORRECT statement.
 (A) External fertilization is seen in fishes and amphibians.
 (B) Syngamy results in the formation of diploid zygote.
 (C) Reptiles are oviparous animals.
 (D) In flowering plants, the unisexual male flower is pistillate.
8. Identify the asexual reproductive structure shown in the diagram given below.

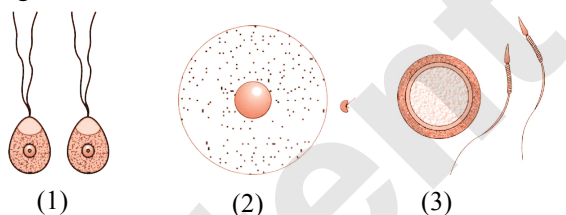


- (A) Gemmule (B) Buds
 (C) Zoospores (D) Conidia
9. Complete the analogy.
 Rhizome : Ginger :: _____ : Water Hyacinth
 (A) Bulbil (B) Offset
 (C) Adventitious buds (D) Eyes
10. In an apple, the chromosome number in meiocyte is 34. What will be the chromosome number in its gamete?
 (A) 34 (B) 20
 (C) 71 (D) 17
11. Identify the INCORRECT match.
 (A) Fishes – External fertilization
 (B) Mammals – Internal fertilization
 (C) Cockroach – Hermaphrodite
 (D) Honeybees – Parthenogenesis
12. Which one of the following is NOT a vegetative propagule?
 (A) Bulb (B) Zoospore
 (C) Offset (D) Tuber

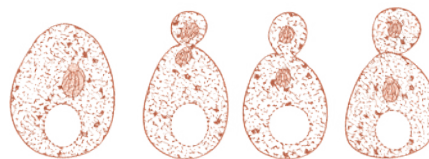
13. Choose the correct option which gives the correct sequence of arrangement of the given organisms in descending order of the chromosome in meiocyte?

- (A) Dog > Butterfly > Fruit fly > Housefly
 (B) Butterfly > Dog > Housefly > Fruit fly
 (C) Housefly > Dog > Butterfly > Fruit fly
 (D) Butterfly > Housefly > Dog > Fruit fly

14. Identify the types of gametes in the diagram given below.



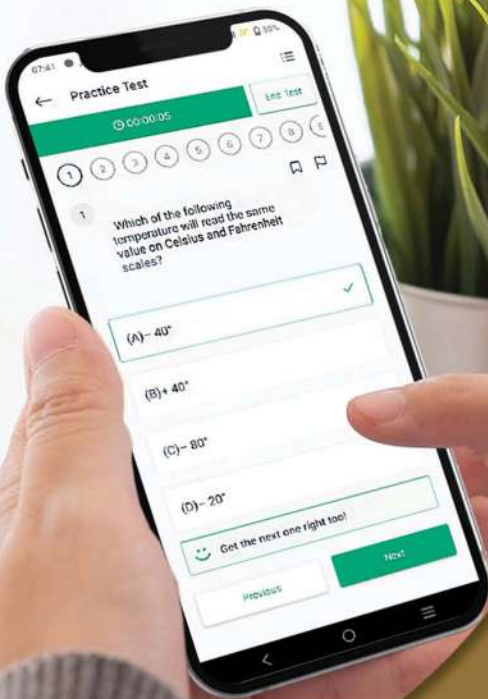
- (A) 1 – Isogametes; 2 – Heterogametes; 3 – Heterogametes
 (B) 1 – Heterogametes; 2 – Isogametes; 3 – Isogametes
 (C) 1 – Homogametes; 2 – Isogametes; 3 – Heterogametes
 (D) 1 – Isogametes; 2 – Homogametes; 3 – Heterogametes
15. **Assertion:** Multicellular organisms reproduce asexually by cell division or binary fission of the parent cell.
Reason: Gametogenesis is a post-fertilization event.
 (A) Both assertion and reason are true and reason is the correct explanation of assertion.
 (B) Both assertion and reason are true but reason is not the correct explanation of assertion.
 (C) Assertion is true but reason is false.
 (D) Both assertion and reason are false.
16. Identify the type of asexual reproduction shown in the diagram given below.



- (A) Gemmule formation
 (B) Binary fission
 (C) Budding
 (D) Zoospore formation

Answers

1. (C) 2. (D) 3. (B) 4. (A)
 5. (B) 6. (C) 7. (D) 8. (A)
 9. (B) 10. (D) 11. (C) 12. (B)
 13. (B) 14. (A) 15. (D) 16. (C)



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