

AIPMT

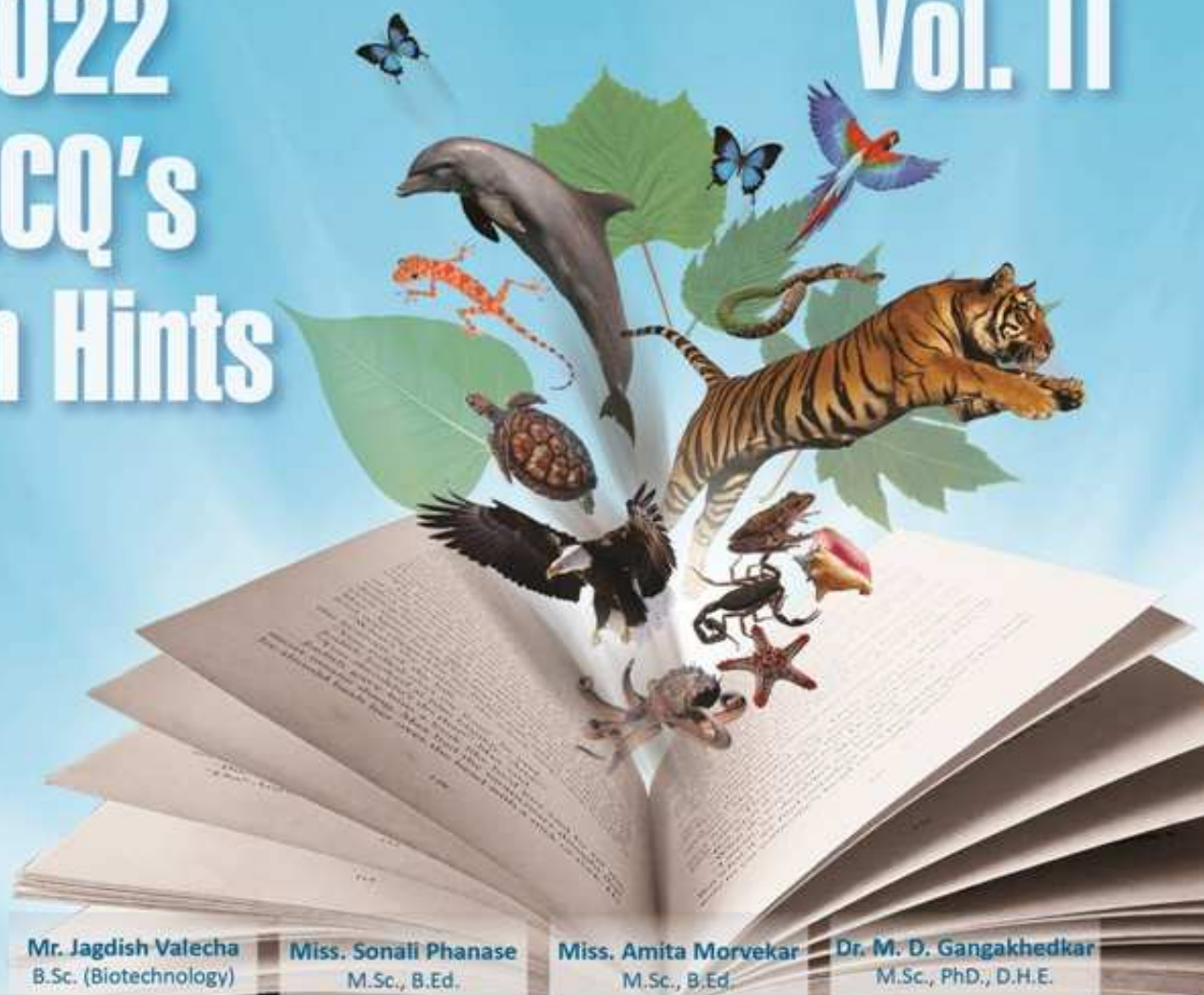


Biology

For all Medical Entrance Examinations held across India.

**4022
MCQ's
with Hints**

Vol. II



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For all Medical Entrance Examinations held across India.

AIPMT Biology

Vol. II

Salient Features

- Exhaustive coverage of MCQs subtopic wise.
- Precise theory for every topic.
- Neat, labelled and authentic diagrams.
- In all '4022' MCQs including questions from various competitive exams
- Hints provided wherever relevant.
- Additional information relevant to the concepts.
- Simple and lucid language.
- Self evaluative in nature.

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Preface

Biology is the study of living beings. Life abounds all around us and the progress in this subject has directly resulted in a better, healthier lifestyle for us. We should study and understand Biology to understand and appreciate the mystery called 'Life' at a philosophical level and to score good marks at a rather practical level.

Target's "Biology (Vol. II)" has been compiled according to the notified syllabus for all Medical Entrance Examinations which in turn has been framed after reviewing various state syllabi as well as the ones prepared by CBSE, NCERT and COBSE.

Target's "Biology (Vol. II)" comprises of exhaustive notes as well as a wide range of 'Multiple Choice Questions'. The MCQs in each chapter are adequately filled with distracters to assess the student's conceptual understanding of the subject. The level of difficulty associated with these MCQs is on lines with that of various competitive examinations like CBSE, AIIMS, CPMT, PMT, AFMC, JIPMER, etc. This would help the students to test their knowledge on a broader perspective.

Each chapter is provided with an all exhaustive relevant theory presented in a simple and lucid manner that will help the students to grasp the subject in full measure.

This edition of Target's "Biology (Vol. II)" is created with an absolute focus on theory as well as important tricks and fundamentals to solve tricky questions. A number of new and useful questions have been added.

Lastly, we would like to be grateful to the authors of this book for their care and persistent efforts in bringing out this book. Without their faith and support this book would have never reached the students in time.

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

Best of luck to all the aspirants!

Yours faithfully
Publisher

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REPRODUCTION IN ORGANISMS

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 organism includes four stages:

- i. Juvenility – It is the stage when organism develops capacity to reproduce.
- ii. Maturity – In this stage reproduction starts.
- iii. Ageing and senescence – Progressive deterioration of body of living organism is called ageing. The terminal irreversible stage of ageing is senescence.
- iv. Death – In death, there is permanent cessation of all vital activities.

1.1 Modes of reproduction

There are mainly two types of reproduction:

- i. Sexual reproduction (Amphimixis, gametic)
- ii. Asexual reproduction (Apomixis, non – gametic)

i. Sexual reproduction (Amphimixis)

Production of offsprings by formation and fusion of gametes is called sexual reproduction.

Characteristics:

- a. Two parents are involved.
- b. Gametes are formed.
- c. Fertilization takes place.
- d. Organisms formed by sexual reproduction show characters of both the parents.
- e. As meiosis takes place, offsprings show variations.
- f. It is a slow process.
- g. Sexual reproduction takes place in higher plants and animals. It is also found in some protists eg. *Monocystis*, *Plasmodium*, *Paramoecium*.

Types of Sexual reproduction:

a. Syngamy:

It involves the complete and permanent fusion of two haploid gametes to form a diploid zygote. When both types of reproductive organs (gonad) are present in separate parents, then they are called unisexual or dioecious. eg. Papaya, Mulberry, etc.

When reproductive organs are present in same parent, then the parent is called bisexual or monoecious or hermaphrodite. eg. *Chara*, Maize, etc.

It may be Endogamy (self fertilization), Exogamy (cross fertilization), Anisogamy or Heterogamy, Isogamy.

Endogamy: Gametes are derived from same parent. eg. *Taenia solium*.

Exogamy: Gametes are derived from different parents. eg. All vertebrates.

Anisogamy or Heterogamy: Fusion of gametes which are morphologically and physiologically different from each other. eg. mammals, frog and fish.

Isogamy: Fusion of similar gametes eg. *Monocystis*.

b. Conjugation:

The temporary pairing of parents for exchange of genetic material is called conjugation. eg. *Paramoecium*.

ii. Asexual reproduction (Apomixis)

Production of offsprings by a single parent without the formation and fusion of gametes is called asexual reproduction.

Characteristics:

- Single parent is involved.
- Gametes are not formed.
- Fertilization does not take place.
- Only mitosis takes place.
- Organisms reproduced through asexual reproduction are genetically identical to their parent.
- Multiplication is rapid.
- As new organisms are produced from the somatic part of parental organism, it is also called somatogenic reproduction.
- Asexual reproduction takes place in lower organisms like monera, protists, sponges, coelenterates and in some plants. It does not take place in vertebrates and higher invertebrates.

1.2 Modes of asexual reproduction

Asexual reproduction takes place by following modes:

- | | | | |
|------------------|------------------|----------------------|------------------------|
| i. Fission | ii. Sporulation | iii. Budding | iv. Plasmotomy |
| v. Fragmentation | vi. Regeneration | vii. Spore formation | viii. Gemmae formation |

i. Fission:

Parent body divides into two or more daughter individuals.

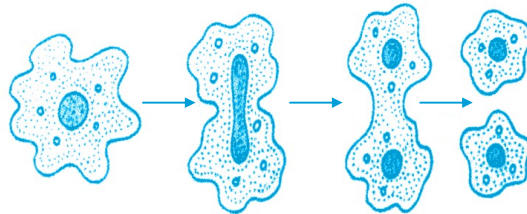
Modes of fission:**a. Binary fission**

Division of parental body into two nearly equal daughter individuals during favourable condition.

Modes of binary fission:**1. Simple or irregular fission:**

Cytokinesis takes place through any direction, but it is always perpendicular to that of karyokinesis.

eg. *Amoeba*

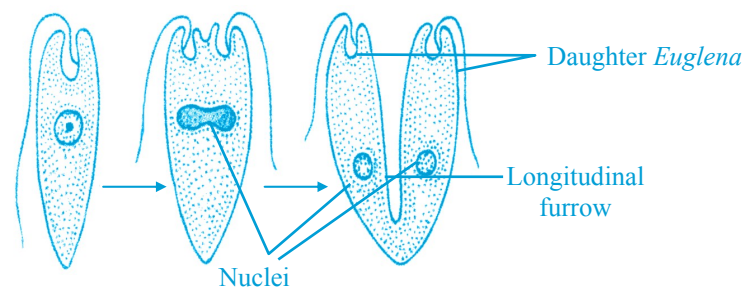


Simple binary fission in *Amoeba*

2. Longitudinal fission:

Cytokinesis takes place along longitudinal axis.

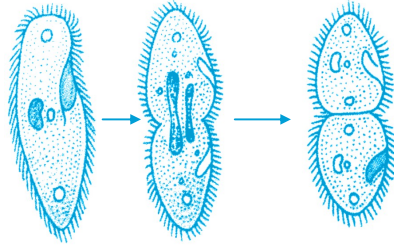
eg. *Euglena*



Longitudinal binary fission in *Euglena*

3. Transverse fission:

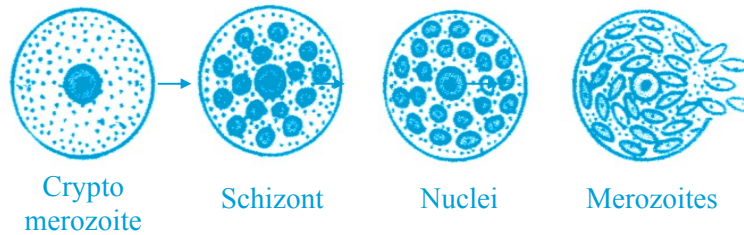
Cytokinesis takes place along transverse axis.
eg. *Paramecium*



Transverse binary fission in *Paramecium*

b. Multiple fission

The parental body divides into many daughter cells simultaneously during unfavourable conditions to increase the chances of survival of daughter cells.
eg. *Plasmodium*, *Amoeba*, *Monocystis*



Multiple fission of malarial parasite in RBC of man

ii. Sporulation:

During unfavourable condition, *Amoeba* forms a hard covering or cyst around itself, it is known as encystation.

During favourable condition, the encysted *Amoeba* divides by multiple fission and produces many minute amoebae. Cyst wall burst out and spores are liberated. This phenomenon is termed as sporulation.

iii. Budding:

A small projection or bud is formed on parent body.

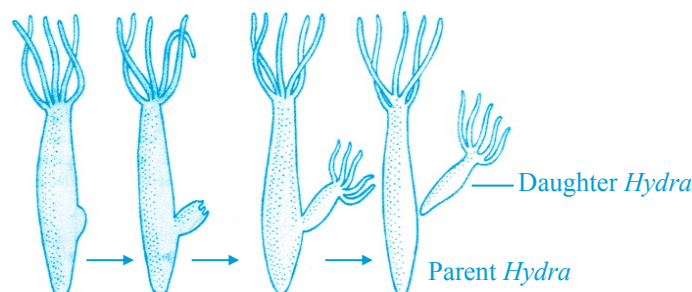
New individual is formed by mitosis.

It is a common method of asexual reproduction observed in some protozoans and lower animals such as sponges (*Scypha*), coelenterates (*Hydra*), annelids (*Chaetopterus*) and tunicates (*Salpa*)

There are two types of budding.

a. Exogenous budding

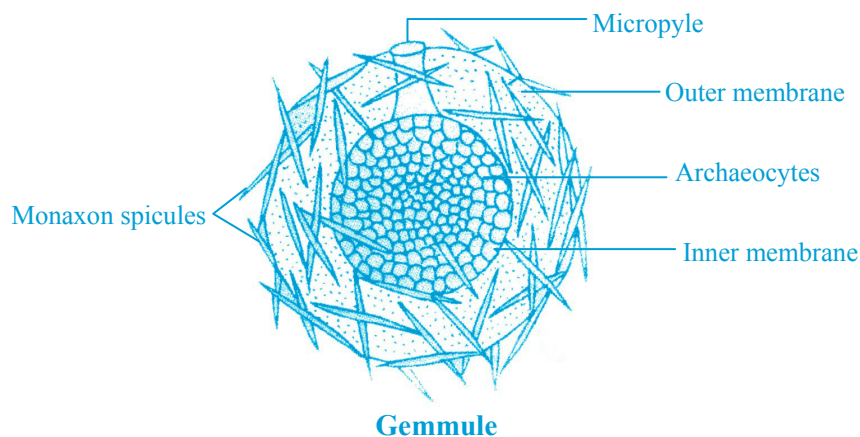
In exogenous budding, bud is formed on the outer surface of parental body. It is observed in *Scypha* and *Hydra*.



External budding in *Hydra*

b. Endogenous budding :

In endogenous budding, buds called gemmules are formed on the inner surface of parental body. It is observed in *Spongilla*. Each gemmule of *Spongilla* consists of mass of undifferentiated cells called archaeocytes. Gemmule helps in perennation and dispersal.

**iv. Plasmotomy:**

Multinucleate protozoan divides into several small, multinucleate daughters without nuclear division. It occurs in *Opalina* and *Pelomyxa*.

v. Fragmentation:

Parent body breaks into two or more fragments. Each fragment develops into an organism. eg. algae, fungi, bryophytes, pteridophytes.

vi. Regeneration:

It was first observed in *Hydra* by Abraham Trembley.

Regeneration means formation of the whole body of organism from a small fragment or the replacement of lost part.

eg. *Planaria*, *Hydra*.

Two types;

- a. Reparative regeneration – damaged tissues can be regenerated
- b. Restorative regeneration – several body parts can be redeveloped

vii. Spore formation:

Spores are minute, single celled structures. Spore formation takes place in algae, fungi, monera and protista. Types of spores.

- a. Zoospores: Flagellated motile spores produced by algae. eg. *Chlamydomonas*.
- b. Conidia: Non motile spores which are produced exogenously on special hyphal branches called conidiophore. eg. *Penicillium*
- c. Chlamydospores: Thick walled spores capable of withstanding long unfavourable conditions eg. *Rhizopus*.
- d. Sporangiospores: Non motile spores produced within sporangia. eg. *Mucor*
- e. Oidia: In fungi, the hyphae break up into small fragments known as oidia.

viii. Gemmae formation:

These are specialised structures which are green, multicellular, asexual buds which develop in small receptacles called gemma cups located on thalli. Gemmae formation is found in liverworts. eg. *Marchantia*

1.3 Vegetative propagation in plants**Vegetative propagation:**

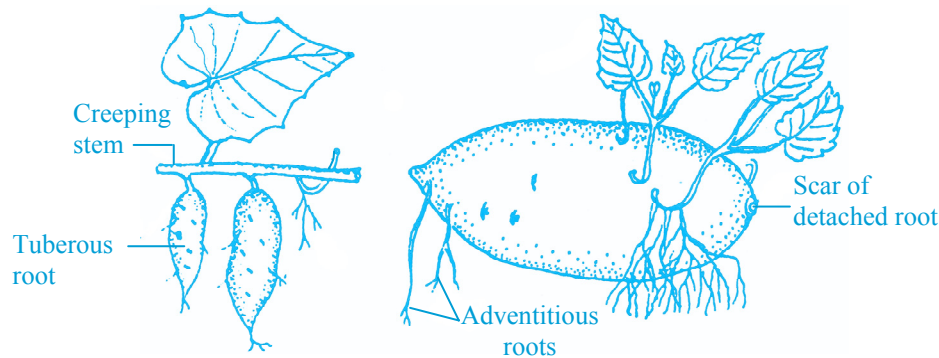
It is a process of multiplication in which a portion of fragment of plant body functions as propagule and develops into new individual. Two types of vegetative propagation:

- i. Natural method
- ii. Artificial method

i. Natural methods

a. Root Tuber: eg. Sweet Potato (*Ipomoea batatas*)

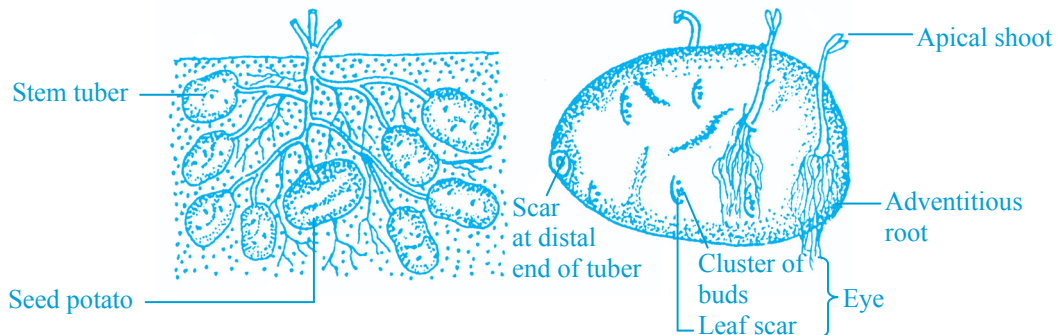
1. It is a modification of root for vegetative reproduction.
2. These roots develop from the nodes of stem.
3. They become tuberous and fleshy for storage of food.
4. In addition to the storage of food, these roots also develop adventitious buds on their surface which sprout under favourable conditions to produce 'leafy shoot' and adventitious roots.
5. Under suitable environmental conditions, these leafy shoots separate and develop into new plants.
6. The tuberous roots are adventitious and when produce singly are called as simple tuberous roots eg. sweet potato and when produce in groups or cluster are called as fasciculated tuberous roots eg. *Asparagus*, *Dahlia*.
7. The other examples of tuberous roots are *Dalbergia*, *Guava*, *Murraya*, *Albizia*.



Root tuber of sweet potato

b. Stem tuber: eg. Potato (*Solanum tuberosum*)

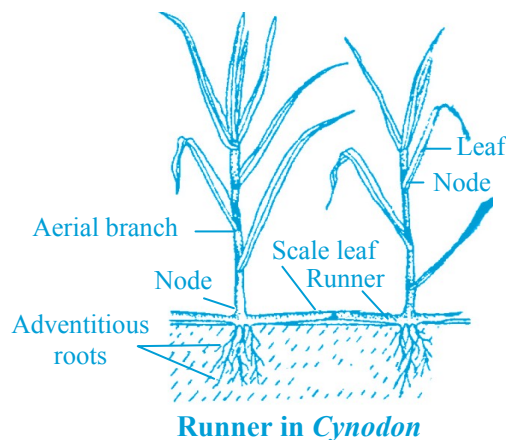
1. Stem tuber is a modified stem for vegetative reproduction.
2. In case of potato, some lateral branches are produced from under ground part of stem which grow down in the soil.
3. The tip of these branches store food and hence are swollen.
4. These tubers show nodes, internodes, scale leaves and axillary buds.
5. A stem tuber has many notches on its surface called 'eye'.
6. The eyes that are seen on the surface of the tuber represent nodes.
7. Each 'eye' is actually a node and is made up of one or more axillary buds subtended by a leaf scar.
8. Under favourable conditions, axillary buds develop into new plants.
9. Rhizome reproduce by vegetative reproduction eg. *Banana*, *Ginger*, *Turmeric*
10. Corm, an underground stem reproduce vegetatively eg. *Colocasia*, *Crocus*.
11. A bulb bears number of buds eg. *Garlic*, *Onion*.
12. Suckers have aerial shoots at the base which help in vegetative propagation. eg. *Chrysanthemum*



Stem tuber of potato

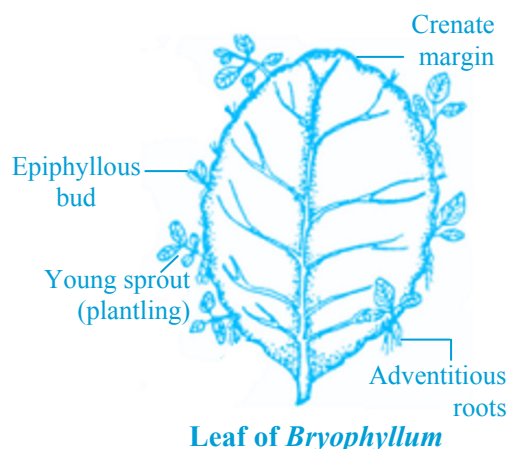
c. Vegetative propagation by runner:

1. Runner is a slender, prostrate, subaerial branch with short or long internode and creeps horizontally on the soil.
2. Runner develops from the axillary bud in the axil of the lowest leaf.
3. After creeping some distance, away from the parent plant, it produces shoot from upper side and roots from lower side of the nodes.
4. Many runners are produced by the parent plant which may get detached from parent plant to develop new plants.
eg. *Cynodon*



d. Vegetative propagation by leaf :

1. In some plants leaves also take part in vegetative reproduction.
2. In *Bryophyllum*, leaves are fleshy and notched along the margin.
3. Adventitious buds or epiphyllous buds are developed on their leaves. These buds usually remain dormant, till the leaf is attached with plants.
4. These plantlets fall off from parent plant to continue their growth in the soil.
eg. *Bryophyllum*, *Kalanchoe*, *Begonia*, *Adiantum*, *Saintpaulia*



e. Bulbil:

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.

ii. Artificial methods

Artificial methods of vegetative propagation or Horticultural methods:

These are the methods used by man in which a portion of plant body is separated from the parent plant mechanically (by special technique) to propagate new plants.

This method is used by horticulturists for quick production and also for combining good qualities of two different varieties.

a. Cutting:

It is defined as a process by which a plant is produced by cutting a vegetative portion from the parent plant and growing it in a suitable medium under favourable condition.

Some of the common cuttings are :

1. Root cutting : eg. Apple, Tamarind, Lemon
2. Stem cutting : eg. Sugarcane, Rose, Grapes etc.
3. Leaf cutting : eg. *Peperomia*, *Bryophyllum*, *Sansevieria*.

Special growth hormones like IAA (Indole acetic acid), IBA (Indole butyric acid), NAA (Naphthalene acetic acid) are applied in dilute quantities to the lower end of stem cuttings. Such application of hormones leads to the quick formation of adventitious roots.

b. Grafting:

Grafting is an art of joining parts of two plants in such a manner that they unite and continue their growth as one plant (composite plant).

1. This is the characteristic feature of plants which have cambium for secondary growth. eg. Dicotyledons.
2. As monocots do not have inter or intrafascicular cambium and do not show secondary growth, grafting is not possible in monocots.
3. Part of the rooted plant on which grafting is done is called **stock** (root stock).
4. The part which is inserted on stock is called **scion** (graft).
5. The stock and scion should be mutually compatible.
6. The success of grafting depends upon matching of cambium between stock and scion which results in organic connection between them.
7. The stock provides root while scion becomes shoot of new plant.
8. The stock usually has strong root system while scion has strong desired characters of flowers and fruits.
9. All shoots sprouting from the stock should be removed otherwise they will not permit the scion to grow.
10. The stock and scion are given slanting cut.
11. Cut surface should be held together tightly by wrapping, nailing etc.
12. Common methods of grafting are Tongue (whip) grafting, Wedge grafting and Crown grafting, etc.

Types of grafting:**1. Tongue grafting (Whip):**

- i. In this, stock and scion are of same diameter.
- ii. The stock and scion are given oblique cuts followed by a notch to get a tongue like structure in each.

2. Wedge grafting:

- i. In this, stock and scion are of same diameter.
- ii. V – shaped notch is given in the stock and scion is cut like a wedge.

3. Crown grafting:

- i. In this, diameter of stock is many times more than scion.
- ii. In this case many scions are grafted on to a single stock.

4. Lateral grafting:

- i. Only one scion having wedge – shaped cut is inserted in a stock in a lateral slit.
- ii. Only one scion or one branch is inserted in a stock.

c. Budding:

1. Budding is a type of grafting in which bud is a scion.
2. In this method instead of a branch, a single bud along with a piece of bark is used as a scion.
3. In the stock, 'T' or 'I' shaped incision is made upto the bark.
4. A single bud with little bark is then inserted in the slit of the stock.
5. Both are tied by polythene or by plantain fibre.
6. Bud germinates after 3 weeks and a new plant is produced.
eg. Rose, Mulberry, Rubber.

d. Layering:

In layering, stem branch is chosen for propagation.

It is then pegged out around the parent plant till it produces adventitious roots.

This method is used for plants which produce runners. eg. Strawberry, *Clematis*.

e. Micropropagation:

Micropropagation refers to a technique to obtain new plants by cultivating cells or tissue in culture medium.

Significance of vegetative propagation:

- a. Vegetative propagation results into genetically identical offspring (clone) and preserve a stock of desired variety
- b. It is an easier, less expensive and a rapid method of desired variety.
- c. Disease free plants can be developed in a short time by tissue culture technique.

Additional Information**Parthenogenesis:**

Development of an egg into a complete individual without fertilization is known parthenogenesis. It is found in many non-vertebrates such as aphids, bees and crustaceans.

Parthenogenesis is of two types:

1. Natural
2. Artificial

1. Natural parthenogenesis:

In this, parthenogenesis is a regular and characteristic feature of life cycle. eg. honey bee. It is of 3 types.

- i. **Arrhenotoky:** In this, only males are produced parthenogenetically. eg. honey bee, wasp, mite.
- ii. **Thelytoky:** In this, only females are parthenogenetically produced. eg. *Lacerta saxicola armeniaca* (belongs to lizard family in which absence of male lizard is seen).
- iii. **Amphitoky:** In this, parthenogenetic eggs may develop into any sex.

2. Artificial parthenogenesis:

In this, eggs of some sexually reproducing animals can be induced by artificial means to develop parthenogenetically.

Multiple Choice Questions**1.0 Introduction**

1. The ability of living organism to give rise to the young ones of its own kind is called
 - (A) segregation
 - (B) reproduction
 - (C) perpetuation
 - (D) sedimentation
2. Reproduction helps in
 - (A) continuation of species
 - (B) ageing of species
 - (C) decline of species
 - (D) metamorphosis of species
3. The period from birth to the natural death of an organism is called as
 - (A) regeneration
 - (B) life span
 - (C) metamorphosis
 - (D) reproduction
4. The stage at which organism develops the capacity to reproduce is called
 - (A) maturity
 - (B) senescence
 - (C) juvenility
 - (D) ageing
5. Progressive deterioration of body of an organism is called
 - (A) senescence
 - (B) juvenility
 - (C) maturity
 - (D) ageing

1.1 Modes of reproduction

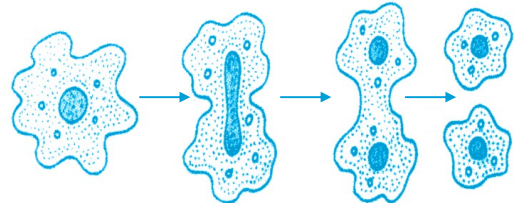
6. Production of offsprings by a single parent without fusion of gametes is called
 - (A) asexual reproduction
 - (B) sexual reproduction
 - (C) amphimixis
 - (D) all of the above
7. Amphimixis means
 - (A) sexual reproduction
 - (B) vegetative propagation
 - (C) parthenogenesis
 - (D) binary fission
8. 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 genetical 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

9. Asexual reproduction involves
 - (A) only meiosis
 - (B) only mitosis
 - (C) both mitosis and meiosis
 - (D) either mitosis or meiosis
10. Somatogenic reproduction is nothing but
 - (A) asexual reproduction
 - (B) sexual reproduction
 - (C) parthenogenesis
 - (D) none of these
11. Asexual reproduction takes place in
 - (A) monera
 - (B) protists
 - (C) sponges
 - (D) all of these
12. Which statement is incorrect about sexual reproduction?
 - (A) It is a rapid process
 - (B) Offspring shows variation
 - (C) Meiosis takes place
 - (D) It is biparental
13. 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
14. Complete and permanent fusion of two haploid gametes to form a diploid zygote is called
 - (A) chalazogamy
 - (B) porogamy
 - (C) syngamy
 - (D) mesogamy
15. 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)
16. Temporary pairing of parents involving exchange of pronuclei is called
 - (A) transformation
 - (B) conjugation
 - (C) transduction
 - (D) translocation

1.2 Modes of asexual reproduction

17. A type of asexual reproduction in an unicellular organism 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

18. As a result of binary fission, number of individuals produced by one fission is
 - (A) two
 - (B) three
 - (C) four
 - (D) five
19. In simple fission
 - (A) Cytokinesis takes place along any plane but always perpendicular to the karyokinesis
 - (B) Cytokinesis takes place along a plane parallel to the karyokinesis
 - (C) Cytokinesis takes place along longitudinal axis
 - (D) Cytokinesis takes place along transverse axis
20. Which of the following statements are correct?
 - i. *Euglena* divides by longitudinal binary fission
 - ii. Cytokinesis takes place along transverse axis in *Paramecium*
 - iii. *Amoeba* divides by irregular binary fission
 - iv. In multiple fission, parental body divides into many daughter cells under favourable conditions.
 - (A) (i) and (iv) are correct
 - (B) only (iv) are correct
 - (C) (i), (ii) and (iii) are correct
 - (D) (ii) and (iv) are correct
21. Identify the mode of asexual reproduction shown in the diagram given below.



- (A) Fragmentation
 - (B) Binary fission
 - (C) Budding
 - (D) Gemmule formation
22. An asexual reproduction in which multinucleate parent divides into many multinucleate individuals is called
 - (A) binary fission
 - (B) multiple fission
 - (C) plasmotomy
 - (D) fragmentation
 23. Plasmotomy is observed in
 - (A) *Opalina*
 - (B) *Euglena*
 - (C) *Planaria*
 - (D) *Monocystis*

24. Which is the mode of reproduction in *Amoeba*? [RPMT 2001]
 (A) Binary fission only
 (B) Binary fission and multiple fission
 (C) Binary fission and conjugation
 (D) Multiple fission only
25. What is the mode of reproduction in *Syllis* and *Salpa*?
 (A) Fission (B) Budding
 (C) Fragmentation (D) Regeneration
26. Exogenous budding is observed in
 (A) *Scypha* (B) *Hydra*
 (C) *Spongilla* (D) both (A) and (B)
27. Gemmule formation in sponges is helpful in [AIIMS 2001]
 (A) parthenogenesis
 (B) sexual reproduction
 (C) only dissemination
 (D) asexual reproduction
28. Gemmule consists of mass of undifferentiated cells called
 (A) archaeocytes (B) amoebocytes
 (C) fragments (D) external bud
29. Filamentous algae reproduce by
 (A) fragmentation (B) budding
 (C) binary fission (D) conidia
30. Regeneration was observed in *Hydra* by
 (A) George Mendel
 (B) Abraham Trembley
 (C) Leeuwenhoek
 (D) Maheshwari
31. Regeneration means
 (A) formation of the whole body of organism from a small fragment
 (B) replacement of lost part
 (C) formation of buds
 (D) both (A) and (B)
32. In restorative regeneration
 (A) several body parts are redeveloped
 (B) damage tissues are regenerated
 (C) parent body is divided into two or more individuals
 (D) gemmules are formed
33. Zoospores are
 (A) non-motile spores of algae
 (B) motile spores of algae
 (C) non-motile spores of fungi
 (D) motile spores of fungi
34. *Penicillium* produce non-motile spores called
 (A) zoospores (B) conidia
 (C) fragments (D) bud
35. _____ are thick walled spores produced by *Rhizopus* which are capable of withstanding unfavourable conditions.
 (A) Chlamydospores
 (B) Zoospores
 (C) Oidia
 (D) Sporangiospores
36. *Mucor* produce non-motile spores called
 (A) sporangiospores
 (B) conidia
 (C) chlamydospores
 (D) oidia
37. Gemmae formation is found in
 (A) *Salpa* (B) *Schypa*
 (C) *Mucor* (D) *Marchantia*
38. Methods of asexual reproduction in lower organisms include
 (A) binary fission, budding
 (B) fertilization, syngamy
 (C) porogamy, autogamy
 (D) geitonogamy, xenogamy

1.3 Vegetative propagation in plants

39. A process of multiplication in which a portion of fragment of plant body function as propagule and develops into new individual is called
 (A) vegetative propagation
 (B) sexual propagation
 (C) regeneration
 (D) metamorphosis
40. The roots become fleshy due to storage of food in
 (A) *Pothos* (B) *Groundnut*
 (C) *Texoma* (D) *Dahlia*
41. Among the following which one is not a method of vegetative propagation? [AFMC 1990]
 (A) Budding (B) Layering
 (C) Sowing (D) Tissue culture
42. Under favourable conditions, adventitious buds present on the surface of tuberous roots produce
 (A) leafy shoots and adventitious roots
 (B) axillary leaves and buds
 (C) seed and seed coat
 (D) nodes and internodes

43. In *Ipomoea batatas*, the modified roots are
 (A) clustered (B) fasciculated
 (C) paired (D) single
44. In sweet potato, _____ are present.
 (A) fasciculated tuberous roots
 (B) simple tuberous roots
 (C) prop roots
 (D) both (A) and (B)
45. In sweet potato, food is stored in
 (A) leaves
 (B) stem
 (C) roots
 (D) underground stem
46. Tuberous roots which are produced in groups or clusters are called
 (A) stilt tuberous roots
 (B) simple tuberous roots
 (C) fasciculated tuberous roots
 (D) prop tuberous roots
47. Reproductive roots taking part in reproduction are found in
 (A) *Dalbergia* (Shisav)
 (B) *Dahlia*
 (C) Sweet Potato (*Ipomoea batatas*)
 (D) All of these
48. Potato is multiplied vegetatively with the help of [BHU 1991]
 (A) Corm (B) Rhizome
 (C) Tuber (D) Phyllode
49. The tip of the lateral branches of potato are swollen due to
 (A) storage of water
 (B) storage of salts
 (C) storage of food
 (D) storage of oil
50. Stem tubers show
 (A) nodes (B) scale leaves
 (C) axillary bud (D) all of these
51. 'Eye' in a stem tuber is
 (A) an adventitious root
 (B) a node
 (C) root
 (D) flower bud
52. Each eye present on the stem tuber consists of
 (A) only axillary buds
 (B) only reduced scale leaves
 (C) both axillary buds and reduced scale leaves
 (D) axillary roots
53. A corm is
 (A) an underground stem
 (B) a swollen root
 (C) a swollen stem
 (D) a swollen leaf
54. Bulbs of garlic and onion have
 (A) no leaves
 (B) no root system
 (C) no stem
 (D) greatly reduced stem
55. Identify the ODD one.
 (A) *Cynodon* – Runner
 (B) *Bryophyllum* – Epiphyllous bud on leaf
 (C) *Dahlia* – Tuberous root
 (D) *Solanum tuberosum* – Bulbil
56. Which of the following plant is not propagated by root tuber?
 (A) Sweet potato (B) *Dalbergia*
 (C) Guava (D) Onion
57. In grasses, the sub – aerial stem is modified as
 (A) phylloclade (B) phyllode
 (C) runner (D) stolon
58. Find out the wrong statement about runner.
 (A) It develops from the axillary bud of stem
 (B) It does not possess roots
 (C) It is a slender, prostrate, sub aerial branch with long internodes
 (D) It creeps on the ground and becomes rooted at the nodes
59. Find the ODD from following.
 (A) *Dalbergia* (B) *Murraya*
 (C) *Cynodon* (D) *Albizia*
60. In *Bryophyllum*, vegetative reproduction takes place with the help of
 (A) epiphyllous bud
 (B) fibrous roots
 (C) floral bud
 (D) adventitious roots
61. One of the plants using 'Foliar adventitious buds' as method for vegetative propagation is [AIIEE 2004]
 (A) Banana (B) Ginger
 (C) *Bryophyllum* (D) *Colocasia*
62. In which one pair both the plants can be vegetatively propagated by leaf pieces? [CBSE PMT 2005]
 (A) *Bryophyllum* and *Kalanchoe*
 (B) *Chrysanthemum* and *Agave*
 (C) *Agave* and *Kalanchoe*
 (D) *Asparagus* and *Bryophyllum*

63. In *Bryophyllum*, the plantlets are occurring on
(A) roots (B) surface
(C) notched margin (D) base of leaf
64. Which of the following cannot be propagated by leaf?
(A) *Kalanchoe* (B) *Bryophyllum*
(C) *Begonia* (D) *Fragaria*
65. Which of the following is propagated by a bulbil?
(A) *Agave* (B) *Bryophyllum*
(C) Onion (D) *Cynodon*
66. Natural vegetative reproduction is not observed in
(A) *Bryophyllum* (B) Mango
(C) Potato (D) Sweet potato
67. A technique of artificial vegetative propagation in which a vegetative portion from the parent plant is cut and grown in a suitable medium under favourable condition is called
(A) layering (B) grafting
(C) cutting (D) budding
68. Stem cuttings are frequently used for
(A) propagation
(B) fertilization
(C) conjugation
(D) sexual reproduction
69. Stem cuttings are commonly used for the propagation of [BHU 2005]
(A) Banana (B) Rose
(C) Mango (D) Cotton
70. Which of the following can be propagated by leaf cutting?
(A) *Peperomia*
(B) *Sansevieria*
(C) *Arum*
(D) Both (A) and (B)
71. Which root promoting hormone is applied to stem cutting?
(A) IAA (B) IBA
(C) NAA (D) All of these
72. An artificial method which involves joining the parts of two different plants in such a way that they unite and continue their growth as one plant is called
(A) layering (B) grafting
(C) cutting (D) doubling
73. Grafting can be done in plants having
(A) cambium for secondary growth
(B) xylem for secondary growth
(C) phloem for secondary growth
(D) pith for secondary growth
74. Grafting is not possible in monocots because
(A) they do not show secondary growth
(B) stock and scion of monocot plants do not fuse
(C) they do not have inter or intra-fascicular cambium
(D) all the above
75. In grafting, the rooted plant is used as a
(A) scion (B) stock
(C) stem (D) root
76. The part which is grafted on stock of another tree is called [Haryana PMT 2005]
(A) Graft (B) Bulbil
(C) Bud (D) Scion
77. The success of grafting depends upon
(A) union of cambium
(B) union of meristem
(C) union of phloem
(D) union of phellogen
78. In grafting scion forms
(A) root system
(B) shoot system
(C) adventitious roots
(D) all the three
79. The common method of grafting include
(A) tongue grafting
(B) wedge grafting
(C) crown grafting
(D) all of these
80. Stock and scion are of same diameter in
(A) tongue grafting
(B) wedge grafting
(C) crown grafting
(D) both (A) and (B)
81. In which of the following type of grafting stock is bigger than scion?
(A) crown grafting
(B) lateral grafting
(C) wedge grafting
(D) both (A) and (B)
82. Many scions are grafted on a single stock in
(A) tongue grafting
(B) wedge grafting
(C) crown grafting
(D) lateral grafting

83. In lateral grafting
 (A) only one scion is inserted in a stock
 (B) two scion is inserted in a stock
 (C) more than two scion is inserted in a stock
 (D) no scion is inserted in a stock
84. A technique of grafting in which a single bud with a small part of bark and living tissue is grafted on the particular stock is called
 (A) cutting (B) budding
 (C) cloning (D) stocking
85. During grafting, all shoot sprouting are removed from
 (A) Stock (B) Scion
 (C) Root (D) Leaf
86. In budding, ____ incision is made in the stock.
 (A) T or I shaped (B) U or V shaped
 (C) X or Y shaped (D) C or D shaped
87. An artificial vegetative method of propagation in which branch remains attached to parent plant till it develops adventitious roots is
 (A) grafting (B) layering
 (C) cutting (D) budding
88. Micropropagation refers to
 (A) mature stage of endosperm
 (B) the phenomenon of manufacture of hormones
 (C) germination of seed where cotyledons come above the soil
 (D) a technique to obtain new plants by cultivating cells or tissues in culture medium
89. For vegetative propagation, the vegetative part of the plant should have
 (A) a growing point
 (B) reserved food
 (C) leaf
 (D) both (A) and (B)
90. Vegetative reproduction by layering is found in [AFMC 1996]
 (A) Jasmine (B) Mango
 (C) Rose (D) All of these
91. Development of an egg into a complete individual without fertilization by a sperm is known as
 (A) apomixis (B) amphimixis
 (C) parthenogenesis (D) heterostyly
92. Natural parthenogenesis occurs in [BHU 1995, 2004]
 (A) Frog to form female
 (B) Honeybee to produce drones
 (C) Cockroach
 (D) Vegetarian eggs
93. Drones in a colony of honey bees originate by [BHU 2002]
 (A) Thelytoky
 (B) Arrhenotoky
 (C) Cyclic parthenogenesis
 (D) Diploid parthenogenesis
94. In thelytoky type of parthenogenesis
 (A) only males are produced parthenogenetically
 (B) only females are produced parthenogenetically
 (C) both males and females are produced parthenogenetically
 (D) parthenogenetic eggs may develop into any sex
95. Parthenogenetic eggs develop into any sex by
 (A) arrhenotoky parthenogenesis
 (B) thelytoky parthenogenesis
 (C) amphitoky parthenogenesis
 (D) artificial parthenogenesis

Miscellaneous

96. Which one is propagated by cutting?
 (A) Lemon (B) Rose
 (C) Grapes (D) all the three
97. In a grafted plant, stock has 48 chromosomes while scion has 24 chromosomes. The chromosome number for root cells and eggs are [Har. PMT 2000]
 (A) 48 and 24 (B) 24 and 24
 (C) 24 and 12 (D) 48 and 12
98. Meiosis takes place in [NEET 2013]
 (A) Meicyote (B) Conidia
 (C) Gemmule (D) Megaspore
99. 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
100. Which of the following organism shows regenerative type of asexual reproduction?
 (A) *Amoeba* (B) *Planaria*
 (C) *Hydra* (D) All of these

101. Find the ODD one.
(A) Banana – Rhizome
(B) *Cynodon* – Runner
(C) *Begonia* – Leaf
(D) *Oxalis* – stem tuber
102. Apple and tamarind can be propagated by
(A) root cutting
(B) stem cutting
(C) leaf cutting
(D) tissue cutting
103. Which of the following can be grown through layering method?
(A) Strawberry
(B) *Clematis*
(C) *Begonia*
(D) both (A) and (B)
104. 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
105. Plants exactly similar to mother plants are obtained through [CPMT 1975, 1988]
(A) seeds
(B) stem cuttings
(C) grafting
(D) both (B) and (C)
106. A clone is a group of individuals obtained through [DPMT 1986]
(A) self pollination
(B) hybridization
(C) vegetative propagation
(D) cross pollination
107. *Chrysanthemum* multiplies vegetatively by [Kerala 2000]
(A) Suckers (B) Runners
(C) Stolons (D) Rhizomes
108. 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
109. In Papaya plant, flowers are
(A) hermaphrodite (B) unisexual
(C) monoecious (D) neuter
110. *Euglena* reproduces
(A) asexually
(B) bisexually
(C) parthenogenetically
(D) self fertilization
111. Find the CORRECT match.
(A) *Pelomyxa* – multiple fission
(B) *Scypha* – budding
(C) *Amoeba* – transverse binary fission
(D) *Paramoecium* – irregular binary fission
112. Grafting can be done in
(A) dicots only (B) monocots only
(C) all plants (D) spermatophytes
113. In prokaryotes, fission is
(A) sexual, mitotic process
(B) asexual, amitotic process
(C) asexual, mitotic process
(D) sexual, amitotic process
114. Apomixis in plant means development of a plant
(A) from root cuttings
(B) without fusion of gametes
(C) from fusion of gametes
(D) from stem of cuttings
115. Reproducing new plants by cells instead of seeds is known as [MP PMT 1994]
(A) Biofertilizer (B) Mutation
(C) Tissue Culture (D) Antibiotics
116. Which of the following propagates through leaf-tip? [CBSE PMT 2004]
(A) *Marchantia*
(B) Moss
(C) Walking fern
(D) Sprout-leaf plant
117. A scion is grafted to a stock. The quality of fruits produced will be determined by genotype of [AIIMS 2006]
(A) stock
(B) scion
(C) both stock and scion
(D) neither stock nor scion
118. In *Albizzia*, vegetative propagation takes place with the help of [MH CET 2014]
(A) fasciculated tuberous roots
(B) epiphyllous buds
(C) subaerial branches
(D) nonfleshy roots

119. Vegetative propagation in *Pistia* occurs by
[CBSE 2010]

- (A) stolon
- (B) offset
- (C) runner
- (D) sucker

120. In budding the scion is a

- (A) branch
- (B) bud
- (C) flower
- (D) any one from above

121. Match the terms in column I with suitable terms in column II and select the correct option.

Column I		Column II	
i.	Gemmule	a.	<i>Hydra</i>
ii.	Conidia	b.	Asexual reproduction
iii.	Budding	c.	<i>Penicillium</i>
iv.	Amphimixis	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

 **Answers to Multiple Choice Questions**

- 1. (B)
- 2. (A)
- 3. (B)
- 4. (C)
- 5. (D)
- 6. (A)
- 7. (A)
- 8. (A)
- 9. (B)
- 10. (A)
- 11. (D)
- 12. (A)
- 13. (C)
- 14. (C)
- 15. (A)
- 16. (B)
- 17. (B)
- 18. (A)
- 19. (A)
- 20. (C)
- 21. (B)
- 22. (C)
- 23. (A)
- 24. (B)
- 25. (B)
- 26. (D)
- 27. (D)
- 28. (A)
- 29. (A)
- 30. (B)
- 31. (D)
- 32. (A)
- 33. (B)
- 34. (B)
- 35. (A)
- 36. (A)
- 37. (D)
- 38. (A)
- 39. (A)
- 40. (D)
- 41. (C)
- 42. (A)
- 43. (D)
- 44. (B)
- 45. (C)
- 46. (C)
- 47. (D)
- 48. (C)
- 49. (C)
- 50. (D)
- 51. (B)
- 52. (C)
- 53. (A)
- 54. (D)
- 55. (D)
- 56. (D)
- 57. (C)
- 58. (B)
- 59. (C)
- 60. (A)
- 61. (C)
- 62. (A)
- 63. (C)
- 64. (D)
- 65. (A)
- 66. (B)
- 67. (C)
- 68. (A)
- 69. (B)
- 70. (D)
- 71. (D)
- 72. (B)
- 73. (A)
- 74. (D)
- 75. (B)
- 76. (D)
- 77. (A)
- 78. (B)
- 79. (D)
- 80. (D)
- 81. (D)
- 82. (C)
- 83. (A)
- 84. (B)
- 85. (A)
- 86. (A)
- 87. (B)
- 88. (D)
- 89. (D)
- 90. (A)
- 91. (C)
- 92. (B)
- 93. (B)
- 94. (B)
- 95. (C)
- 96. (D)
- 97. (D)
- 98. (A)
- 99. (C)
- 100. (D)
- 101. (D)
- 102. (A)
- 103. (D)
- 104. (A)
- 105. (D)
- 106. (C)
- 107. (A)
- 108. (D)
- 109. (B)
- 110. (A)
- 111. (B)
- 112. (A)
- 113. (B)
- 114. (B)
- 115. (C)
- 116. (C)
- 117. (B)
- 118. (D)
- 119. (B)
- 120. (B)

 **Hints to Multiple Choice Questions**

- 6. Asexual reproduction is also called apomixis, whereas amphimixis means sexual reproduction.
- 7. Production of offsprings by formation and fusion of gametes is called amphimixis or sexual reproduction.
- 13. Sexual reproduction involves mixing of gametes of parents, this leads to genetic combination which results into variation.
- 15. When reproductive organs are present in same parent, such animals are called monoecious or bisexual or hermaphrodite.
- 16. Conjugation is observed in *Paramecium*.
- 20. Multiple fission occurs during unfavourable conditions to increase the chances of survival of daughter cells.
- 25. In budding, the division is unequal and small projections called buds are produced on or inside the parental body.
- 26. In exogenous budding, bud is formed on the outer surface of parental body which is observed in *Scypha* and *Hydra*. *Spongilla* shows endogenous budding in which bud is formed in the inner surface of parental body.
- 27. Gemmules are endogenous buds formed on inner side of parental body.
- 29. Fragmentation is an asexual reproduction in which parent body breaks into two or more fragments.
- 37. Gemmae are green, multicellular, asexual buds which develop in receptacles called gemma cups located on thalli.

41. Sowing is related to sexual reproduction.
55. In *Solanum tuberosum* vegetative propagation occurs by stem tubers.
59. *Cynodon* is a runner where subaerial stem is modified for vegetative reproduction. Remaining three are non-fleshy roots which help in vegetative propagation.
60. Epiphyllous buds remain dormant, till the leaf is attached with plants. When these buds / sprouts fall on the wet soil, they develop into independent plants.
61. Foliar (on the leaf) adventitious buds are formed at place other than nodes.
64. *Fragaria* (strawberry) can be propagated by runner.
69. Stem cutting of atleast one year old stem are employed in case of rose.
78. In grafting, stock forms the root system.
80. In crown grafting, diameter of stock is many times more than the diameter of scion as many scions are grafted on a single stock.
85. All shoot sprouting from the stock should be removed otherwise they will not permit the scion to grow.
90. Jasmine is example of mound layering.
91. Parthenogenesis is found in aphids, bees and crustaceans.
92. Parthenogenesis is the development of an individual from an unfertilized egg. In honey bees, drones develop parthenogenetically.
93. Arrhenotoky is a type of parthenogenesis, in which the unfertilized eggs develop into males with haploid cells.
97. Roots are produced from stock. Stock is diploid so the number of chromosomes in root cells of stock is 48. But egg is haploid, so in egg chromosome number will be 12 [as scion forms shoot system and its chromosome number is 24 (diploid)].
98. The cells in which meiosis takes place are called meiocyte.
101. *Oxalis* is vegetatively propagated by runner.
118. Simple fleshy tuberous roots occur in sweet potato. Fasciculated fleshy roots occur in asparagus.