UNIT I

Chapter 1

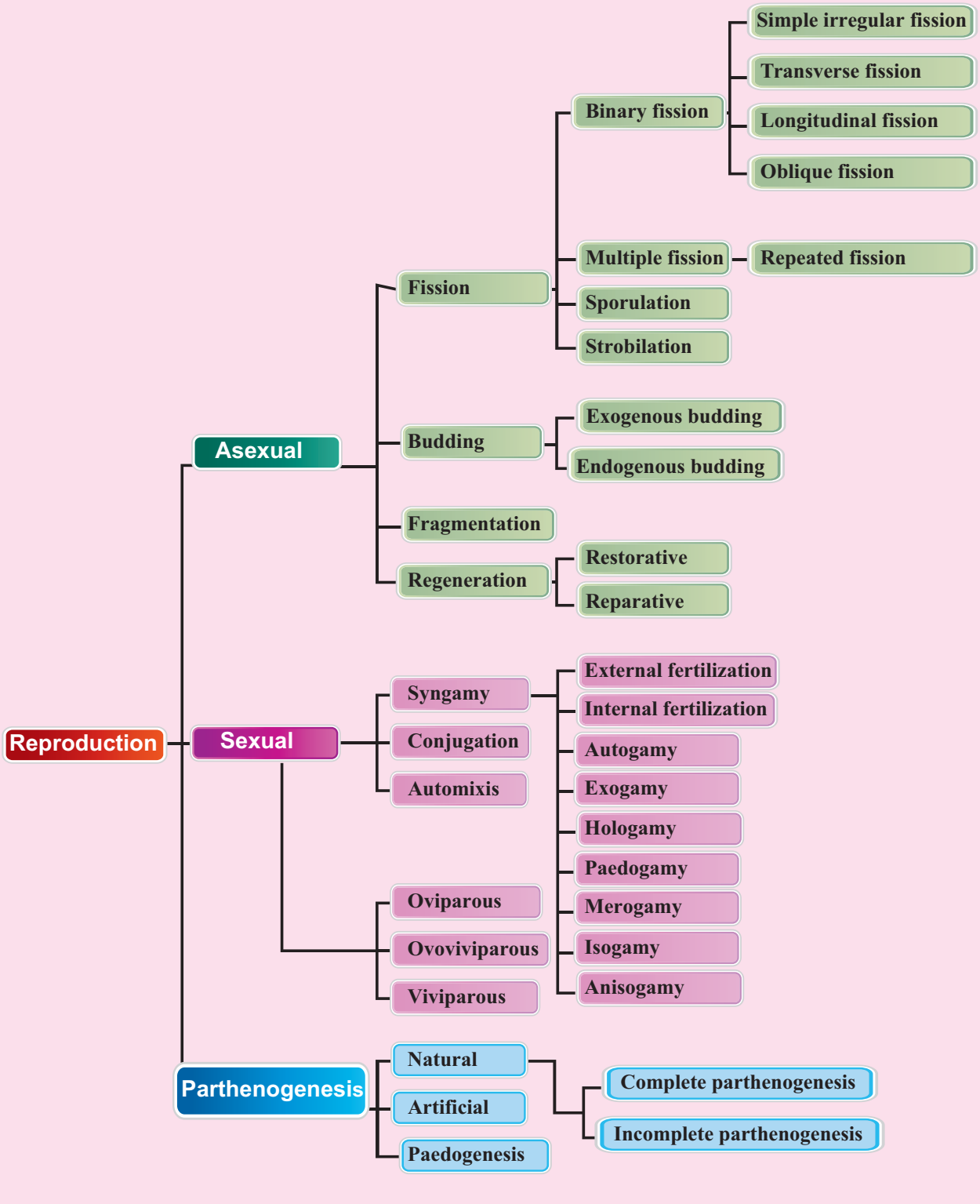
REPRODUCTION IN ORGANISMS

CHAPTER SNAPSHOT

MUST KNOW DEFINITIONS

Asexual reproduction	:	Reproduction by single parent involving amitotic or mitotic divisions only.
Sexual reproduction	:	Participation of two individuals and involves formation of male and female gamete.
Fission	:	Division of parent body into two or more identical Daughter individuals.
Binary fission	:	Parent organism divides into two daughter cells.
Multiple fission	:	Parent body divides into many similar daughter cells.
Strobilation	:	A special type of transverse fission giving rise to number of individuals.
Budding	:	Parent body produces one or more buds which separate from the parent and lead an independent life
Gemmule	:	Internal buds formed is sponge which can tolerate adverse conditions and are a means of asexual reproduction.
Apolysis	:	Separation of gravid proglottids from the body of a tape worm.
Regeneration	:	Regrowth in the injured region.
External fertilization	:	Fusion of male & female gametes takes place outside the body of the female organism.
Internal fertilization	:	Fusion of male and female gametes takes place within the body of the female organism.
Fertilization	:	Fusion of male & female gametes.
Conjugation	:	Type of sexual reproduction between two individuals, where certain amount of nuclear material exchange takes place after which they separate.
Parthenogenesis	:	Development of an egg into a complete individual without fertilization.
Oviparous condition	:	Young ones hatch from eggs laid outside the mother's body.
Viviparous condition	:	Animals give birth to young ones.
Ovoviviparous conditions	:	Embryo develops inside the eggs and remains in the mother's body until they are ready to hatch.

Concept Map



Evaluation

1. In which type of parthenogenesis are only males produced?

(a) Arrhenotoky (b) Thelytoky
(c) Amphitoky (d) Both a and b

[Ans. (a) Arrhenotoky]

2. Animals giving birth to young ones:

(a) Oviparous (b) Ovivivipara
(c) Viviparous (d) Both a and b

[Ans. (c) Viviparous]

3. The mode of asexual reproduction in bacteria is by

(a) Formation of gametes
(b) Endospore formation
(c) Conjugation
(d) Zoospore formation

[Ans. (b) Endospore formation]

4. In which mode of reproduction variations are seen

(a) Asexual (b) Parthenogenesis
(c) Sexual (d) Both a and b

[Ans. (c) Sexual]

5. Assertion and reasoning questions:
In each of the following questions there are two statements. One is assertion (A) and other is reasoning (R). Mark the correct answer as

A. If both A and R are true and R is correct explanation for A.
B. If both A and R are true but R is not the correct explanation for A.
C. If A is true but R is false.
D. If both A and R are false.

I. **Assertion:** In bee society, all the members are diploid except drones.
Reason: Drones are produced by parthenogenesis.
A B C D
[Ans. (A) Both A and R are true and R is correct explanation for A]

II. **Assertion:** Offsprings produced by asexual reproduction are genetically identical to the parent.
Reason: Asexual reproduction involves only mitosis and no meiosis.
A B C D
[Ans. (C) If A is true but R is false]

III. **Assertion:** Viviparous animals give better protection to their offsprings.
Reason: They lay their eggs in the safe places of the environment.
A B C D
[Ans. (C) A is true but R is false]

6. Name an organism where cell division is itself a mode of reproduction.

Ans. Bacteria, *Amoeba.*

7. Name the phenomenon where the female gamete directly develops into a new organism with an avian example.

Ans. Phenomenon – Parthenogenesis
Eg: Turkey.

8. What is parthenogenesis? Give two examples from animals.

Ans. (i) Development of an egg into a complete individual without fertilization is known as parthenogenesis.
(ii) Parthenogenesis is of two main types namely, **Natural Parthenogenesis** and **Artificial Parthenogenesis**.
(iii) Ex: Honey bees, Gall fly.

9. Which type of reproduction is effective -Asexual or sexual and why?

Ans. (i) Reproduction is a biological process by which organisms produce their young ones. Reproduction results in continuation of species and introduces variations in organisms which are essential for adaptation and evolution of their own kind.
(ii) Sexual Reproduction can only bring about variation in the organism since it involves fusion of gametes from two different individuals, (parents). A sexual reproduction involves uniparental inheritance and cannot bring about variation.
(iii) Thus, sexual & asexual reproduction can help to create the next generation but only sexual reproduction is said to be more effective than asexual reproduction

10. The unicellular organisms which reproduce by binary fission are considered immortal. Justify.

Ans. ***(i)*** In **binary fission** (asexual reproduction), the parental organism divides into two halves and each half forms a daughter individual. This is seen in unicellular organism like bacteria, *Amoeba* etc.

(ii) At maturity the single parent cell divides, to form the daughter cells. The parent cell does not die but it becomes a part of the daughter cells formed.

(iii) Thus the unicellular organisms which reproduce by binary fission are considered immortal.

(iv) In other cases of asexual reproduction, the parent produces special structures like buds, spores etc for reproduction but the parent organism continues to live and grow. It dies a natural death.

11. Why is the offspring formed by asexual reproduction referred as a clone?

Ans. Clones refers to the group of genetically identical cells or organisms asexually produced from a single progenitor cell or organism Asexual reproduction involves a single parent. Offsprings produced by asexual reproduction are morphologically and genetically similar to their parents and are hence called clones.

12. Why are the offsprings of oviparous animal at a greater risk as compared to offsprings of viviparous organisms?

Ans. Oviparous animals lay eggs outside their body. These eggs are exposed to various environmental conditions and may be eaten by predators also. They face lot of risks until the young ones hatche. But the offsprings of viviparous animals are more safe and protected in the maternal womb until they are born.

13. Give reasons for the following:

(a) Some organisms like honey bees are called parthenogenetic animals

(b) A male honey bee has 16 chromosomes where as its female has 32 chromosomes.

Ans. ***(a)*** Development of an egg into a complete individual without fertilization is known as parthenogenesis It is of two types. Natural parthenogenesis occurs in Nature in many animals such as honey bees. Artificially it can be induced in animals by physical or chemical stimuli which is called artificial parthenogenesis.

(b) In honey bees both sexual reproduction and parthenogenesis occurs, and it is described as incomplete parthenogenesis. It is a kind of natural parthenogenesis.

During sexual reproduction, the fertilized eggs (zygotes) develop into queen bee and workers (females). The unfertilized eggs develop into drones (males). This honey bees are called parthenogenesis animals.

In honey bees the normal chromosomal number in a cell is $2n = 32$. Gametes (sperms & egg) will have only $n = 16$ chromosomes since they are haploid. The female bees are formed by fertilization of gametes.

$$\text{sperm } (n) + \text{egg } (n) = 2n$$

Therefore they have 32 chromosomes. Since the drones (males) are formed from unfertilized eggs(n) they have only 16 chromosomes. Honey bees show incomplete parthenogenesis.

14. Differentiate between the following:

(a) Binary fission in *amoeba* and multiple fission in *Plasmodium*

(b) Budding in yeast and budding in *Hydra*

(c) Regeneration in lizard and *Planaria*

Ans.

(a)

Binary Fission in *Amoeba*	Multiple fission in *Plasmodium*
The nucleus divides mitotically only once.	The nucleus divides repeatedly
The cell constricts in the middle after nuclear division to form the daughter cells.	The cytoplasm divides into as many parts as that of nuclei and each part encircles a daughter nucleus.
Two daughter cells are formed.	Many daughter cells are formed.

(b)

Budding in Yeast	Budding in *Hydra*
Yeast is a unicellular organism. The single cell produces an outgrowth to form a bud. Nucleus of the parent cell divides and a daughter nuclei enters the bud which is unicellular.	The Bud is developed by mitotic divisions of its cells and is multicellular.
A Chain of buds may be formed in the parent cell at times.	Chain of buds are not formed.

In both cases, the buds separate and lead an independent life

(c) Regeneration is regrowth in the injured region

Regeneration in *Planaria*	Regeneration in lizard
It shows the morphallaxis type of regeneration in which the whole body grows from a small fragment	Lizard shows the epimorphosis type of regeneration in which replacement of lost body parts occur.
The whole body can be got by regeneration	It shows the restorative type of regeneration in which several body parts can only develop but the whole body cannot develop.

15. How is juvenile phase different from reproductive phase?

Ans. Organisms have three phases – Juvenile phase, reproductive phase and senescent phase.

(i) Juvenile phase/ vegetative phase is the period of growth between the birth of the individual upto reproductive maturity.

(ii) During reproductive phase/ maturity phase the organisms reproduce and their offsprings reach maturity period.

(iii) Senescent phase begins at the end of reproductive phase when degeneration sets in the structure and functioning of the body.

16. What is the difference between syngamy and fertilization?

Ans. The entire process involved in fusion of male and female gamete in sexual reproduction is called fertilization. It includes the entry of sperm into the egg followed by fusion of nuclei to form a zygote. Syngamy refers to the process of fusion of the male & female gametes. (fusion of cytoplasm and nuclei)

Additional Questions

Choose the Correct Answer — 1 Mark

I. Choose the Correct options for the below Questions

1. Transverse Binary fission is seen is ____

(a) *Vorticella* (b) *Paramecium*
(c) Plasmodium (d) Euglena

[Ans. (b) *Paramecium*]

2. In dinoflagellates the types of asexual reproduction seen is _____

(a) Simple Binary fission
(b) Multiple fission
(c) Oblique binary fission
(d) Longitudinal binary fission

[Ans. (c) Oblique binary fission]

3. Multiple fission is seen in _____

(a) *Vorticella* and ceratium
(b) Plasmodium and *paramecium*
(c) *Amoeba* and cyanobacteria
(d) *Vorticella* and plasmodium

[Ans. (d) *Vorticella* and plasmodium]

4. During favourable conditions _____ shows multiple fission.

(a) Plasmodium
(b) *Amoeba*
(c) Planaria
(d) Euglena

[Ans. (b) *Amoeba*]

VII. Identify the Correct pair from the below

1. i. Shark - placenta
ii. *Taenia solium* - Regeneration
iii. Frog - Continuous breeder
iv. Plasmotomy - *Pelomyxa*
(a) i and iii (b) ii and iii
(c) i and iv (d) i, ii and iv
[Ans. (c) i and iv]

2. i. Sporogony - *Paramecium*
ii. Bacteria - Uniparental inheritance
iii. *Amoeba* - Multiple fission
iv. Birds - External fertilization
(a) i, ii and iv (b) iii and iv
(c) ii and iv (d) ii and iii
[Ans. (c) ii and iii]

VIII. Identify the Incorrect pair from the below

1. i. Starfish - Gemmule
ii. Exogamy - *Amoeba*
iii. Tapeworm - Pig
iv. Continuous breeder - Poultry
(a) i, ii and iii (b) ii, iii and iv
(c) i and iv (d) i and ii
[Ans. (d) i and ii]

2. i. *Planaria* - Morphallaxis
ii. Conjugation - *Amoeba*
iii. Autogamy - *Paramecium*
iv. Apolysis - sea anemones
(a) i and iii (b) ii and iv
(c) ii and iii (d) i, iii and iv
[Ans. (b) ii and iv]

3. i. *Hologamy* - Fusion of nature individuals
ii. Merogamy - Fusion of small sized, morphologically different gametes.
iii. Paedogamy - Fusion of young individuals
iv. Isogamy - Fusion of dissimilar gametes.
(a) i and iii (b) ii and iv
(c) ii and iii (d) iv
[Ans. (d) iv]

IX. Identify the Odd-man out from the below

1. (a) *Amoeba* (b) *Paramecium*
(c) *Vorticella* (d) *Hydra*
[Ans. (d) Hydra]
Reason: It reproduces, asexually by budding whereas the others reproduce asexually by fission.

2. (a) *Hydra* (b) *Noctiluca*
(c) Sea anemones (d) *Leucosolenia*
[Ans. (c) sea anemones]
Reason: It reproduces asexually by fragmentation whereas the others reproduce a sexually by Budding.

3. (a) Conjugation (b) Hologamy
(c) Paedogamy (d) Regeneration
[Ans. (d) Regeneration]
Reason: It is associated with asexual reproduction whereas the others are associated with sexual reproduction.

4. (a) Honey bees (b) Shark
(c) Human being (d) Cow
[Ans. (c) Honey bees]
Reason: It shows sexual reproduction and parthenogenesis in its life cycle, whereas the others show sexual reproduction only

Answer in one word*

1. Ovoviviparity is seen in ____ **[Ans. shark]**
2. _____ serves to transfer nutrients to the young ones of viviparous animals before birth. **[Ans. placenta]**
3. The eggs are covered by a membrane in ____ **[Ans. Amphibians]**
4. Replacement of lost body parts is called _____ **[Ans. epimorphosis]**
5. Exogenous buds are seen in ____. **[Ans. *Hydra*]**
6. Division of cytoplasm is called _____ **[Ans. cytokinesis]**
7. Division of nucleus is called _____. **[Ans. karyokinesis]**

*** Only for quick revision not in pattern**

8. Repeated fission is seen in _____.
[Ans. *vorticella*]

9. Oblique binary fission is seen in _____.
[Ans. *ceratium*]

10. Longitudinal binary fission is seen in _____
[Ans. *vorticella*]

11. The multiple fission of the schizont in plasmodium is called _____
[Ans. schizogony]

12. Schizogony leads to the production of _____ in plasmodium. [Ans. Merozoites]

13. Multiple fission of the oocyte in plasmodium is called _____.
[Ans. sporogony]

14. During multiple fission *Amoebae* produce _____.
[Ans. Amoebulae or Pseudopodiospores]

15. The temporary union of two individuals of same species is called ____.
[Ans. conjugation]

Very Short Answers — 2 Marks

1. Name the types of fission.

Ans. Binary fission, multiple fission, sporulation, and strobilation.

2. What is peculiar about the cell division of paramecium?

Ans. In paramecium, the macronucleus divides by amitosis and the micronucleus divides by mitosis.

3. What is plasmotomy?

Ans. *(i)* Plasmotomy is the division of multinucleated parent into many multinucleate daughter individuals with the division of nuclei.

(ii) Nuclear division occurs later to maintain normal number of nuclei.

(iii) Plasmotomy occurs in *Opalina* and *Pelomyxa.*

(iv) It is a method of asexual reproduction.

4. What are exogenous buds?

Ans. When buds are formed on the outer surface of the parent body, it is known as **exogenous budding. E.g.** *Hydra*.

5. Define regeneration mention the types.

Ans. *(i)* Regeneration is regrowth in the injured region.

(ii) Regeneration is of two types, (a) morphallaxis (b) epimorphosis.

6. What is morphallaxis?

Ans. It is a type of regeneration. In **morphallaxis**, the whole body grows from a small fragment. **E.g.** *Hydra.*

7. What is epimorphosis?

Ans. *(i)* It is type of regeneration which involves replacement of the lost body pants. It is of two types.

(ii) Reparative regeneration, only certain damaged tissue can be regenerated.

(iii) Restorative regeneration – several body parts can develop. **E.g.** Star fish.

8. What is syngamy?

Ans. In **syngamy**, the fusion of two haploid gametes takes place to produce a diploid zygote.

9. What is autogamy?

Ans. It is a type of fertilization. In **autogamy**, the male and female gametes are produced by the same cell or same organism and both the gametes fuse together to form a zygote.
E.g. Actinosphaerium and *Paramecium*.

10. What is exogamy?

Ans. It is a type of fertilization. In exogamy, the male and female gametes are produced by different parents and they fuse to form a zygote. So it is biparental. **E.g.** Human – dioecious or unisexual animal.

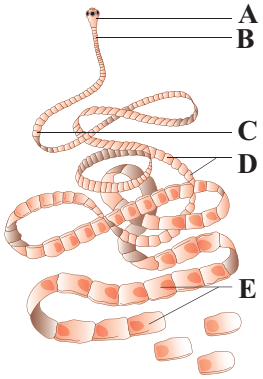
11. Define hologamy.

Ans. It is a type of fertilization. In lower organisms, sometimes the entire mature organisms do not form gametes but they themselves behave as gametes and the fusion of such mature individuals is known as **hologamy**.
E.g. *Trichonympha.*

12. What is merogamy?

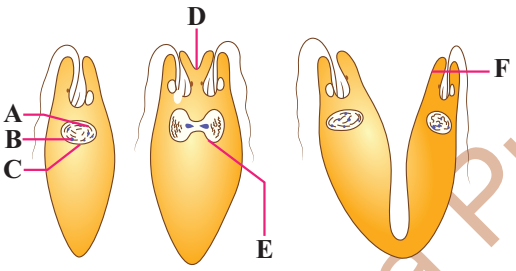
Ans. It is a type of fertilization in **merogamy**, the fusion of small sized and morphologically different gametes (merogametes) takes place.

26. Identify the parts marked as A, B, C, D and E for the below diagram.



Ans. A – Scolex
B – Neck
C – Immature proglottids
D – Mature proglottids
E – Gravid proglottids

27. Identify the parts marked as A, B, C, D, E and F for the below diagram.



Ans. A - Chromosomes
B – Nucleoli
C – Nucleus
D – Longitudinal furrow
E – Nuclear constriction
F – Daughter Euglena

SHORT ANSWERS 3 Marks

1. What is asexual reproduction?

Ans. ***(i)*** Reproduction by a single parent without the involvement of gamete formation is asexual reproduction and the offspring produced are genetically identical. (uniparental inheritance)

(ii) Asexual reproduction is usually by amitotic or mitotic division of the somatic (body) cells, hence is also known as somatogenic or blastogenic reproduction. **Eg.** members of Protista, Bacteria.

2. What is repeated fission?

Ans. If multiple fission produces four or many daughter individuals by equal cell division and the young ones do not separate until the process is complete, then this division is called repeated fission. **E.g.** *Vorticella*.

3. Explain multiple fission in plasmodium.

Ans. ***(i)*** In Plasmodium, multiple fission occurs in the schizont and in the oocyte stages. When multiple fission occurs in the schizont, the process is called schizogony and the daughter individuals are called merozoites.

(ii) When multiple fission occurs in the oocyte, it is called sporogony and the daughter individuals are called sporozoites.

4. Explain encystment in *amoeba*.

Ans. ***(i)*** During unfavorable conditions *Amoeba* withdraws its pseudopodia and secretes a three-layered, protective, chitinous cyst wall around it and becomes inactive. This phenomenon is called encystment.

(ii) When conditions become favourable, the encysted *Amoeba* divides by multiple fission and produces many minute amoebae called pseudopodiospore or amoebulae.

(iii) The cyst wall breaks off liberating the young pseudopodiospores.

5. What is strobilation?

Ans. ***(i)*** In some metazoan animals, a special type of transverse fission called strobilation occurs.

(ii) In the process of strobilation, several transverse fissions occur simultaneously giving rise to a number of individuals which often do not separate immediately from each other. **E.g.** *Aurelia*.

6. Differentiate exogenous and endogenous budding.

Ans.

Exogenous budding	Endogenous Budding
Buds are formed on the outer surface of the parent body.	Buds are formed inside the cytoplasm within the body of the parent
E.g. Hydra	**E.g.** Noctiluca

14. What is ovoviviparous condition?

Ans. **(i)** In **Ovoviviparous** animals, the embryo develops inside the egg and remains in the mother's body until they are ready to hatch.

(ii) This method of reproduction is similar to Viviparity but the embryos have no placental connection with the mother and receive their nourishment from the egg yolk. Ovoviviparity is seen in fishes like shark.

15. How does budding occurs is *hydra*?

Ans. **(i)** Buds are formed on the outer surface of the parent body, it is known as **exogenous budding** e.g. *Hydra*.

(ii) In *Hydra* when food is plenty, the ectoderm cells increase and form a small elevation on the body surface.

(iii) Ectoderm and endoderm are pushed out to form the bud. The bud contains an interior lumen in continuation with parent's gastrovascular cavity.

(iv) The bud enlarges, develops a mouth and a circle of tentacles at its free end.

(v) When fully grown, the bud constricts at the base and finally separates from the parent body and leads an independent life.

16. Describe pedal laceration.

Ans. **(i)** In **fragmentation**, the parent body breaks into fragments (pieces) and each of the fragment has the potential to develop into a new individual.

(ii) Fragmentation or **pedal laceration** occurs in many genera of sea anemones.

(iii) Lobes are constricted off from the pedal disc and each of the lobe grows mesenteries and tentacles to form a new sea anemone.

17. Describe the different phases of life cycle in an organism.

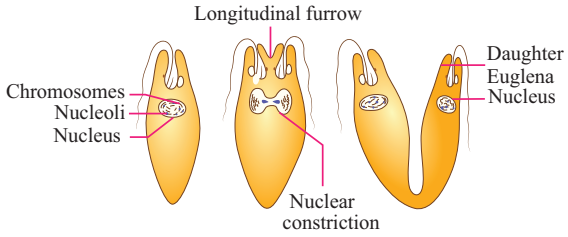
Ans. Organisms have three phases in its life cycle.

(i) **Juvenile phase/ vegetative phase** is the period of growth between the birth of the individual upto reproductive maturity.

(ii) **Reproductive phase/ maturity phase** the organisms reproduce and their offsprings reach maturity period.

(iii) **Senescent phase** begins at the end of reproductive phase when degeneration sets in the structure and functioning of the body.

18.



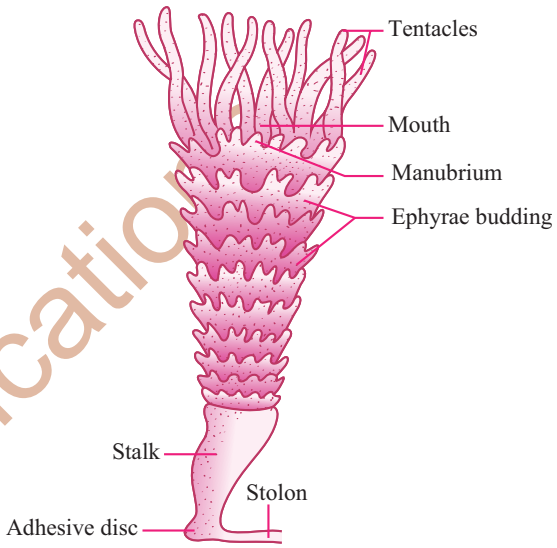
(i) Identify the Process.

(ii) Name the Organism.

Ans. **(i)** Longitudinal binary fission

(ii) *Euglena*

19.



(i) Identify the animal.

(ii) What is significant about the animal.

Ans. **(i)** *Aurelia*

(ii) The significance is that *Aurelia* reproduces asexually by a special type of transverse fission called strobilation.

Long Answers — 5 Marks

1. Write a note on regeneration.

Ans. **(i)** Regeneration is regrowth in the injured region. Regeneration was first studied in *Hydra* by Abraham Trembley in 1740.

(ii) Regeneration is of two types, **morphallaxis** and **epimorphosis**. In morphallaxis the whole body grows from a small fragment. **E.g.** *Hydra* and *Planaria*.

(iii) When *Hydra* is accidentally cut into several pieces, each piece can regenerate the lost parts and develop into a whole new individual.

(iv) The parts usually retain their original polarity, with oral ends, by developing tentacles and aboral ends, by producing basal discs.

(v) **Epimorphosis** is the replacement of lost body parts. It is of two types, namely **reparative** and **restorative** regeneration.

(vi) In reparative regeneration, only certain damaged tissue can be regenerated, whereas in restorative regeneration several body parts can develop. **E.g.** star fish, tail of wall lizard.

2. Explain parthenogenesis.

Ans. *(i)* Development of an egg into a complete individual without fertilization is known as parthenogenesis.

(ii) It was first discovered by Charles Bonnet in 1745. Parthenogenesis is of two main types namely, natural Parthenogenesis and artificial Parthenogenesis.

(iii) In certain animals, parthenogenesis occurs regularly, constantly and naturally in their life cycle and is known as natural parthenogenesis.

Natural parthenogenesis are of different types:

a) **Arrhenotoky :** In this type only males are produced by parthenogenesis. **E.g:** honey bees

b) **Thelytoky :** In this type of parthenogenesis only females are produced by parthenogenesis. **E.g:** Solenobia

c) **Amphitoky :** In this type parthenogenetic egg may develop into individuals of any sex. **E.g:** *Aphis*.

(iv) Natural parthenogenesis may be of two types, viz., complete and incomplete. **Complete parthenogenesis** is the only form of reproduction in certain animals and there is no biparental sexual reproduction. These are no male organisms and so, such individuals are represented by females only.

(v) **Incomplete parthenogenesis** is found in some animals in which both sexual reproduction and parthenogenesis occurs. **E.g.** In honeybees; fertilized eggs (zygotes) develop into queen and workers, whereas unfertilized eggs develop into drones (male).

(vi) In **paedogenetic parthenogenesis (paedogenesis)** the larvae produce a new generation of larvae by parthenogenesis.

(vii) It occurs in the sporocysts and Redia larvae of liver fluke. It is also seen in the larvae of some insects. **E.g.** Gall fly.

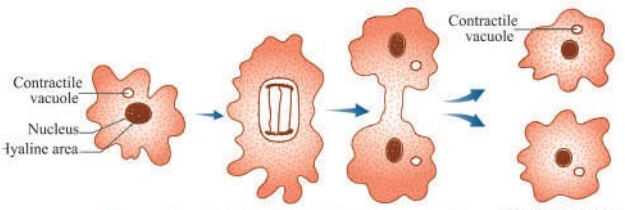
(viii) In **artificial parthenogenesis,** the unfertilized egg (ovum) is induced to develop into a complete individual by physical or chemical stimuli. **E.g.** Annelid and seaurchin eggs.

3. Write notes on binary fission in animals.

Ans. In **binary fission**, the parent organism divides into two halves and each half forms a daughter individual. The nucleus divides first amitotically or mitotically (**karyokinesis**), followed by the division of the cytoplasm (**cytokinesis**). The resultant offsprings are genetically identical to the parent. Depending on the plane of fission, binary fission is of the following types

(i) Simple irregular binary fission
(ii) Transverse binary fission
(iii) Longitudinal binary fission
(iv) Oblique binary fission

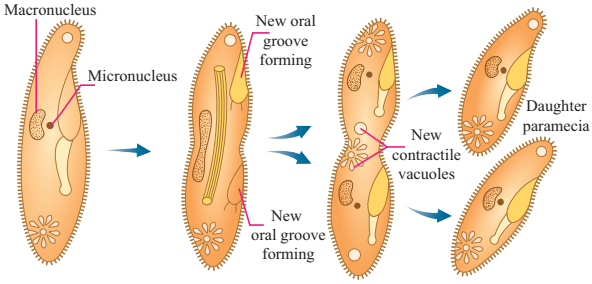
(i) **Simple binary fission** is seen in *Amoeba* like irregular shaped organisms, where the plane of division is hard to observe. The contractile vacuoles cease to function and disappear. The nucleoli disintegrate and the nucleus divides mitotically. The cell then constricts in the middle, so the cytoplasm divides and forms two daughter cells.



Irregular simple binary fission in Amoeba

(ii) In **transverse binary fission**, the plane of the division runs along the transverse axis of the individual. **E.g.** *Paramecium*

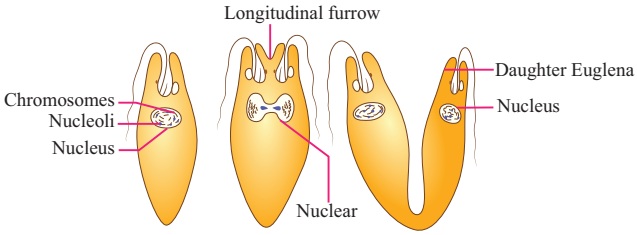
and *Planaria*. In *Paramecium* the macronucleus divides by amitosis and the micronucleus divides by mitosis.



Transverse binary fission in Paramecium

(iii) In **longitudinal binary fission**, the nucleus and the cytoplasm divides in the longitudinal axis of the organism. In flagellates, the flagellum is retained usually by one daughter cell. The basal granule is divided into two and the new basal granule forms a flagellum in the other daughter individual. **E.g.** *Vorticella* and *Euglena*.

(iv) In **oblique binary fission** the plane of division is oblique. It is seen in dinoflagellates. **E.g.** *Ceratium*.



Longitudinal binary fission in Euglena

HOTS

1. The organisms exhibiting sexual reproduction shows variations. Give reasons.

Ans. (i) Sexual reproduction involves formation of gametes by meioses brings in exchange of chromosomal segments between paternal and maternal chromosomes.

(ii) Fertilization is a chance of probability because the ovum is can be fertilized by any of the sperms. Hence variations will occur and degree of variations cannot be predicted in sexual reproduction.

Unit Test

[Time : 1 hr] [Marks: 25]

I. Choose the Correct Answer. 10 × 1 = 10

1. **Technique used for cultivation of sponges is based on _____**
(a) Multiple fission (b) Parthenogenesis
(c) Regeneration (d) Autogamy

2. **Conjugation is a type of _____**
(a) Asexual reproduction
(b) Autogamy
(c) External fertilization
(d) Sexual reproduction

3. **Choose the correct pair**
i. **Shark - placenta**
ii. ***Taenia solium* - Regeneration**
iii. **Frog - Continuous breeder**
iv. **Plasmotomy - *Pelomyxa***
(a) i and iii (b) ii and iii
(c) i and iv (d) i, ii and iv

4. (i) **Lizard is a continuous breeder.**
(ii) **Asexual reproduction is also known as somatogenic reproduction**
(iii) **In repeated fission, young ones do not separate till fission process is completed.**
(iv) **strobilation is a kind of longitudinal fission.**
(a) i and iii (b) i, ii and iv
(c) ii and iii (d) ii and iv

5. **Starfish shown ____ type of regeneration.**
(a) epimorphosis - reparative
(b) epimorphosis (restorative)
(c) morphallaxis
(d) paedogenesis

6. **Assertion : Ovoviviparity is seen is shark**
Reason : Placentas is formed to transfer nutrients to the embryo
(a) If both A and R are true and R is correct explanation for A
(b) If both A and R are true but R is not the correct explanation for A
(c) If A is true but R is false
(d) If both A and R are false.

7. **Which statement is incorrect regarding the type of binary fission stated?**
(a) Transverse binary fission in seen in *Planaria*.
(b) Longitudinal binary fission in seen in *Euglena*.
(c) Oblique binary fission in seen in *flagellates*.
(d) Simple binary fission in seen in *Amoeba*.

8. **Division of cytoplasm is called _____**
(a) karyokinesis (b) cytokinesis
(c) *Trichonympha* (d) Paedogamy

9. **The mode of asexual reproduction in bacteria is by**
(a) Formation of gametes
(b) Endospore formation
(c) Conjugation
(d) Zoospore formation

10. **In which mode of reproduction variations are seen**
(a) Asexual (b) Parthenogenesis
(c) Sexual (d) Both a and b

II. Very Short Answer 2 × 2 = 4

11. What is repeated fission? Give an example.
12. Explain apolysis.

III. Short Answer 2 × 3 = 6

13. What is
(a) Merogamy (b) Hologamy
14. Draw a gemmula and label any two parts.

IV. Long Answer 1 × 5 = 5

15. Write a note on parthenogenesis.