EXERCISES PAGE NO.17

1. Why is reproduction essential for organisms?
Solution:
Reproduction is essential for the continuity of species on earth. If the organisms do not reproduce, life will cease to exist.

2. Which mode of reproduction is better: asexual or sexual? Why?
Solution:
Sexual reproduction is better than asexual reproduction because it produces offsprings that are genetically unique from the parents. It also means that the offspring will be more resilient and be able to survive better than either parent due to genetic variation.

3. Why is the offspring formed by asexual reproduction referred to as clone?
Solution:
The offsprings formed by asexual reproduction are referred to as clones because it involves only a single parent. Furthermore, there is no recombination of genes and the offsprings produced are genetically identical.

4. Offsprings formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?
Solution:
Sexual reproduction is said to occur when two gametes fuse. This leads to the production of the offspring that are genetic variants of the parents, and therefore, are able to survive better.
However, the organisms produced by sexual reproduction do not always survive more than those produced by asexual reproduction. Sometimes, the organisms produced by asexual reproduction survive better than those produced by sexual reproduction. Also, it is a fairly quick process and consumes less energy and time.

5. How does the progeny formed from asexual reproduction differ from those formed by sexual reproduction?
Solution:
The progeny formed by asexual reproduction involves a single parent and are genetically identical to the parent whereas the progeny formed by sexual reproduction are formed when male and female gametes fuse together and are genetically unique.

6. Distinguish between sexual and asexual reproduction. Why is vegetative reproduction also considered a type of asexual reproduction?
Solution:
Differences between sexual and asexual reproduction are mentioned below:

Sexual Reproduction	Asexual Reproduction

It takes place by the fusion of male and female gametes.	In this, the organism arises from a single organism.
The offsprings produced are not identical to the parents.	The offsprings produced are identical to the parents and are known as clones.
It is found in higher invertebrates and all the vertebrates.	It is found in lower organisms.
It is a slow process.	It is faster compared to sexual reproduction.
For eg., budding, fragmentation, binary fission	For eg., syngamy, conjugation

Vegetative reproduction is considered to be a form of asexual reproduction as it does not involve the fusion of male and female gametes. In this, a new plant grows from the fragment of the genetically identical parent plant.

7. What is vegetative propagation? Give two suitable examples.
Solution:
Vegetative propagation is a common form of asexual reproduction observed plants. In this, a fragment of a plant is used to grow another plant. Many plants reproduce naturally as well artificially by vegetative propagation and the offsprings produced are genetically identical.
For eg., ginger, garlic

8. Define:
a) **Juvenile phase**
b) **Reproductive phase**
c) **Senescent phase**

Solution:
a) **Juvenile phase:** It is defined as the period of growth between an organism's birth and reproductive maturity.
b) **Reproductive phase:** It is the phase in which an organism can reproduce sexually. In males, it lasts until death, but in females it lasts uptil the age of 50.
c) **Senescent phase:** It is the period of ageing in an organism.

9. Higher organisms have resorted to sexual reproduction in spite of their complexity. Why?
Solution:
Higher organisms undergo sexual reproduction despite its complex nature because the organisms are produced by the fusion of two different gametes and therefore show genetic variations. Due to these variations, they are well adapted to different environmental factors, and hence usually have higher rates of survival.

10. Explain why meiosis and gametogenesis are always interlinked?
Solution:
Meiosis is the process that occurs during gametogenesis. Gametogenesis refers to process how gametes are formed. Meiosis is necessary for the formation of gametes. Hence, both the processes are said to be interlinked.

11. Identify each part in a flowering plant and write whether it is haploid (n) or diploid (2n).

a) Ovary
b) Anther
c) Egg
d) Pollen
e) Male gamete
f) Zygote

Solution:

a) Ovary - Diploid (2n)
b) Anther – Diploid (2n)
c) Egg – Haploid (n)
d) Pollen – Haploid (n)
e) Male gamete – Haploid (n)
f) Zygote – Diploid (2n)

12. Define external fertilization. Mention its disadvantages.

Solution:

External fertilization is a mode of reproduction characterized by the fertilization of male and female gametes outside the body of the organisms. External fertilization is observed in amphibians such as frogs and toads. However, there are a few drawbacks of external fertilization:

- The chances of survival of the gametes are very less.
- Not all the gametes are fertilized.
- The gametes might desiccate.
- The predators usually eat the eggs.

13. Differentiate between a zoospore and a zygote.

Solution:

The important differences between a zoospore and a zygote are mentioned below:

Zoospore	Zygote
These are formed inside the zoosporangium.	These are formed by the fusion of male and female gametes.
Result of asexual reproduction.	Result of sexual reproduction.
Flagellated and motile spore.	Non-motile.
Can be haploid or diploid.	Diploid.
Participates in dispersal.	Does not participate in dispersal.
It is found in algae, fungi and protozoans.	Found in higher organisms.

14. Differentiate between gametogenesis and embryogenesis.

Solution:

Following are the crucial differences between gametogenesis and embryogenesis:

Gametogenesis	Embryogenesis
It is the process of formation of male and female gametes.	It is the process of formation and development of an embryo.
Both meiosis and mitosis occur during the process.	Just mitosis occurs during the process.
Oogenesis and spermatogenesis are the two processes of gametogenesis.	Embryogenesis leads to organogenesis.
Occurs before fertilization.	Occurs after fertilization.
In animals, it occurs inside the ovaries and testis of animals, and antheridia and archegonia in plants.	It occurs inside the female reproductive system of animals, and in female gametophyte in the plants.
Formation of haploid gametes.	Formation of diploid cells of the embryo.

15. Describe the post-fertilization changes in a flower.
Solution:
The post-fertilization changes include:

1) The sepals, petals and stamens fall off, while the pistil remains attached to the flower.
2) The zygote develops into an embryo.
3) The ovule forms the seed.
4) The ovary develops into the fruit.

16. What is a bisexual flower? Collect five bisexual flowers from your neighborhood and write their scientific names.
Solution:
The flowers that contain both female and male reproductive structures are considered a bisexual flower. The androecium is the male reproductive structure, while the female reproductive structure is gynoecium. Examples of bisexual flowers are:

1) *Solanum lycopersicum* (Tomato)
2) *Tulipa* (Tulip)
3) *Helianthus* (Sunflower)
4) *Brassica* (Mustard)
5) *Narcissus* (Daffodil)

17. Examine a few flowers of any cucurbit plant and try to identify the staminate and pistillate flowers. Do you any other plant that bears unisexual flowers?
Solution:
Flowers that bear stamens are called staminate flowers while the flowers that bear pistil are known as pistillate flowers. Cucurbit plants bear unisexual flowers, i.e., both the male and female reproductive structures are on the same plant.
The staminate flowers of cucurbit have petals that are coloured bright yellow. It also has stamens which

function as the male reproductive structures of a flower. The female reproductive structures of a flower are the pistils, which is present on the pistillate flowers.
Papaya is another plant that bears unisexual flowers.

18. Why are offsprings of oviparous animals at a greater risk as compared to offsprings of viviparous animals?
Solution:
Oviparous animals are the animals that lay eggs which mature outside the mother. These eggs are at a greater risk of being destroyed by predators or environmental factors. In the case of viviparous organisms; however, the eggs develop inside the female, and therefore, the fetus is shielded from predators and environmental threats as opposed to the fetus of oviparous animals.