

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 offspring 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 a clone?**Solution:**

The offspring formed by asexual reproduction is referred to as clones because it involves only a single parent. Furthermore, there is no recombination of genes, and the offspring produced is 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 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 is genetically identical to the parent, whereas the progeny formed by sexual reproduction is 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 through 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 vertebrates.	It is found in lower organisms.
It is a slow process.	It is faster compared to sexual reproduction.
For e.g., Humans and nearly most other higher lifeforms exhibit sexual reproduction. Conjugation can also be considered the bacterial equivalent of sexual reproduction.	For e.g., Budding and fragmentation. Even cloning is considered a form of asexual reproduction.

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 in plants. In this, a fragment of a plant is used to grow another plant. Many plants reproduce naturally as well as artificially by vegetative propagation, and the offspring produced is genetically identical.

For e.g., Ginger and garlic.

8. Define:

- Juvenile phase**
- Reproductive phase**
- Senescent phase**

Solution:

- 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 until 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 the process of how gametes are formed. Meiosis is necessary for the formation of gametes. Hence, both processes are said to be interlinked.

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

1. **Ovary**
2. **Anther**
3. **Egg**
4. **Pollen**
5. **Male gamete**
6. **Zygote**

Solution:

1. Ovary – Diploid (2n)
2. Anther – Diploid (2n)
3. Egg – Haploid (n)
4. Pollen – Haploid (n)
5. Male gamete – Haploid (n)
6. Zygote – Diploid (2n)

12. Define external fertilisation. Mention its disadvantages.

Solution:

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

- The chances of survival of the gametes are very less.
- Not all gametes are fertilised.
- 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 the 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 fertilisation.	Occurs after fertilisation.
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 gametophytes of plants.
Formation of haploid gametes.	Formation of diploid cells of the embryo.

15. Describe the post-fertilisation changes in a flower.

Solution:

The post-fertilisation 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 neighbourhood and write their scientific names.

Solution:

The flowers that contain both female and male reproductive structures are considered bisexual flowers. The androecium is the male reproductive structure, while the female reproductive structure is the 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 know any other plant that bears unisexual flowers?

Solution:

Flowers that bear stamens are called staminate flowers, while flowers that bear pistils 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 are 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 foetus is shielded from predators and environmental threats, as opposed to the foetus of oviparous animals.

