
1. Reproduction in Organisms

Question 1. Define vital capacity. What is its significance?

Answer: Reproduction is essential for organism because through reproduction we can reproduce our young ones who are similar to us in most of our characters. Reproduction enables us to continue the life of species even after our death.

Question 2. Which mode of reproduction is better: asexual or sexual? Why?

Answer: Sexual reproduction is a better mode of reproduction. It allows the formation of new variants by the combination of the DNA from two different individuals, typically one of each sex. It involves the fusion of the male and the female gamete to produce variants, which are not identical to their parents as well as among themselves. These variations allow the individual to adapt to constantly changing and challenging environments. Also, it leads to the evolution of better suited organisms which ensures greater survival of a species. On the contrary, asexual reproduction allows very little or no variation at all. As a result, the individuals produced are exact copies of their parents and exactly similar to each other as well.

Question 3. Why is the offspring formed by asexual reproduction referred to as clone?

Answer: Clone is defined as group of morphologically and genetically identical individuals. In the process of asexual reproduction, only one parent is involved to produce morphologically and genetically similar off spring from parents and are thus called clones

Question 4. Offsprings formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?

Answer: Yes, it is true that offsprings born from sexual reproduction have better survival rates than those of asexual reproduction. This is because during sexual reproduction, the gametes of two parents, male and female, come together and fuse. Thus, the offspring has the genetic material of both the parents. Apart from this, variations are also introduced in the offsprings. As a result, they are better adapted to the environment as these variations help them to survive better.

Question 5. How does the progeny formed from asexual reproduction differ from those formed by sexual reproduction?

Answer: In asexual reproduction, offsprings are produced by a single parent without the involvement of gamete formation and fusion. Thus offsprings resemble the parent genetically and morphologically. In sexual reproduction, fusion of gametes occur and fertilization and meiosis are essential events. Here, offsprings differ from parents due to appearance of variations.

Question 6. Distinguish between sexual and asexual reproduction. Why is vegetative reproduction also considered a type of asexual reproduction?

Answer: Differences between sexual and asexual reproduction are as follows:

Asexual reproduction	Sexual reproduction
It involves a single parent	It involves two parents
There is no requirement of sex organs and gametes	Gamete formation occurs in sex organs
It involves somatic cells of the body	it involves germ cells of the body
Offsprings produced in asexual reproduction are exactly similar to their parent	offsprings produced in sexual reproduction are different from their parents
It occurs rapidly	It is a slow process
It occurs in unicellular organisms, lower invertebrates, plants etc.	It occurs in higher organisms

Vegetative reproduction is considered to be a type of asexual reproduction because

1. Vegetative reproduction is uniparental i.e. it involves a single parent.
2. The reproductive propagules of vegetative reproduction are somatic cells as in asexual reproduction.
3. Meiosis and fertilisation are absent in vegetative reproduction.
4. Vegetative reproduction does not cause variations. The offsprings produced are similar to their parent

Question 7. What is vegetative propagation? Give two suitable examples.

Answer: Vegetative propagation is a mode of asexual reproduction in which new plants are obtained from the vegetative parts of plants. It does not involve the production of seeds or spores for the propagation of new plants. Vegetative parts of plants such as runners, rhizomes, suckers, tubers, etc. can be used as propagules for raising new plants. Examples of vegetative reproduction are:

1. Eyes of potatoes

The surface of a potato has several buds called eyes. Each of these buds when buried in soil develops into a new plant, which is identical to the parent plant.

2. Leaf buds of *Bryophyllum*:

The leaves of *Bryophyllum* plants bear several adventitious buds on their margins. These leaf buds have the ability to grow and develop into tiny plants when the leaves get detached from the plant and come in contact with moist soil.

Question 8. Define:

- I. **Juvenile phase**
- II. **Reproductive phase**
- III. **Senescent phase**

Answer:

(i) Juvenile phase is the period of growth between the birth of an individual up to maturity.

(ii) Reproductive phase starts after the juvenile phase and remains up to the stage when an organism is capable of reproduction.

(iii) Senescent phase is the phase of ageing when an organism loses its capacity of reproduction. In plants, it is characterised by yellowing and leaf fall.

Question 9. Higher organisms have resorted to sexual reproduction in spite of their complexity. Why?

Answer: Higher organisms have resorted to sexual reproduction due to it allows genetic variations through the combination of different gametes and improves the genetic makeup in the offspring. These factors may give rise to survival advantages on species and contribute to evolution.

Question 10. Explain why meiosis and gametogenesis are always interlinked?

Answer: Meiosis refers to the cell division which causes a reduction in the number of chromosomes by half and gametogenesis is the formation of male and female gametes. These two terms are often interlinked because gamete formation in diploid organisms occurs through meiosis only. The number of chromosomes in diploid organisms must be reduced to half because if this doesn't happen then the zygote after fertilisation would have $4n$ ploidy. Thus, gametogenesis and meiosis are interlinked.

Question 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

Answer:

(a) Ovary – Diploid

(b) Anther - Diploid

(c) Egg - Haploid

(d) Pollen – Haploid

(e) Male gamete – Haploid

(f) Zygote - Diploid

Question 12. Define external fertilization. Mention its disadvantages.

Answer: External fertilization is the process in which the fusion of the male and the female gamete takes place outside the female body in an external medium, generally water. Fish, frog, starfish are some organisms that exhibit external fertilization. Disadvantages of external fertilization: In external fertilization, eggs have less chances of fertilization. This can lead to the wastage of a large number of

eggs produced during the process. Further, there is an absence of proper parental care to the offspring, which results in a low rate of survival in the progenies.

Question 13. Differentiate between a zoospore and a zygote.

Answer:

Zoospore and zygote are differentiated as follows:

Zoospore	Zygote
Asexual spore generated by some species of fungi and algae	Sexually reproduced cells, where female and male gametes unite
It is flagellated and motile	It is non flagellated and motile or non-motile
Diploid or haploid	Diploid
Produces individuals after germination	Undergoes development forming an embryo producing new individuals
Formed in lower entities	Formed in higher plant and animal entities
Formed inside zoosporangium	Formed by gamete fusion

Question 14. Differentiate between gametogenesis and embryogenesis.

Answer: Differentiation between gametogenesis and embryogenesis is as follows:

Gametogenesis	Embryogenesis
The process of formation of gametes is called gametogenesis	The process of formation of the embryo is called embryogenesis
This process involves meiotic divisions that lead to the formation of gametes	This process involves mitotic division that leads to the development of a zygote into an embryo
Gametogenesis leads to fertilisation	embryogenesis is followed by organogenesis

Question 15. Describe the post-fertilization changes in a flower.

Answer: In flowering plants, zygote is formed inside the ovule. After fertilization, sepals, petals and stamens of the flower wither and fall off. The pistil remains attached to the flower. Zygote forms the embryo and ovule having embryo forms the seed. Ovary wall develop into fruit wall (pericarp). Ovary develops into fruit. Pericarp is protective in function. After dispersal of fruits and seeds, seed germinate to form new plants and suitable germinating conditions.

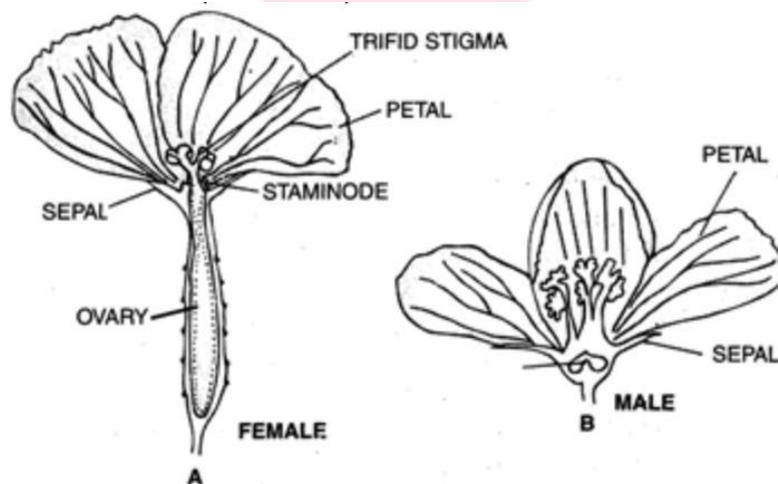
Question 16. What is a bisexual flower? Collect five bisexual flowers from your neighborhood and write their scientific names.

Answer: A flower that contains both the male and female reproductive structure (stamen and pistil) is called a bisexual flower. Examples of plants bearing bisexual flowers are:

- (1) Water lily (*Nymphaea odorata*)
- (2) Rose (*Rosa multiflora*)
- (3) Hibiscus (*Hibiscus Rosa-sinensis*)
- (4) Mustard (*Brassica nigra*)
- (5) Petunia (*Petunia hybrida*)

Question 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?

Answer: Study a flowering plant of family Cucurbitaceae (Gourd family) like *Luffa aegyptiaca* (Ghia tori). It is observed that male flowers are present at the summit peduncles and female flowers are solitary. Both male and female flowers are borne on the same plant (monoecious). Male flowers bear five stamens. In these flowers gynoecium is absent. Female flowers bear three fused carpels, inferior ovary, unilocular and parietal placentation. In such flowers androecium is absent.



Luffa aegyptiaca (Ghia tori) A. V.S. Female flower, B. V.S. Male flower.

Question 18. Why are offsprings of oviparous animals at a greater risk as compared to offsprings of viviparous animals?

Answer: Oviparous animals lay eggs outside their body. As a result, the eggs of these animals are under continuous threat from various environmental factors. On the other hand, in viviparous animals, the development of the egg takes place inside the body of the female. Hence, the offspring of an egg-laying or oviparous animal is at greater risk as compared to the offspring of a viviparous animal, which gives birth to its young ones.