

# Reproduction in Organisms: Exemplar Solutions

## Multiple Choice Questions (MCQs)

1. A few statements describing certain features of reproduction are given below

**I. gametic fusion takes place.**

**II. transfer of genetic material takes place.**

**III. reduction division takes place.**

**IV. progeny have some resemblance with parents.**

Select the options that are true for both asexual and sexual reproduction from the options given below

- (a) I and II
- (b) II and III
- (c) II and IV
- (d) I and III

**Ans. (c) II and IV**

2. The term 'clone' cannot be applied to offspring formed by sexual reproduction because

- (a) offspring do not possess exact copies of parental DNA
- (b) DNA of only one parent is copied and passed on to the offspring
- (c) offspring are formed at different times
- (d) DNA of parent and offspring are completely different

**Ans. (a) offspring do not possess exact copies of parental DNA**

3. Amoeba and yeast reproduce asexually by fission and budding, respectively, because they are

- (a) microscopic organisms
- (b) heterotrophic organisms
- (c) unicellular organisms
- (d) uninucleate organisms

**Ans. (c) unicellular organisms**

4. A few statements with regard to sexual reproduction are given below

**I. Sexual reproduction does not always require two individuals.**

**II. Sexual reproduction generally involves gametic fusion.**

**III. Meiosis never occurs during sexual reproduction.**

**IV. External fertilisation is a rule during sexual reproduction.**

Choose the correct statements from the options below.

- (a) I and IV
- (b) I and II
- (c) II and III
- (d) I and IV

**Ans. (c) II and III**

**5. A multicellular, filamentous alga exhibits a type of sexual life cycle in which the meiotic division occurs after the formation of zygote. The adult filament of this alga has**

- (a) haploid vegetative cells and diploid gametangia
- (b) diploid vegetative cells and diploid gametangia
- (c) diploid vegetative cells and haploid gametangia
- (d) haploid vegetative cells and haploid gametangia

**Ans.** (d) haploid vegetative cells and haploid gametangia

**6. The male gametes of rice plant have 12 chromosomes in their nucleus. The chromosome number in the female gamete, zygote, and the cells of the seedling will be, respectively**

- (a) 12, 24, 12
- (b) 24, 12, 12
- (c) 12, 24, 24
- (d) 24, 12, 24

**Ans.** (c) 12, 24, 24

**7. Given below are a few statements related to external fertilisation.**

**I. The male and female gametes are formed and released simultaneously.**

**II. Only a few gametes are released into the medium.**

**III. Water is the medium in a majority of organisms exhibiting external fertilisation.**

**IV. Offspring formed as a result of external fertilisation have better chances of survival than those formed inside an organism.**

Choose the correct statements.

- (a) III and IV
- (b) I and III
- (c) II and IV
- (d) I and IV

**Ans.** (b) I and III

**8. The statements given below describe certain features that are observed in the pistil of flowers.**

**I. Pistil may have many carpels.**

**II. Each carpel may have more than one ovule.**

**III Each carpel has only one ovule.**

**IV. Pistils have only one carpel.**

Choose the statements that are true from the options below.

- (a) I and II
- (b) I and III
- (c) II and IV
- (d) III and IV

**Ans.** (a) I and II

**9. Which of the following situations correctly describes the similarity between an angiosperm egg and a human egg?**

**I. Eggs of both are formed only once in a lifetime.**

**II. Both the angiosperm egg and human egg are stationary.**

**III. Both the angiosperm egg and human egg are motile transported.**

**IV. Syngamy in both results in the formation of zygote.**

Choose the correct answer from the options given below.

- (a) II and IV
- (b) only IV
- (c) III and IV
- (d) I and IV

**Ans. (b) only IV**

**10. Appearance of vegetative propagules from the nodes of plants such as sugarcane and ginger is mainly because**

- (a) Nodes are shorter than internodes
- (b) Nodes have meristematic cells
- (c) Nodes are located near the soil
- (d) Nodes have non-photosynthetic cells

**Ans. (b) nodes have meristematic cells**

**11. Which of the following statements supports the view that elaborate sexual reproductive processes appeared much later in the organic evolution?**

**I. Lower groups of organisms have simpler body designs.**

**II. Asexual reproduction is common in lower groups.**

**III. Asexual reproduction is common in higher groups of organisms.**

**IV. The high incidence of sexual reproduction in angiosperms and vertebrates.**

Choose the correct answer from the options given below.

- (a) I and III
- (b) I and III
- (c) II and IV
- (d) II and III

**Ans. (c) II and IV**

**12. Offspring formed by sexual reproduction exhibit more variation than those formed by asexual reproduction because**

- (a) sexual reproduction is a lengthy process
- (b) gametes of parents have qualitatively different genetic composition
- (c) genetic material comes from parents of two different species
- (d) greater amount of DNA is involved in sexual reproduction

**Ans. (b) gametes of parents have qualitatively different genetic composition**

**13. Choose the correct statement from amongst the following.**

- (a) Dioecious (hermaphrodite) organisms are seen only in animals.
- (b) Dioecious organisms are seen only in plants.
- (c) Dioecious organisms are seen in both plants and animals.
- (d) Dioecious organisms are seen only in vertebrates.

**Ans.** (c) Dioecious organisms are seen in both plants and animals.

**14. There is no natural death in single-celled organisms like Amoeba and bacteria because**

- (a) They cannot reproduce sexually
- (b) They reproduce by binary fission
- (c) The parental body is distributed among the offspring
- (d) They are microscopic

**Ans.** (c) parental body is distributed among the offspring

**15. There are various types of reproduction. The type of reproduction adopted by an organism depends on**

- (a) the habitat and morphology of the organism
- (b) morphology of the organism
- (c) morphology and physiology of the organism
- (d) the organism's habitat, physiology, and genetic makeup

**Ans.** (d) the organism's habitat, physiology, and genetic makeup

**16. Identify the incorrect statement.**

- (a) In asexual reproduction, the offspring produced are morphologically and genetically identical to the parent.
- (b) Zoospores are sexual reproductive structures.
- (c) In asexual reproduction, a single parent produces offspring with or without the formation of gametes.
- (d) Conidia are asexual structures in Penicillium.

**Ans.** (b) Zoospores are sexual reproductive structures.

**17. Which of the following is a post-fertilisation event in flowering plants?**

- (a) Transfer of pollen grains
- (b) Embryo development
- (c) Formation of flower
- (d) Formation of pollen grains

**Ans.** (b) Embryo development

**18. The number of chromosomes in the shoot tip cells of a maize plant is 20. The number of chromosomes in the microspore mother cells of the same plant shall be**

- (a) 20
- (b) 10
- (c) 40
- (d) 15

**Ans.** (a) 20

### Very Short Answer Type Questions

**1. Mention two inherent characteristics of Amoeba and yeast that enable them to reproduce asexually.**

**Ans.** The characteristics that enable Amoeba and yeast to reproduce asexually are as follows.

- (i) Unicellularity
- (ii) Simple body organisation
- (iii) Uniparental condition

**2. Why do we refer to offspring formed by asexual methods of reproduction as clones?**

**Ans.** The reproduction is called asexual when offspring are produced by a single parent with or without the involvement of gamete formation.

As a result, the offspring that are produced are not only similar to one another but are also exact copies of their parents. Such a group of morphologically and genetically similar individuals is called a clone.

**3. Although potato tuber is an underground part, it is considered as a stem. Give two reasons.**

**Ans.** The potato tuber is considered a stem because of the following reasons.

- (i) The tuber has nodes and internodes.
- (ii) Leafy shoots appear from the nodes.

**4. Between an annual and a perennial plant, which one has a shorter juvenile phase? Give one reason.**

**Ans.** In a lifespan, the organism has to grow and develop (the juvenile phase). After that, the organism matures sexually and enters the reproductive phase, before it undergoes senescence, followed by death. Since the entire life cycle of an annual plant is shorter and has to be completed in one growing season, its juvenile phase is shorter than that of a perennial plant.

**5. Rearrange the following events of sexual reproduction in the sequence in which they occur in a flowering plant: embryogenesis, fertilisation, gametogenesis, pollination.**

**Ans.** The correct sequence of events of sexual reproduction in a flowering plant is as follows: gametogenesis, pollination, fertilisation, and embryogenesis.

**6. The probability of fruit set in a self-pollinated bisexual flower of a plant is far greater than in a dioecious plant. Explain.**

**Ans.** The probability of fruit set in a self-pollinated bisexual flower of a plant is far greater than in a dioecious plant.

In self-pollinated bisexual plants transfer of pollen to the stigma of flowers is easier than the dioecious plants. It is so because the anther and stigma lie close to each other, and pollination is not affected even in the absence of pollinators. But in dioecious plants pollinator is necessary to bring about effective pollination as the anther and stigma lie away from each other.

**7. Is the presence of a large number of chromosomes in an organism a hindrance to sexual reproduction? Justify your answer by giving suitable reasons.**

**Ans.** No, the presence of a large number of chromosomes in an organism is not a hindrance to sexual reproduction. *Ophioglossum* (a fern) has a chromosome number of 1260, still it can reproduce sexually. In higher organisms, the chromosomes are present in a compartment called the nucleus, within the cell. Whether the number is small or large, the chromosomes are duplicated and then segregated inside this compartment during cell division. The basis of sexual reproduction is the generation of haploid gametes.

**8. Is there a relationship between the size of an organism and its life span? Give two examples in support of your answer.**

**Ans.** There is no relationship between the size and life span of an organism. e.g.,

- (i) The mango tree has a shorter life span as compared to a peepal tree, though both are of the same size.
- (ii) The size of the crow and parrot is almost the same, but the lifespan is 15 years and 150 years, respectively.

**9. In the figure given below, the plant bears two different types of flowers marked 'A' and 'B'. Identify the types of flowers and state the type of pollination that will occur in them.**



**Ans.** In the figure given below, the plant bears the following two types of flowers.

- A—Chasmogamous flower (the flowers remain open, exposing anthers and stigmas).
- B—Cleistogamous flowers (the flowers remain closed, so that anthers and stigmas are never exposed)

The following are the types of pollination that will occur in these flowers.

- (i) Autogamy (within the same flower)
- (ii) Geitonogamy (different flowers of the same plant)
- (iii) Xenogamy (different plants)

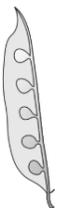
It is a case of cleistogamy (a type of autogamy) in which some plants, like *Commelina benghalensis*, possess both chasmogamous and cleistogamous flowers.

In chasmogamous flowers, the flowers may undergo self-pollination or cross-pollination, while in cleistogamous flowers, the flowers undergo only self-pollination.

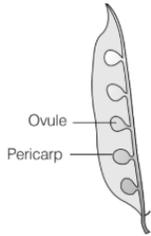
**10. Give reasons as to why cell division cannot be a type of reproduction in multicellular organisms.**

**Ans.** In unicellular animals, cell division is the means of reproduction to increase their number, while in the case of multicellular organisms, they have well-developed reproductive organs that help in reproduction. Their whole body does not participate in reproduction like unicellular organisms.

**11. In the figure given below, mark the ovule and pericarp.**



**Ans.** In flowering plants, the zygote is formed inside the ovule. After fertilisation, the sepals, petals, and stamens of the flower wither and fall off. The pistil, however, remains attached to the plant.



The zygote develops into the embryo, and the ovules develop into the seed. The ovary develops into the fruit, which develops a thick wall called the pericarp that is protective in function.

**12. Why do gametes produced in large numbers in organisms exhibit external fertilisation?**

**Ans.** Organisms that take part in such processes produce a large number of gametes because

- (i) In external fertilisation, there is a great chance that the sperm and the eggs released by the organisms can be affected by factors present in the environment, like desiccation, predators, etc. So, to make up for the high fatality rate of the gametes, the organism produces a lot of gametes.
- (ii) Producing a large number of gametes increases the chance for at least some eggs and sperm to meet in the environment, ensuring that at least a stable number of offspring can survive and carry on.

**13. Which of the following are monoecious and dioecious organisms?**

- (a) Earthworm .....
- (b) Chara .....
- (c) Marchantia .....
- (d) Cockroach .....

**Ans.**

- (a) Earthworm- Monoecious animal
- (b) Chara- Monoecious plant
- (c) Marchantia-Dioecious plant
- (d) Cockroach- Dioecious animal

**14. Match the organisms given in column I with the vegetative propagules given in column II.**

Column I	Column II
A. Bryophyllum	1. Offset
B. Agave	2. Eyes
C. Potato	3. Leaf buds
D. Water hyacinth	4. Bulbils

**Ans.** The correct matching is as follows.

Column I	Column II
A. Bryophyllum	3. Leaf buds
B. Agave	4. Bulbils
C. Potato	2. Eyes
D. Water hyacinth	1. Offset

In plants, the units of vegetative propagation, such as runners, rhizomes, sucker, tubers, offsets, bulbs, are all capable of giving rise to new offspring. These structures are called vegetative propagules.

**15. What do the following parts of a flower develop into after fertilisation?**

(a) Ovary .....

(b) Ovules .....

Ans.

- (a) Ovary ..... fruit
- (b) Ovules ..... seed

After fertilisation, the zygote develops into the embryo, and the ovules develop into the seed. The ovary develops into the fruit, which develops a thick, protective wall called the pericarp.

### Short Answer Type Questions

**1. In haploid organisms that undergo sexual reproduction, name the stage in the life cycle when meiosis occurs. Give reasons for your answer.**

Ans. Meiosis can take place only in a diploid stage (post-zygotic stage) because the zygote is the only diploid cell in the life cycle of such organisms. This meiosis, the case of haploid organisms, will occur upon fertilisation.

**2. The number of taxa exhibiting asexual reproduction is drastically reduced in higher plants (angiosperms) and higher animals (vertebrates) as compared with lower groups of plants and animals. Analyse the possible reasons for this situation.**

Ans. Higher plants (angiosperms) and higher animals (vertebrates) have a more complex structural organisation as compared to the lower groups of plants and animals. They have evolved a very efficient mechanism of sexual reproduction. These groups have resorted to reproduction by the sexual method for the following reasons.

- (i) To ensure healthy progeny
- (ii) To produce genetically varied offspring that adapt to changes in the environment and survive in all climatic conditions.
- (iii) It ensures the genetic recombination that results in variation, which gives rise to evolution.

**3. Honeybees produce their young ones only by sexual reproduction. In spite of this, in a colony of bees, we find both haploid and diploid individuals. Name the haploid and diploid individuals in the colony and analyse the reasons behind their formation.**

**Ans.**

- (i) Sterile diploid females as workers
- (ii) One fertile diploid female as queen
- (iii) Fertile haploid males as drones.

In the case of honeybees, both haploid and diploid individuals are formed as a result of incomplete (cyclic) parthenogenesis, i.e., both sexual reproduction and parthenogenesis. Fertilised eggs (zygotes) give rise to queens and workers (both are females) by the process of sexual reproduction, and unfertilised eggs (ova) develop into drones (males) by the process of parthenogenesis.

**4. With which type of reproduction do we associate the reduction division? Analyse the reasons for it.**

**Ans.** Reduction division (meiosis) is associated with sexual reproduction. The reasons are

- (i) Since sexual reproduction involves the fusion of two types of gametes, male and female, they must have a haploid number of chromosomes.
- (ii) The cell (meiocyte) which gives rise to gametes often has a diploid number of chromosomes, and it is only by reducing the number by half that we can get haploid gametes.
- (iii) Reduction division also ensures the maintenance of the constancy of chromosome number from generation to generation.

**5. Is it possible to consider vegetative propagation observed in certain plants like Bryophyllum, water hyacinth, ginger, etc., as a type of asexual reproduction? Give two/three reasons.**

**Ans.** The formation of new plants from vegetative units (vegetative propagules) such as buds, tubers, and rhizomes. etc., is called vegetative propagation (vegetative reproduction). It can be considered a type of asexual reproduction as it involves the production of new individuals.

- (i) by a single parent
- (ii) without the formation and fusion of gametes
- (iii) without resulting in any genetic or morphological variations.

**6. 'Fertilisation is not an obligatory event for fruit production in certain plants.' Explain the statement.**

**Ans.** Fertilisation is not an obligatory event for fruit production in certain plants. Some fruits are developed from unfertilised ovaries called parthenocarpic fruits.

These are seedless fruits, such as pomegranate, grapes, etc. Flowers of these plants are sprayed with a growth hormone that induces fruit development even though fertilisation has not occurred. The ovules of such fruits, however, fail to develop into seeds.

**7. In a developing embryo, analyse the consequences if cell divisions are not followed by cell differentiation.**

**Ans.** Cell divisions increase the number of cells in the developing embryo, while cell differentiation helps groups of cells to undergo certain modifications to form specialised tissues and organs to form an

organism. At many stages of embryogenesis, if cell differentiation does not occur, the embryo cannot develop into a new organism. It will only remain as a mass of cells.

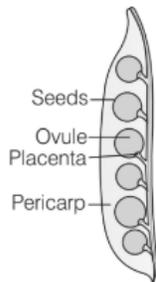
**8. List the changes observed in an angiosperm flower subsequent to pollination and fertilisation.**

**Ans.** In an angiosperm flower, the post-fertilisation changes occur as follows.

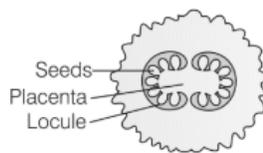
Sepal	Fall off
Petal	Fall off
Stamen	Fall off
Zygote	Embryo
Primary endosperm nucleus	Endosperm (3n)
Synergid	Disintegrate
Antipodals	Disintegrate
Ovary	Fruit
Ovule	Seed
Ovary wall	Pericarp (epicarp+mesocarp+endocarp)
Integument	Seed coat (testa+tegmen)
Funicle of the ovule	Stalk of the seed
Micropyle	Seed pore

**9. Suggest a possible explanation why the seeds in a pea pod are arranged in a row, whereas those in tomato are scattered in the juicy pulp.**

**Ans.** In peas, the fruit is a legume. The pea pod is developed from a monocarpellary, unilocular, and half-superior ovary. At maturity, the fruit splits along the dorsal and ventral sutures and discharges its seeds. In a gynoecium with a single carpel, ovules are always attached to the ventral suture. This results in the fruit with marginal placentation. Thus, the seeds are arranged in a row in legume (pea) pods.



**Marginal placentation in pea**



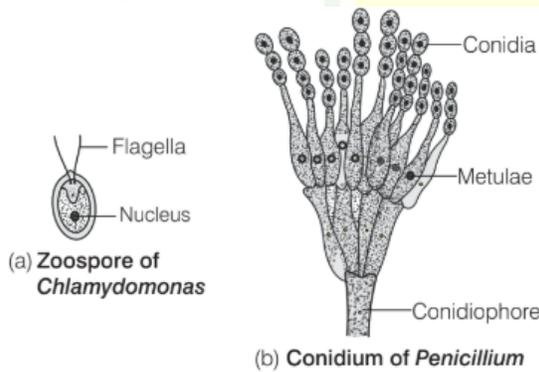
**Axial placentation in tomato**

In tomatoes, the fruit is a berry. It is a fleshy fruit developed from a superior or inferior ovary. In this, the margins of the carpels grow inward to the centre of the ovary, dividing the central chamber into compartments called locules.

So, the ovules are arranged radially on the axis, attached by a placenta that is called axial placentation. That's the reason the seeds are embedded in the juicy pulp.

**10. Draw the sketches of a zoospore and a conidium. Mention two dissimilarities between them and at least one feature common to both structures.**

**Ans.** The feature common to zoospores and conidia is that both are asexual reproductive structures, which facilitate the process of reproduction in asexually reproducing organisms.



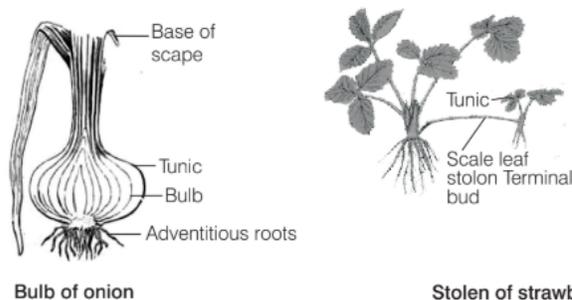
The two dissimilarities between these (zoospore and conidium) are as follows.

Zoospore (Found usually in Algae)	Conidium (Found usually in Fungi)
Flagellated	Non-flagellated
Formed inside a sporangium (endogenously)	Formed at the tip of conidiophores (exogenously)

**11. Justify the statement ‘vegetative reproduction is also a type of asexual reproduction’.**

**Ans.** In flowering plants, the units of vegetative reproduction, such as runners, stolons, suckers, offsets, rhizomes, corms, tubers, etc., are capable of giving rise to new offspring. These structures are called vegetative propagules.

In all these plants, the formation of these structures does not involve two parents; the process involved is asexual. So, it can be said that vegetative reproduction is also a type of asexual reproduction.



## Long Answer Type Questions

**1. Enumerate the differences between asexual and sexual reproduction. Describe the types of asexual reproduction exhibited by unicellular organisms.**

**Ans.** The differences between asexual and sexual reproduction are mentioned below.

Asexual Reproduction	Sexual Reproduction
Uniparental	Biparental
Somatic cells are involved.	Germ cells are involved.
It involves the production of asexual spores	It involves the formation and fusion of gametes.
Offspring are genetically similar to parents.	Offspring are genetically dissimilar to parents.
The rate of reproduction is faster.	The rate of reproduction is slower.

Asexual reproduction occurs usually in unicellular organisms, such as monerans and protists, and in plants and certain animals. It takes place in the following ways.

- (i) Binary Fission. In this type of asexual reproduction, the parent organism divides into two halves, each half forming an independent daughter organism. e.g., *Amoeba*, *Euglena*, *Paramecium*.
- (ii) Budding. In this type of asexual reproduction, a daughter individual is formed from a small projection, the bud, arising from the parent body. e.g., yeast, *Hydra*.
- (iii) Fragmentation. In this type of asexual reproduction, the parent body breaks into two or more fragments. Each body fragment develops into an organism. e.g., sponges, *Selaginella*.
- (iv) Gemmule: In this type of asexual reproduction, internal buds, called gemmules, are involved. Gemmules are asexual masses of cells that are capable of developing into a new organism. e.g., sponges.
- (v) Sporulation: In this type of asexual reproduction, dispersive structures called spores are released from the parent body that germinate under favourable conditions to form new individuals.
  - (a) Motile spores are called zoospores and are found in aquatic animals. e.g., *Albugo*, *Chlamydomonas*.
  - (b) Non-motile spores are named as sporangiospores (e.g., *Rhizopus*, *Mucor*) and conidia e.g., *Penicillium*.

**2. Do all the gametes formed from a parent organism have the same genetic composition (identical DNA copies of the parental genome)? Analyse the situation with the background of gametogenesis and provide or give suitable explanation.**

**Ans.** No, all the gametes formed from a parent organism do not have the same genetic composition.

It can be better understood with the help of the explanation given below

Sexual reproduction in organisms generally involves the fusion of gametes from two different individuals.

These gametes form by the process of gametogenesis. In the heterogametic species, gametes are of two

types, namely male and female. Gametes are haploid, though the parent body from which they arise may be either haploid or diploid.

- (a) A haploid parent, like Monera, fungi, algae, and bryophytes, produces gametes by mitotic division. The number of chromosomes, i.e., the genetic composition, remains the same after such a type of division.
- (b) The diploid parent, like pteridophytes, gymnosperms, angiosperms, and most of the animals, including human beings, produces gametes by meiosis. In such organisms (diploid), specialised cells called meiocytes (gamete mother cell) undergo meiosis. At the end of meiosis, only one set of chromosomes gets incorporated into each gamete. It means the gametes formed contain a haploid number of chromosomes, in contrast to the number of chromosomes in the mother cells.

**3. Although sexual reproduction is a long, drawn, energy-intensive complex form of reproduction, many groups of organisms in the kingdoms Animalia and Plantae prefer this mode of reproduction. Give at least three reasons for this.**

**Ans.** The following are the three reasons for the mode of sexual reproduction in the higher group of organisms.

- (i) The sexual mode of reproduction ensures the creation of new variants.
- (ii) Genetically varied offspring are produced that adapt to changes in the environment and survive in all climatic conditions.
- (iii) Sexual reproduction ensures the genetic recombination that results in variation, which gives rise to evolution.

**4. Differentiate between (a) oestrus and menstrual cycles; (b) ovipary and vivipary. Give an example for each type.**

**Ans.** The differences between oestrus and the menstrual cycle are as follows

(a) Oestrus and Menstrual cycles;

Oestrus cycle	Menstrual cycle
The cyclic changes in the activities of ovaries and accessory ducts, as well as hormones, during the reproductive phase of non-primate mammals are called the oestrus cycle.	The cyclic changes in the activities of the ovaries and accessory ducts, as well as hormones during the reproductive phase of primate mammals, are called the menstrual cycle.
Females show a strong, irresistible sexual urge.	Females do not show an irresistible sexual urge.
There is estrus/heat production at the time of ovulation, and copulation occurs only during that period.	There is no heat period, and copulation occurs at any time of the cycle.
The shedding of endometrium and bleeding do not occur. e.g., cows, sheep, rats, deer, dogs, and tigers, etc.	The shedding of endometrium and bleeding occur. e.g., monkeys, apes, and humans.

(b) The differences between ovipary and vivipary are as follows

Ovipary	Vivipary
In ovipary, animals lay eggs.	In vivipary, animals give birth to young ones.
The eggs are covered by a hard calcareous shell.	Ova are not covered by a calcareous shell.
The development of the zygote takes place outside the female's body.	The development of zygote takes place inside the female's body.
Females lay eggs in a safe place in the environment, but the chances of survival are less	Females deliver young ones, and the chances of survival are higher.
e.g., All birds, most reptiles are egg-laying mammals.	e.g., Mammals except monotremes are egg-laying mammals.

**5. Rose plants produce large, attractive bisexual flowers, but they seldom produce fruit. On the other hand, a tomato plant produces plenty of fruits, though they have small flowers. Analyse the reasons for failure of fruit formation in roses.**

**Ans.** Rose plants produce large, attractive bisexual flowers, but they seldom produce fruit. The reasons for the failure of fruit formation in roses are as follows.

- (i) Rose plants may not produce viable pollen; hence, no fertilisation can take place.
- (ii) Rose plants may not have functional eggs.
- (iii) Rose plants may have defective and non-functional ovules, which are the female gametophyte generators.
- (iv) There may be self-incompatibility.
- (v) There may be internal barriers for pollen tube growth or fertilisation.
- (vi) As rose plants are hybrids and reproduce vegetatively, there are chances for them to be sterile.

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