HOW DO ORGANISMS REPRODUCE?

Solved Intext Exercises

Q1. What is the importance of DNA copying in reproduction?

Sol.

- The chromosomes in the nucleus of a cell contain information for the inheritance of features from the parents to next generation in the form of DNA (Deoxyribo Nucleic Acid) molecules. So, the first importance of DNA copying is that the characteristics of the parent organism are transmitted to its offsprings.
- When the DNA already present in the nucleus of a parent cell is copied by making more of DNA by certain biochemical reactions, then slight variations come in the two copies formed. These slight variation in the copying of DNA molecules lead to slight variations in the offspring produced. Thus, another importance of DNA copying is that some variations are produced in the offsprings during the reproduction which form the basis for evolution.

Q2. Why is variation beneficial to the species but not necessarily for the individual?

Sol. Variation is useful for the survival of a species even in adverse environmental conditions. This happens as follows: There may be some drastic changes like excessive heat or cold or shortage of water (drought0, etc., in the habitat of a species of organisms. Now, if all the organisms of a population living in that habitat are exactly identical, then there is danger that all of them may die and no one would survive under those conditions. This will eliminate the species from that habitat completely. However, if some variations are present in some individual organisms to tolerate excessive heat or cold or survive on meagre water supply, then there is a chance for them to survive and flourish even in adverse environment. For example, if there is a population of certain bacteria living in temperate water (which is neither very hot nor very cold) and the temperature of water increases too much due to global warming, then most of these bacteria will not be able to tolerate excessive heat and hence die. But some bacteria which had variations to resist heat would survive and grow further.

Q3. How does binary fission differ from multiple fission?

Sol. In binary fission, the parent organism splits (or divides) to form two new organisms. On the other hand, in multiple fission the parent organisms splits (or divides) to form many new organisms simultaneously. Amoeba reproduces by the process of binary fission whereas the malarial parasite Plasmodium reproduces by the process of multiple fission.

Q4. How will an organism be benefitted if it reproduces through spores?

Sol. The reproduction by spores takes place in plants. Spores are covered by hard protective coat which enables them to survive under unfavourable conditions like lack of food, lack of water and extreme temperatures. But when the conditions become favourable (food and water are available, and temperature is suitable), then the spores can grow to produce new plants. Thus, the reproduction by spores benefits the plants because by surviving under adverse conditions, the spores make these plants live for ever.

Q5. Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?

Sol. In complex multicellular organisms, specialised cells make up tissues; tissues make up organs; organs make up organ systems; and finally organ systems make up organisms. Since complex multicellular

organisms have a very high degree of organisation in their body, they cannot be reproduced from their cut body parts by the process of regeneration. For example, a dog is a complex multicellular organism which cannot be regenerated from its cut body part say, a cut tail. This is because the cells present in the cut tail of a dog cannot produce dog's organs like heart, brain, lungs, stomach, intestines and limbs, etc., needed for the making of a complete dog. The complex multicellular organisms need more complex ways of reproduction like sexual reproduction.

Q6. Why is vegetative propagation practiced for growing some types of plants?

Sol. Vegetative propagation is practiced for growing some type of plants because it has the following advantages:

- All the plants produced by vegetative propagation are genetically similar enough to the parent plant to have all its characteristics.
- The fruit trees grown from seeds may take many years before they start to bear fruits. But the fruit tree grown by vegetative propagation methods like cuttings or by grafting start to bear fruits much earlier (only after a few growing seasons).
- The plants grown by vegetative propagation usually need less attention in their early years than the plants grown from seeds.
- Many plants can be grown from just one parent plant by artificial propagation.
- Vegetative propagation makes possible the propagation of plants such as banana, rose, jasmine and orange that have lost the capacity to produce viable seeds.

Q7. Why is DNA copying an essential part of the process of reproduction?

Sol. DNA contains information for the inheritance of characteristics from the parents to the next generation. DNA copying is an essential part of the process of reproduction because it makes possible the transmission of characteristics of the parents to its offsprings in the next generation.

Q8. How is the process of pollination different from fertilisation?

Sol. Pollination is the transfer of pollen grains from the another of stamen of a flower to the stigma of a carpel in the same flower or another flower of the same species. On the other hand, fertilisation occurs when the male gamete present in the pollen grain joins with the female gamete (or egg) present in ovule to form a zygote.

Q9. What is the role of seminal vesicles and prostrate gland?

Sol. Seminal vesicles and prostrate gland occur in male reproductive system. The seminal vesicles and prostrate gland add their secretions to the vas deferens which carries sperms from the testes. The secretions of seminal vesicles and prostrate gland provide nutrition to the sperms and also make their further transport easier.

Q10. What are the changes seen in girls at the time of puberty?

Sol. The various changes which occur in girls at puberty are: Hair grow under armpits and pubic region. Mammary glands (or breasts) develop and enlarge. The hips broaden. Extra fat is deposited in various parts of the body like hips and thighs. Fallopian tubes, uterus and vagina enlarge. Ovaries start to release eggs. Menstruation (monthly periods) starts. Feelings and sexual drives associated with adulthood begin to develop.

Q11. How does the embryo get nourishment inside the mother's body?

Sol. The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. Placenta is a disc-shaped tissue which is embedded in the uterus wall (uterine wall). It has villi on the embryo side of the tissue. On the mother's side are blood spaces which surround the villi. Placenta provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo also produces waste substances which can be removed by transferring them into the mother's blood through the placenta.

Q12. If a woman is using a copper-T, will it help in protecting her from sexually transmitted diseases?

Sol. No, the use of copper-T for contraception will not protect a woman from sexually transmitted diseases.

Solved NCERT Exercises

Q1. Asexual reproduction takes place through budding in

(a) Amoeba.

(b) Yeast.

(c) Plasmodium.

(d) Leishmania.

Sol. (b) yeast

Q2. Which of the following is not a part of the female reproductive system in human beings?

(a) Ovary

(b) Uterus

(c) Vas deferens

(d) Fallopian tube

Sol. (c) vas deferens

Q3. The anther contains

(a) sepals.

(b) ovules.

(c) pistil.

(d) pollen grains.

Sol. (d) pollen grains

Q4. What are the advantages of sexual reproduction over asexual reproduction?

Sol.

- Sexual reproduction combines DNA from two individuals (male and female) due to which the offspring has a lot of variations. On the other hand, in asexual reproduction, only the DNA of one individual is copied due to which the variations in the offspring are extremely small.

- Due to lot of variations sexual reproduction allows species to change to more advanced forms from one generation to the next and speed up evolution. On the other hand, asexual reproduction does not allow a species to change much from one generation to the next and hence evolution becomes very, very slow.

Q5. What are the functions performed by the testis in human beings?

Sol. The function of testes is to make male sex cells (or male gametes) called sperms and also to make the male sex hormone called testosterone. The testosterone hormone brings about changes seen in the appearance of boys at the time of puberty such as deeper voice, beard, moustache, and more body hair (than girls).

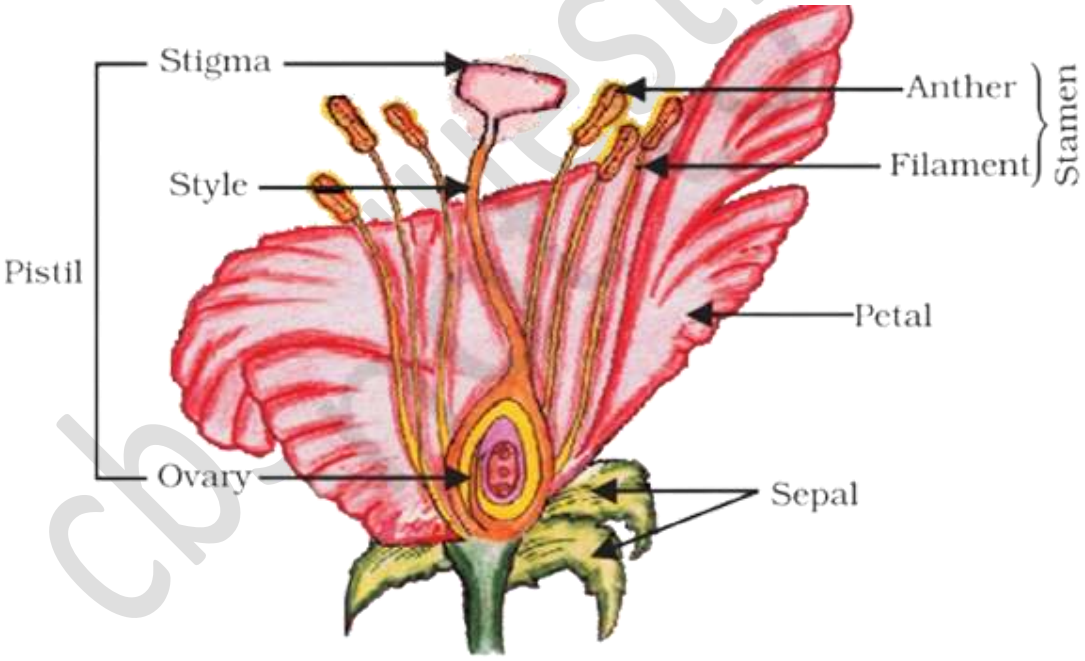
Q6. Why does menstruation occur?

Sol. Since the ovary of a woman releases one egg (or ovum) every month, therefore, the uterus also prepares itself every month to receive a fertilised egg (if formed). In this process, the inner lining of the uterus becomes thick and soft with lots of blood capillaries (blood vessels) in it. This preparation in uterus is necessary because in case the egg is fertilised by a sperm, then the uterus has to keep this fertilised egg and nourish it to develop it into a baby. If, however, the egg released by the ovary is not fertilised, then the thick lining of the uterus is not needed. So, the uterus lining breaks down and comes out through the vagina in the form of blood and mucous. This is called menstruation.

Q7. Draw a labelled diagram of the longitudinal section of a flower.

Sol.

fig. Longitudinal Section of a Flower



Q8. What are the different methods of contraception?

Sol. The various methods of contraception (preventing pregnancy in woman) are: Barrier methods, Chemical methods, use of Loop or Copper-T, and Surgical methods.

- In the barrier methods of preventing pregnancy, the physical devices such as condoms and diaphragm (or cap) are used. Condoms are used by males (by putting them as a covering on the penis). Diaphragm (or cap) is used by females (by putting it in the vagina to cover the cervix).

Condom as well as diaphragm prevent the sperms from meeting the ovum (or egg) by acting as a barrier between them.

- In the chemical methods of preventing pregnancy, the females use oral pills. The oral pills contain hormones which stop the ovaries from releasing ovum (or eggs) into the oviduct.
- The loop or copper-T are also very effective in preventing pregnancy. A loop or copper-T is placed inside the uterus by a doctor or a trained nurse. The loop or Copper-T prevents the implantation of fertilised egg in the uterus. Loop and copper-T are called intra-uterine contraceptive devices (IUCD).
- Surgical methods of birth control are available for males as well as females. In males, a small portion of the sperm duct (or vas deferens) is removed by surgical operation and both the cut ends are ligated (or tied) properly. This prevents the sperms from coming out. The surgical procedure carried out in males is called 'vasectomy'. In females, a small portion of the oviducts is removed by surgical operation and the cut ends are ligated(or tied). This prevents the ovum (or egg) from entering into the oviducts. The surgical procedure carried out in females is called tubectomy.

Q9. How are the modes for reproduction different in unicellular and multicellular organisms?

Sol.

- Most of the unicellular organisms (such as protozoa) and bacteria) reproduce by the asexual process of 'fission'. In this process, mere cell division leads to the creation of new individuals.
- In simple multicellular organisms, reproduction occurs by asexual methods such as budding, spore formation, fragmentation and regeneration, etc. But in complex multicellular organisms, reproduction takes place by sexual methods involving gametes (sex cells) from two parents– a male and a female.

Q10. How does reproduction help in providing stability to populations of species?

Sol. The process of reproduction introduces some variations in the individual organisms of species. The variations in the individual organisms of a species. The variations introduced in some individual organisms may enable them to survive even in adverse environmental conditions such as excessive heat or cold or shortage of water, etc. (when most other members of the species will die). In this way, the introduction of variations during reproduction provides stability to the population of various species by preventing some of their individuals from getting wiped out of during adverse environmental conditions.

Q11. What could be the reasons for adopting contraceptive methods?

Sol.

- The use of contraceptive methods helps in family planning (birth control). By adopting contraceptive methods, a couple can avoid unwanted pregnancy. They can choose how many children to have and when a have them. A couple can also space the birth of children properly by using contraceptive methods.
- Some of the contraceptive methods (like the use of condom) also provide protection to a person from sexually transmitted diseases.