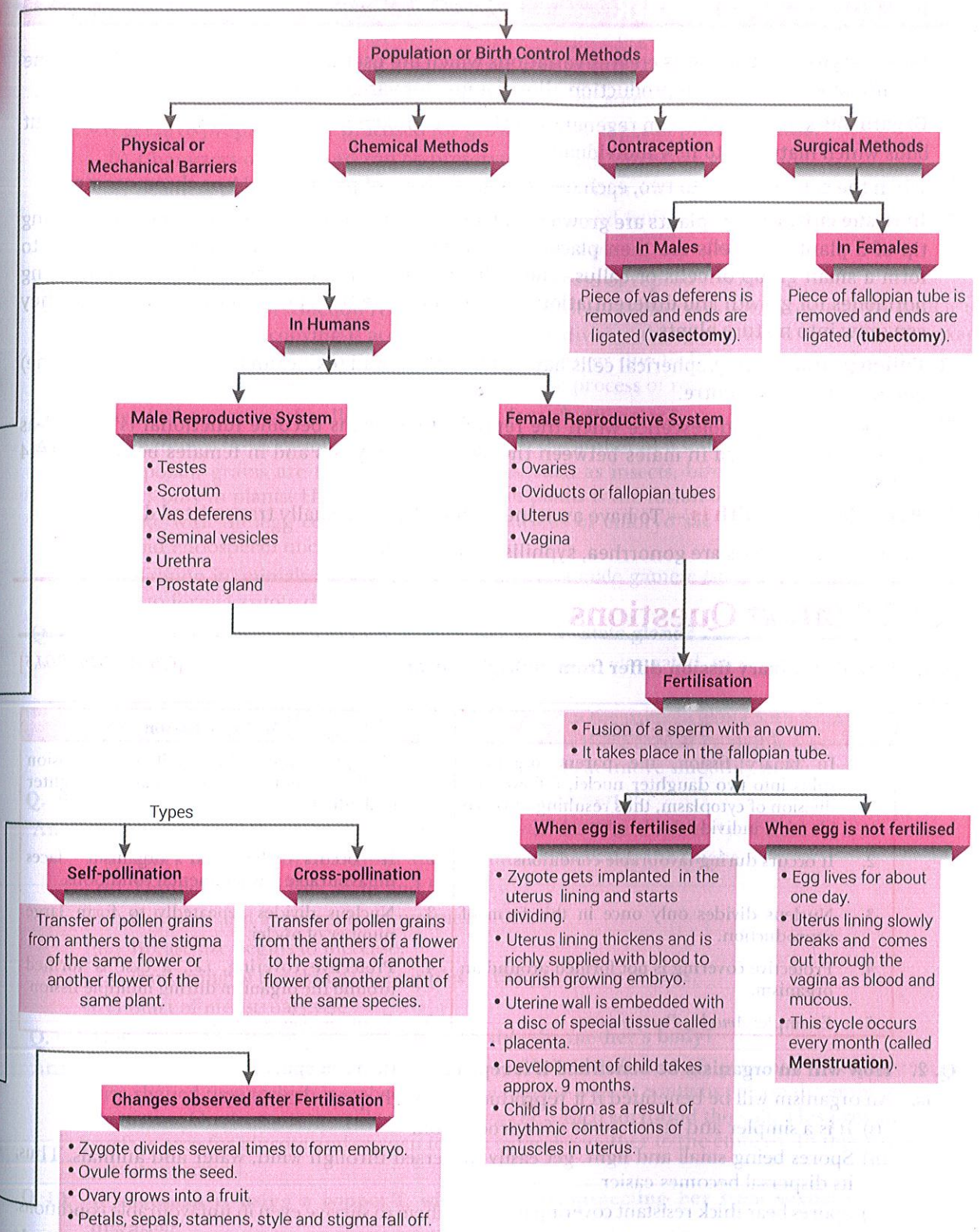
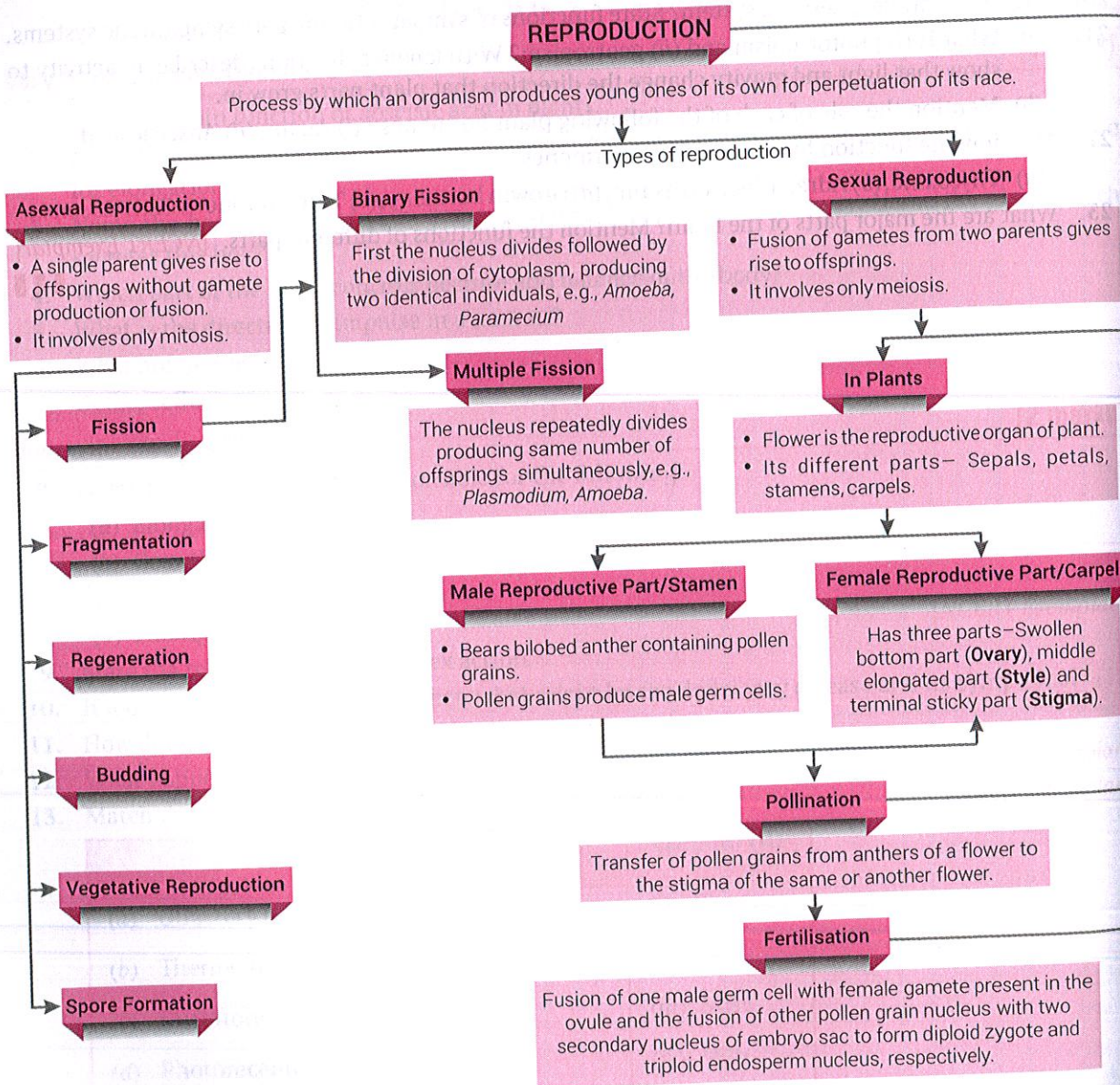


HOW DO ORGANISMS REPRODUCE?

CHAPTER 8

BASIC CONCEPTS – A FLOW CHART



MORE POINTS TO REMEMBER

- ❑ **DNA copying mechanisms** creates variations which are useful for ensuring the survival of the species. Modes of sexual reproduction allow for greater variation to be generated.
- ❑ **Organisms** such as *Hydra* can regenerate if they are broken into pieces. They can also give out buds which mature into new individuals.
- ❑ When the cell divides into two, each new cell gets a copy of parental DNA or chromosomes.
- ❑ **In tissue culture**, new plants are grown by removing tissue or separating cells from the growing tip of a plant. The cells are then placed in an artificial medium where they divide rapidly to form a small group of cells or callus. The callus is transferred to another medium containing hormones for growth and differentiation. The plantlets are then placed in the soil so that they can grow into mature plants.
- ❑ **Pollen grains** are tiny, spherical cells having outer thick wall (exine) and inner thin wall (intine) and nucleus in the centre.
- ❑ The period during adolescence when the reproductive organs become functional is termed as puberty. It is attained in males between the age of 13-16 years and in females between 11-14 years.
- ❑ **Reproductive health is** – To have awareness about STDs (sexually transmitted disease).
Some common STDs are gonorrhoea, syphilis & HIV-AIDS.

NCERT Intext Questions

Q. 1. How does binary fission differ from multiple fission?

[CBSE Delhi 2015]

Ans.

Binary fission	Multiple fission
1. In binary fission, the parent organism splits into two daughter nuclei, followed by division of cytoplasm, thus resulting into two identical individuals (daughter cells).	1. Multiple fission is the simultaneous division of the parent body into many daughter individuals.
2. It occurs during favourable conditions.	2. It occurs when an organism faces unfavourable environmental conditions.
3. Nucleus divides only once in this form of reproduction.	3. Nucleus divides repeatedly to form large number of nuclei.
4. Protective covering is not formed around an organism.	4. Protective covering, <i>i.e.</i> , a cyst is formed around the organism during multiple fission.
5. Example: <i>Amoeba</i> , <i>Paramecium</i> .	5. Example: <i>Plasmodium</i> .

Q. 2. How will an organism be benefitted if it reproduces through spores?

Ans. An organism will be benefitted if it reproduces through spores because:

- (i) It is a simpler and faster mode of reproduction.
- (ii) Spores being small and light, get easily dispersed through wind, water and animals. Thus, its dispersal becomes easier.
- (iii) Spores bear thick resistant covering to enable them to survive even in unfavourable conditions.

Q. 3. Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?

Ans. More complex organisms cannot reproduce by regeneration process because:

- (i) their body is highly complicated,

- (ii) there are specific organs to do specific functions,
- (iii) there is a division of labour in the body of complex organisms,
- (iv) regeneration is carried out by specialised cells, which are not present in complex organisms.

Q. 4. Why is vegetative propagation practised for growing some types of plants?

Ans. Vegetative propagation is practised for growing some types of plants because:

- (i) Characters of the plants can be preserved through successive generation.
- (ii) Seedless plants can be grown through vegetative reproduction.
- (iii) Through cutting and grafting methods, flowers and fruits can be grown in a shorter time.
- (iv) It is a cheaper, easier and more rapid method of plant propagation.

Q. 5. Why is DNA copying an essential part of the process of reproduction?

Ans. The process of reproduction results in the production of offsprings which are exactly similar to the parents. DNA copying is accompanied by cell division that gives rise to two cells. The exact blueprint of body design is inherited in the offsprings due to DNA replication in parent cell. Therefore, DNA copying is an essential part of the process of reproduction.

Q. 6. How is the process of pollination different from fertilisation?

Ans. Pollination is the transfer of pollen grains from the anther of a stamen to the stigma of a carpel. The pollen grains are transferred by agents, such as insects, birds, man, wind and water. It occurs only in plants. However, fertilisation in plants is the fusion of pollen grains, nuclei (male gamete with the egg cell) and secondary nucleus of embryo sac to form diploid zygote and triploid endosperm nucleus, respectively.

Fertilisation in animals is defined as the fusion of a male gamete (sperm) with a female gamete (ova) to form a zygote during sexual reproduction.

Q. 7. What is the role of the seminal vesicles and the prostate gland?

Ans. Seminal vesicles are a pair of thin-walled muscular elongated sacs which secrete fluid for nourishment of sperms.

Prostate glands also produce fluid which is released in the urethra along with secretion of seminal vesicle and helps in sperm mobility. The secretion of these accessory glands together with sperm is called semen. It affects the vaginal pH so that sperms move smoothly inside the vagina.

Q. 8. What are the changes seen in girls at the time of puberty?

Ans. Various changes that take place in a girl's body at the time of puberty are:

- (i) Thick hair growth in armpits and genital area between the thighs.
- (ii) Thinner hair on legs, arms and face.
- (iii) Oily skin and appearance of pimples.
- (iv) Breast size begins to increase.
- (v) Darkening of the skin of the nipples at the tips of the breasts.
- (vi) Start of menstrual cycle

Q. 9. How does the embryo get nourishment inside the mother's body?

Ans. The embryo gets nourishment from the mother's blood through placenta. The placenta is a disc-shaped tissue which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. In this way, embryo gets its nutrition.

Q. 10. If a woman is using a copper-T, will it help in protecting her from sexually transmitted diseases?

Ans. No, because sexually transmitted diseases occur due to fluid to fluid contact that takes place in the vagina.

NCERT Exercises

Q. 1. Asexual reproduction takes place through budding in

- (a) *Amoeba* (b) Yeast
(c) *Plasmodium* (d) *Leishmania*

Ans. (b)

Q. 2. 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

Ans. (c)

Q. 3. The anther contains

- (a) Sepals (b) Ovules
(c) Carpel (d) Pollen grains

Ans. (d)

Q. 4. What are the advantages of sexual reproduction over asexual reproduction?

Ans. In asexual reproduction, the offsprings are almost identical to their parents because they have the same genes as of their parents. Thus, genetic variation is not possible or is slow in asexual reproduction. Sexual reproduction involves fusion of male and female gametes coming from both the parents. Therefore, the offsprings receive some genes from the mother and some from the father. The mixing of these genes of mother and father in various different combinations, results in the offsprings having genetic variations.

Thus, we conclude that sexual reproduction promotes diversity of characters in the offsprings by providing genetic variations. This genetic variation leads to the continuous evolution of various species to form better and better organisms.

Q. 5. What are the functions performed by the testis in human beings?

Ans. The function of testis is to produce sperm and male sex hormone called testosterone. The scrotum provides the optimal temperature for formation of sperms.

Q. 6. Why does menstruation occur?

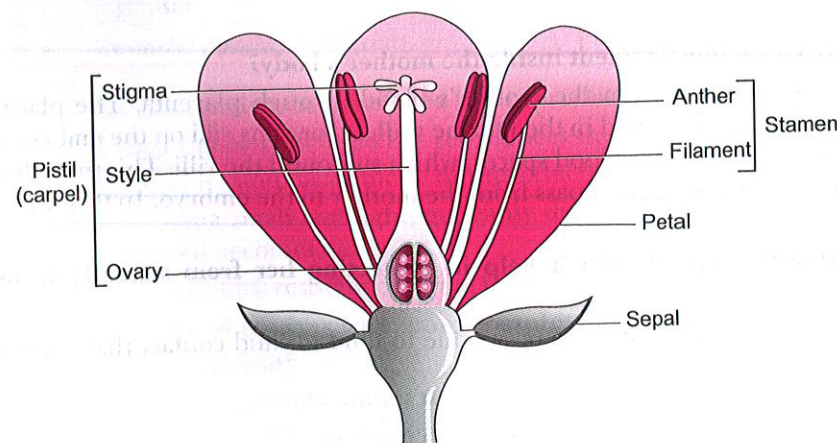
Ans. Menstruation occurs in human females only when the egg is not fertilised by the male sperm. Since the egg is not fertilised so, the thick and soft uterus lining having a lot of blood capillaries in it is not required. Thus, the unfertilised ovum disintegrates within a day and the uterus lining also breaks down. As the uterus lining contains a lot of blood vessels, so when it is shed, blood alongwith other tissues is released. This comes out of the vagina in the form of bleeding.

Q. 7. Draw a labelled diagram of the longitudinal section of a flower.

OR

Draw the diagram of a flower and label the four whorls. Write the names of gamete producing organs in the flower. [NCERT Exemplar]

Ans.



Male gamete forming organ – Anther/Stamen

Female gamete forming organ – Pistil/Ovary/Ovule

Q. 8. What are the different methods of contraception?

OR

What are the various ways to avoid pregnancy? Elaborate any one method. [NCERT Exemplar]

Ans. A number of preventive methods or devices have been developed to prevent unwanted pregnancy. These methods are broadly categorised as:

(i) Barrier methods, (ii) Chemical methods, (iii) Surgical methods.

(i) **Barrier methods:** In these methods, physical devices such as condoms, diaphragms and cervical caps are used. These devices prevent the entry of sperm into the female genital tract, thus acting as a barrier between them.

(ii) **Chemical methods:** This category of contraceptives acts by changing the hormonal balance of the body so that eggs are not released and fertilisation cannot occur. Females use two types of pills for preventing pregnancies: oral pills and vaginal pills.

The oral pills contain hormones which stop the ovaries from releasing ovum into the fallopian tube. This is also called oral contraceptives (OC).

Other contraceptive devices such as loop or the copper-T are placed in the uterus to prevent pregnancy.

(iii) **Surgical methods:** In males, a small portion of the sperm duct (vas deferens) is blocked by surgical operation. This prevents the sperms from coming out. Whereas in females, a small portion of the fallopian tubes (oviducts) is blocked by surgical operation. It prevents the egg to reach uterus. In both the cases, fertilisation will not take place.

Q. 9. How are the modes of reproduction different in unicellular and multicellular organisms?

Ans. The unicellular organisms have only one cell. There is no separate tissue for reproduction. So, they can reproduce asexually by the process of fission (binary or multiple) or budding as in yeast. On the other hand, the multicellular organisms, contain various cells and have separate systems for reproduction. So, they can reproduce by both sexual and asexual reproduction.

Q. 10. How does reproduction help in providing stability to the populations of species?

Ans. The consistency of DNA copying during reproduction is important for maintenance of body design features that allow the organism to live in a particular area. This consistency of DNA copying provides stability to the populations of species. Reproduction is responsible for continuation of a species. Stability to populations of species is attained by equalising the birth and death ratio of individuals. Birth is possible only due to reproduction.

Q. 11. What could be the reasons for adopting contraceptive methods?

Ans. The reasons for adopting contraceptive methods are:

- Protection from sexually transmitted diseases.
- Restricting the number of children in a family.
- Sufficient gap between successive births.
- Enjoying a good reproductive health.
- Controlling population.

VERY SHORT ANSWER QUESTIONS

[1 mark]

Q. 1. What is the effect of DNA copying which is not perfectly accurate in the reproduction process?

Ans. The DNA copying which is not perfectly accurate in the reproduction process results in variations in populations for better survival of the species.

Q. 2. What methods will you use for growing jasmine and rose plants?

Ans. For growing jasmine plants, layering method will be used and for growing rose plants, cutting and grafting methods will be used.

Q. 3. Name the part of *Bryophyllum* where the buds are produced for vegetative propagation. [CBSE Delhi 2016]

Ans. In *Bryophyllum*, the buds are produced in leaf notches.

Q. 4. Which parts of plants can grow vegetatively?

Ans. Modified stems like onion bulbs, runners of doob grass, ginger rhizomes, potato tubers, root tubers of sweet potato and dahlia, stem cutting of plants like rose and leaves of plants like *Bryophyllum* can be grown vegetatively.

Q. 5. Can you consider cell division as a type of reproduction in unicellular organism? Give one reason. [NCERT Exemplar]

Ans. Yes, because it results in the formation of two daughter cells, i.e., it results in the production of more individuals of the organism.

Q. 6. What is the function of pollen grains in flowers?

Ans. Pollen grains are the male gametes which fertilise the egg cell present in the ovule of a flower.

Q. 7. Write the various methods of cross-pollination.

Ans. Various methods of cross-pollination are entomophily (insect pollination), anemophily (wind pollination), hydrophily (water pollination) and zoophily (animal pollination).

Q. 8. Why cannot fertilisation take place in flowers if pollination does not occur? [NCERT Exemplar]

OR

Why is fertilisation not possible without pollination? [CBSE (F) 2016]

Ans. In a flower, fertilisation requires both male and female gametes. If pollination does not occur, male gametes will not be available hence fertilisation cannot take place.

Q. 9. Explain the role of cotyledon and plumule in germination.

Ans. Cotyledon stores food and the plumule acts as future shoot.

Q. 10. Is the chromosome number of zygote, embryonal cells and adult of a particular organism always constant? How is the constancy maintained in these three stages? [NCERT Exemplar]

Ans. Yes, the constancy is maintained because cells in all these three structures undergo only mitotic divisions.

Q. 11. In a bisexual flower inspite of the young stamens being removed artificially, the flower produces fruit. How is it possible? [NCERT Exemplar]

Ans. This is because the pistil is intact due to which cross-pollination takes place leading to fertilisation and formation of fruit.

Q. 12. What is gametogenesis?

Ans. Formation of sperms in testes and ova in ovary is called gametogenesis.

Q. 13. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote? [NCERT Exemplar]

Ans. Number of chromosomes in female gamete is 24 and in zygote it is 48.

Q. 14. How is the sperm genetically different from the egg?

Ans. Sperms contain either X or Y chromosome whereas an egg will always have an X chromosome.

Q. 15. What would be the ratio of chromosome number between an egg and its zygote? How is the sperm genetically different from the egg? [NCERT Exemplar]

Ans. The ratio is 1 : 2. Sperms contain either X or Y chromosome whereas an egg will always have an X chromosome.

Q. 16. List two functions performed by the testis in human beings. [CBSE Delhi 2015]

Ans. Functions of testis:

- (i) To produce sperms.
- (ii) To produce male sex hormone/testosterone.

Q. 17. List two functions of ovary of human female reproductive system. [CBSE (AI) 2016]

- Ans. (i) To produce female gamete.
(ii) To secrete female hormones.

Q. 18. Name the life process of an organism that helps in the growth of its population. [CBSE (AI) 2015]

Ans. Reproduction helps in the growth of the population.

Q. 19. What happens when a mature *Spirogyra* filament attains considerable length? [CBSE (AI) 2016]

Ans. When a mature *Spirogyra* filament attains considerable length its filament breaks up into smaller fragments and each fragment grows into a new filament or individual.

Q. 20. Name two simple organisms having the ability of regeneration. [CBSE (AI) 2015]

Ans. *Planaria*/Hydra/Earthworm (Any two)

Q. 21. What happens when a *Planaria* gets cut into two pieces? [CBSE Delhi 2016]

Ans. Each piece regenerates into a new *Planaria*.

Q. 22. Name the method by which *Hydra* reproduces. Is this method sexual or asexual? [CBSE (F) 2016]

Ans. *Hydra* reproduces by budding or regeneration.
It is a method of asexual reproduction.

Q. 23. Name the method by which *Spirogyra* reproduces under favourable conditions. Is this method sexual or asexual? [CBSE Delhi 2017]

Ans. *Spirogyra* reproduces by fragmentation. It is an asexual method.

Q. 24. How does *Planaria* reproduce? Is this method sexual or asexual? [CBSE Delhi 2017]

Ans. *Planaria* reproduces by regeneration. This method is asexual.

Q. 25. How does *Plasmodium* reproduce? Is this method sexual or asexual? [CBSE Delhi 2017]

Ans. *Plasmodium* reproduces by multiple fission. This method is an asexual means of reproduction.

Q. 26. Name the male and female gametes in animals.

Ans. In animals, male gametes are called sperms while female gametes are called eggs or ova.

Q. 27. Why are testes placed outside the abdominal cavity in the scrotal sac?

Ans. Testes are placed outside the body cavity in the scrotal sac because it requires a temperature 2°C lower than the normal body temperature for production of sperms.

Q. 28. What is hymen?

Ans. It is a thin fold of membrane which surrounds or partly closes the external vaginal opening.

Q. 29. What is funeral of unfertilised egg?

Ans. Menstruation is also called funeral of egg since it is not fertilised.

Q. 30. What is gestation?

Ans. The period of development of foetus in the uterus till birth is called gestation. It is of 9 months duration (i.e., 280 days or 40 weeks from the first day of the last menstrual cycle) in human beings.

Q. 31. Define parturition.

Ans. The birth of the fully developed foetus (childbirth) is called parturition.

Q. 32. Name the causative agent of the disease 'Kala-azar' and its mode of asexual reproduction. [CBSE (F) 2015]

Ans. The causative agent of *Kala-azar* is *Leishmania* and the mode of asexual reproduction is binary fission.

Q. 33. Name the parts of a bisexual flower that are not directly involved in reproduction. [CBSE (F) 2015]

- Ans. (i) Sepals/calyx (ii) Petals/Corolla
(iii) Thalamus

- Q. 34. List two unisexual flowers.** [CBSE (F) 2016]
Ans. Water melon and papaya are unisexual flowers.
- Q. 35. What is DNA?** [CBSE (F) 2015]
Ans. DNA is the carrier of hereditary information from parents to the next generation.
- Q. 36. Write names of one male and one female sex hormone.**
Ans. Male sex hormone is testosterone and female sex hormone is oestrogen.
- Q. 37. Write whether true (T) or false (F):**
 (i) Duration of menstrual cycle in human female is 20 days.
 (ii) Onset of menstruation is termed menopause.
 (iii) In human beings, male attains puberty little later than females.
Ans. (i) F, (ii) F, (iii) T
- Q. 38. What is syngamy?**
Ans. One male gamete fuses with one female gamete or egg. This process of fusion of male and female nuclei is called syngamy.
- Q. 39. What are those organisms called which bear both the sex organs in the same individual? Give one example of such organism.** [CBSE (AI) 2016]
Ans. Organisms bearing both the sex organs in the same individual are called bisexual. Example, Hydra, Mustard.
- Q. 40. Give an example of a unisexual and bisexual flower.** [CBSE (AI) 2014]
Ans. Cucumber is a unisexual flower and hibiscus is a bisexual flower.
- Q. 41. Where is the zygote located in the flower after fertilisation?** [NCERT Exemplar]
Ans. Zygote is located inside the ovule which is present in the ovary.
- Q. 42. Where do the following functions occur?**
 (i) Production of an egg (ii) Fertilisation
 (iii) Implantation of zygote.
Ans. (i) In ovary (ii) In fallopian tube
 (iii) In uterus (uterine wall).
- Q. 43. What changes are observed in the uterus if fertilisation does not occur?** [NCERT Exemplar]
Ans. If fertilisation does not occur, the thick and spongy lining of the uterus slowly breaks and comes out through the vagina as blood and mucus.
- Q. 44. Give reason for the statement- Since the ovary releases one egg every month, the uterus also prepares itself every month by making its lining thick and spongy.** [CBSE Sample Paper 2016]
Ans. The lining of uterus becomes thick for nourishing the embryo if fertilisation takes place and egg reaches the uterus.
- Q. 45. What is menopause?**
Ans. The period of permanent cessation of menstruation in females, usually occurring between the age of 45 and 50 is called as menopause.
- Q. 46. Name the organs producing sperms and ova respectively in humans.** [CBSE (F) 2017]
Ans. Testis produces sperms and ovary produces ova in humans.
- Q. 47. What is fertilisation? Where does it occur in a human female?** [CBSE (F) 2017]
Ans. Fertilisation is the fusion of sperm or male gamete and female gamete. It takes place in oviduct or fallopian tube of human female.

SHORT ANSWER QUESTIONS-I

[2 marks]

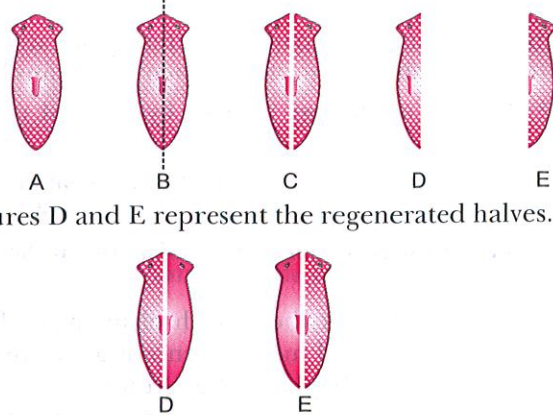
- Q. 1. Define the terms unisexual and bisexual giving one example of each.**
Ans. **Unisexual:** In most of the animals including humans, male and female reproductive organs are in different individuals. Such animals are called unisexual.

Bisexual: In some animals like tapeworm, liver fluke, earthworm, leech, etc., the male and female reproductive organs are found in a single individual. Such organisms are called bisexual (hermaphrodite).

The flower may be unisexual (*e.g.*, papaya, watermelon) when it contains either stamens or carpels and bisexual (*e.g.*, Hibiscus, mustard) when it contains both stamens and carpels.

- Q. 2. What is a clone? Why do offsprings formed by asexual reproduction exhibit remarkable similarity?** [NCERT Exemplar]
Ans. Clone refers to offspring of an organism formed by asexual method of reproduction. Since they possess exact copies of the DNA of their parent, clones exhibit remarkable similarity.
- Q. 3. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread?** [NCERT Exemplar]
Ans. Moisture is an important factor for the growth of hyphae. Moistened bread slice offers both moisture and nutrients to the bread mould, hence it grows profusely. Dry slice of bread offers nutrients but not moisture hence hyphae fail to grow.
- Q. 4. Explain the roles of gametes and zygote in sexual reproduction.**
Ans. The two fusing gametes possess characters of their parents in their DNA. Fertilisation brings characters of both parents into one zygote cell.
 Zygote is the first cell of the next generation. It divides to form an embryo which subsequently grows into a new individual.
 Male gamete forming part – anther/stamen
 Female gamete forming part – pistil/ovary/ovule
- Q. 5. Describe the structure of a pollen grain.**
Ans. Stamens produce pollen grains that are yellowish in colour. Pollen grain is unicellular and haploid. It has two layers, the thicker outer one is called exine, which is thin at places called germ pores and inner thin layer is called intine.
- Q. 6. In a germinating seed, which parts are known as future shoot and future root? Mention the function of cotyledon.** [CBSE Sample Paper 2016]
Ans. In a germinating seed, plumule is known as future shoot and radicle is known as future root. The function of cotyledon is to store food for the future plant or embryo.
- Q. 7. Identify the following parts of a flower:**
 (i) Part that produces pollen grain. (ii) Part that transfers male gametes.
 (iii) Part that is sticky to trap. (iv) Part that develops into a fruit.
Ans. (i) Anther (ii) Style (iii) Stigma (iv) Ovary
- Q. 8. What is puberty?**
Ans. The period of adolescence when the reproductive organs become functional, is termed as puberty. It is accompanied by development of secondary sexual characters both in males and females.
- Q. 9. Differentiate between self-pollination and cross-pollination.**
Ans.
- | Self-pollination | Cross-pollination |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1. Transfer of pollen grains from anthers to the stigma of the same flower or another flower of the same plant. | 1. Transfer of pollen grains from anthers of a flower to the stigma of another flower borne on another plant of the same species. |
| 2. It occurs in bisexual flowers, <i>e.g.</i> , wheat, rice, potato, pea, etc. | 2. It occurs in unisexual as well as in bisexual flowers, <i>e.g.</i> , maize. |
- Q. 10. Give two reasons for the appearance of variations among the progeny formed by sexual reproduction.** [NCERT Exemplar]
Ans. (i) Sexual reproduction involves two parents with different sets of characters.
 (ii) The gene combinations are different in gametes.

- Q. 11.** Would a *Planaria* cut vertically into two halves regenerate into two individuals? Complete Figure D and E by indicating the regenerated regions. [NCERT Exemplar]



Ans. Yes, shaded part in Figures D and E represent the regenerated halves.

- Q. 12.** What are the benefits of using mechanical barriers during sexual act? [NCERT Exemplar]

Ans. Mechanical barriers like condom prevent the sperms from reaching the egg. Thus it is an effective method to avoid pregnancy. It also prevents transmission of infections during sexual act.

- Q. 13.** Write one main difference between asexual and sexual mode of reproduction. Which species is likely to have comparatively better chances of survival—the one reproducing asexually or the one reproducing sexually? Justify your answer. [CBSE (F) 2015]

Ans. Asexual reproduction does not involve genetic fusion while sexual reproduction involves fusion of male and female gametes to form a zygote.

Species reproducing sexually have better chances of survival. This is because sexual reproduction gives rise to more variations which are essential for evolution as well as for the survival of species under unfavourable conditions.

- Q. 14.** Why is DNA copying an essential part of the process of reproduction? What are the advantages of sexual reproduction over asexual reproduction? [CBSE (F) 2015]

Ans. DNA copying is essential because it makes the transmission of characters from parents to the next generation possible.

Advantages of sexual reproduction over asexual reproduction:

Sexual reproduction gives rise to variations, which are essential for evolution as well as for the survival of species under unfavourable conditions.

- Q. 15.** Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system. [NCERT Exemplar]

Ans. Sperm comes out from testis into the vas deferens and then passes through urethra before ejaculation. The secretions of seminal vesicle and prostate glands provide nutrition to the sperms and also facilitate their transport.

- Q. 16.** What changes are observed in the uterus subsequent to implantation of young embryo? [NCERT Exemplar]

Ans. The uterine wall thickens that is richly supplied with blood. A special tissue called placenta develops which connects embryo to the uterine wall that provides nutrients and oxygen to it.

- Q. 17.** Give two reasons for avoiding frequent pregnancies by women.

Ans. Frequent pregnancies by women are avoided due to the following reasons:

- It has adverse effect on the health of women.
- It increases the rate of the population of our country.

SHORT ANSWER QUESTIONS-II

[3 marks]

- Q. 1.** Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement. [CBSE (AI) 2017]

Ans. (a) Reproduction is important for continuation of species or perpetuation of species.

- It promotes diversity of characters or helps to show the variations which enhances the survival chances.
- It increases population of a species.

- Q. 2.** Suggest three contraceptive methods to control the size of human population which is essential for the health and prosperity of a country. State the basic principle involved in each. [CBSE Delhi 2016]

Ans. The methods of contraception are:

- Barrier method or mechanical method (Condom/Diaphragm):** Prevents the meeting of sperms and ova.
- Chemical method (Oral pills):** Changes the hormonal balance of the female partner so that the eggs are not released.
- Surgical method:** The vas deferens in males is blocked (vasectomy) or the fallopian tube (oviduct) in females is blocked (tubectomy) to prevent the transfer of sperms or egg and hence no fertilisation takes place.
- IUCDs/ Loop or the copper-T** is placed in the uterus to prevent pregnancy. (Any three)

- Q. 3.** List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males? How does the use of these techniques have a direct impact on the health and prosperity of a family? [CBSE (AI) 2017]

Ans. Three techniques to prevent pregnancy are barrier method, chemical method and surgical method.

Chemical method is not meant for males.

Use of these techniques helps in maintaining health of the woman. Also, parents can provide more attention and quality resources to the children.

- Q. 4.** List four points of significance of reproductive health in a society. Name any two areas related to reproductive health which have improved over the past 50 years in our country. [CBSE (AI) 2015]

Ans. Significance of reproductive health in a society:

- It prevents the spread of various sexually transmitted diseases such as AIDS, syphilis, etc.
- Individuals with sound reproductive health produce better offspring which have better chances of survival.
- Better sex education and awareness helps to maintain the population and prevent population explosion.
- Unwanted and teen pregnancies can be avoided.

The reproductive health in India has improved tremendously over the past 50 years.

The areas in which reproductive health have improved are:

- Family planning
- Mortality rate

- Q. 5.** List four categories of contraceptive methods. State in brief two advantages of adopting such preventive methods. [CBSE Delhi 2015; (AI) 2015]

Ans. The categories of contraceptive methods are:

- | | |
|------------------------------|-------------------------|
| (i) Barrier method (Condoms) | (ii) Surgical method |
| (iii) Withdrawal method | (iv) Calendar method |
| (v) Hormonal method | (vi) IUCD/Copper-T/Loop |
- (Any four)

Two advantages of adopting preventive methods are:

- It helps in maintaining health of women.
 - It helps in preventing STDs especially AIDS.
 - It helps in birth control.
 - Parents can give more attention to children.
- (Any two)

Q. 6. Name the reproductive parts of an angiosperm. Where are these parts located? Explain in brief the structure of its female reproductive parts. [CBSE (F) 2016]

Ans. In an angiosperm, the male reproductive part is androecium or stamen and the female reproductive part is the gynoecium or carpel. These parts are located in the flower.

The gynoecium (carpel) has three parts :-

- (i) Stigma – It is the upper most part which has sticky surface to which pollen grain stick during pollination.
- (ii) Style – It is the middle elongated part which connects the stigma to the ovary.
- (iii) Ovary – It is the bottom swollen part in which female gametes are formed.

Q. 7. (i) Name the following:

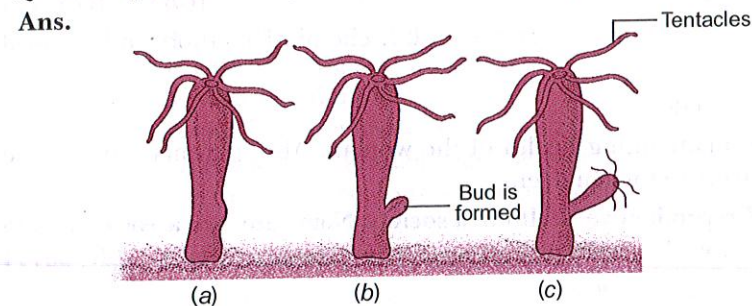
- (a) Thread like non-reproductive structures present in *Rhizopus*.
- (b) 'Blobs' that develop at the tips of the non-reproductive threads in *Rhizopus*.

(ii) Explain how these structures protect themselves and what is the function of the structures released from the 'blobs' in *Rhizopus*. [CBSE Delhi 2015]

Ans. (i) (a) Hyphae/mycelium, (b) *Sporangia*
 (ii) These structures are protected by thick walls.

These structures germinate into new individuals under favourable conditions.

Q. 8. Explain budding in *Hydra* with the help of labelled diagrams only. [CBSE Delhi 2015]

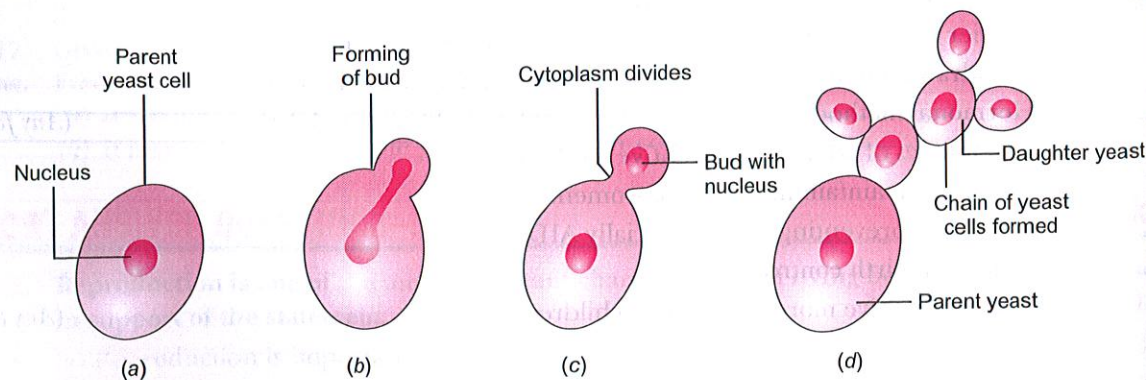


Q. 9. What is asexual reproduction? Write the process of budding in *Hydra*. [CBSE Delhi (C) 2017]

Ans. Asexual reproduction is the mode of reproduction used by single organisms or parent without the gamete production or fusion. In the process of budding in *Hydra*, a bud develops as an outgrowth due to repeated cell division of reproductive cells at one specific site. These buds develop into tiny individuals, and when fully mature, detach from the parent body as new independent individuals.

Q. 10. Explain various steps of budding in yeast.

Ans. Yeast is a unicellular organism. Budding usually occurs when food is available in plenty. In budding, one or more outgrowths appear on one side, which enlarges in size. The nucleus divides mitotically, one daughter nucleus passes into the bud and the other remains in the parent cell. The bud either separates off from the parent cell or new bud appears before its separation from the parent cell resulting in the formation of branched or unbranched chain of buds.



Q. 11. Explain the process of regeneration in *Planaria*. How is this process different from reproduction? [CBSE (F) 2015]

Ans. When *Planaria* is cut into many pieces, each piece grows into a complete organism. This regeneration process is carried out by specialised cells, which proliferate, develop and differentiate into various cell types and tissues.

Regeneration is not same as reproduction as most of the organisms would not normally depend on being cut up to be able to reproduce.

Q. 12. What is regeneration? Give one example of an organism that shows this process and one organism that does not. Why does regeneration not occur in the latter? [CBSE (F) 2017]

Ans. Regeneration is the ability of organisms to give rise to new individual organisms from their body parts.

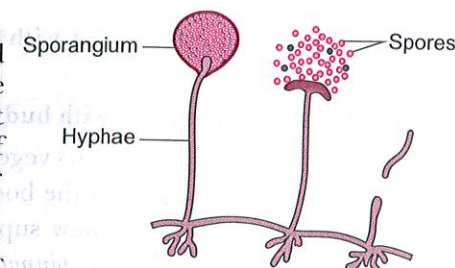
Planaria shows this process and *Amoeba* does not.

Regeneration does not occur in *Amoeba* because regeneration is carried out by specialised cells which are not present in non-regenerating organisms like *Amoeba*.

Q. 13. Illustrate the following with the help of suitable diagrams:

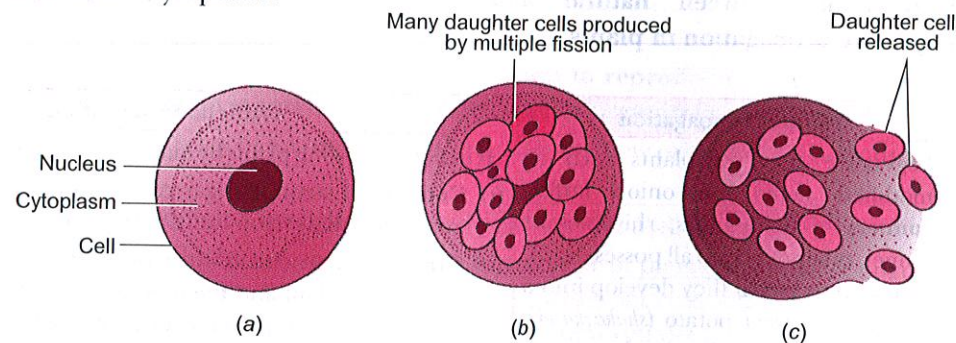
- (i) Spore formation in *Rhizopus*
- (ii) Multiple fission in *Plasmodium*.

Ans. (i) **Spore formation in *Rhizopus*:** This is an asexual method of reproduction in bacteria and fungi. Spores are unicellular bodies formed by cell division in a parent organism. After detaching from the parent, and if conditions are suitable, they germinate directly or indirectly into a new individual.



Spore formation in *Rhizopus*

(ii) **Multiple fission in *Plasmodium*:** It is an asexual mode of reproduction in organisms. Here, the nucleus of the organism divides repeatedly to form a number of equal sized daughter nuclei and each daughter nuclei breaks away together with a small portion of the cytoplasm.



Multiple fission in *Plasmodium*

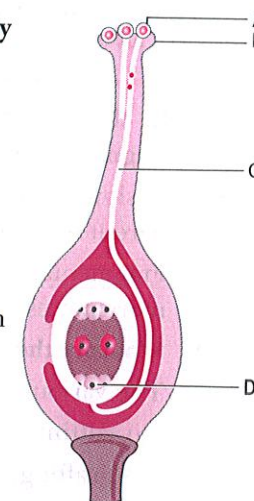
Q. 14. (a) List two reasons for the appearance of variations among the progeny formed by sexual reproduction.

- (b) (i) Name the part marked 'A' in the diagram alongside.
- (ii) How does 'A' reaches part 'B'?
- (iii) State the importance of the part 'C'.
- (iv) What happens to the part marked 'D' after fertilisation is over?

[CBSE (AI) 2016]

Ans. (a) Variation is seen among progeny formed by sexual reproduction because of:

- (i) Involvement of two different individuals.
- (ii) Creation of new combination of variants.
- (b) (i) A – pollen or pollen grain.



- (ii) A reaches the B (stigma) by agents of pollination.
- (iii) C (pollen tube) helps male gamete to reach the egg (ovule).
- (iv) After fertilisation it converts into embryo.

Q. 15. How does natural vegetative propagation occur?

Ans. Natural vegetative propagation occurs from modified stems, roots, leaves and bulbs. Modified short stems of onion bear **bulbs** which when grown in soil develop into a new plant. **Runners** – stems of doob grass have nodes and internodes. From nodes, roots are developed that form a new plant. **Rhizome** of ginger is a horizontal underground stem. If kept in soil with adequate moisture, it develops into a new plant. **Tuber** of potato bears eyes (buds), which when sown (entire or in pieces) in soil develops into a new plant.

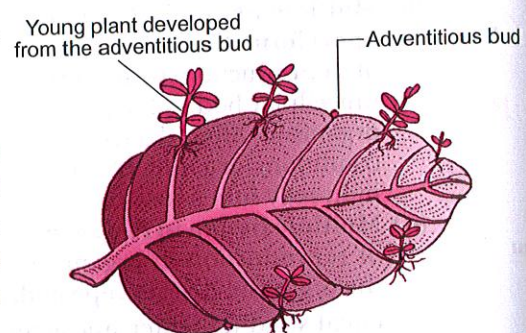
Modified root **tubers** of sweet potato also grows into a new plant.

Buds produced in the notches along the leaf margin of *Bryophyllum* fall on the soil and develop into new plants.

Q. 16. Illustrate the following with the help of suitable diagrams:

Leaf of *Bryophyllum* with buds.

Ans. Leaf of *Bryophyllum* shows vegetative propagation in plants where a part of the body becomes detached and develops into a new supporting plant. Here, leaves of *Bryophyllum pinnatum* having plantlets along the leaf margins when grown in soil develops into a new plant.



Leaf of *Bryophyllum* with Buds

Q. 17. Differentiate between natural and artificial vegetative propagation in plants.

Ans.

Natural Propagation	Artificial Propagation
Vegetative parts of plants such as modified stems like onion bulbs , runners of doob grass, rhizomes of ginger, tuber of potato all possess buds. When sown in soil they develop into a new plant. Sweet potato (<i>shakarkandi</i>) is a root tuber that also develops into a new plant when sown in soil.	It includes growing plants by man-made methods. For example, (i) Cuttings of stem of sugar cane, grapes, etc., which when grown in soil develop into a new plant. (ii) Grafting is a process in which branches of two similar plants, one potted plant and the other of a good quality plant are obliquely cut and placed over each other and tied by a tape and left for a month or so. A new plant thus develops. (iii) In layering , the roots are induced to develop in the branch of a rooted plant buried in the soil.

Q. 18. In the context of reproduction of species state the main difference between fission and fragmentation. Also give one example of each. [CBSE (AI) 2016]

Ans. Fission is the method of asexual reproduction in unicellular forms of life. In this process the parent organism splits to form two or more daughter cells. Example, *Ameoba* and *Plasmodium*

Fragmentation is the process found in multicellular organisms. The filament breaks up into two or more pieces upon maturation. These pieces then grow into new individuals. Example, *Spirogyra*.

Q. 19. What are the various methods of vegetative propagation? Discuss any one method with example.

Ans. The various methods of vegetative propagation are:

- (i) cutting,
- (ii) layering,
- (iii) grafting,
- (iv) tissue culture.

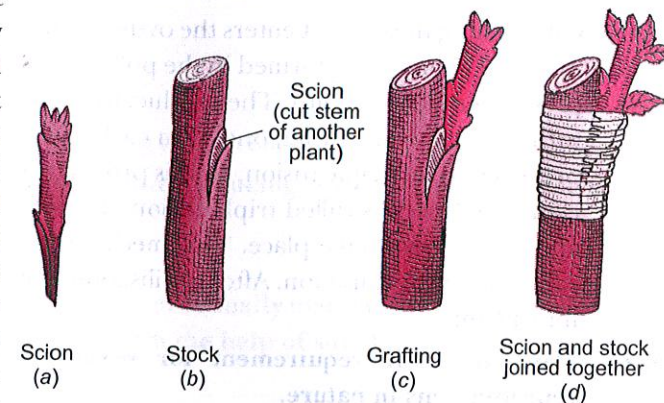
Layering: In layering, roots are induced on the stem of a rooted plant. When roots develop, that part of stem is detached from the parent plant and grown in the soil. Layering is of two types:

(i) **Mound layering:** A lower branch of a rooted plant is bent and buried into the moist soil. The tip of the branch should remain above the ground. In a few days, the buried part of the branch develops roots. It is now cut off from the parent plant and grown in the soil as a new plant. This method is used in the propagation of grapevine, strawberry, raspberry, jasmine, etc.

(ii) **Air layering:** This method is used in plants like crotons whose branches cannot be bent and buried in the soil. The stem is girdled, i.e., a ring of bark is removed and then it is covered with a moist moss or cotton and enclosed in a polythene bag. After a few days, roots emerge from this region and branch is cut off from the parent plant. It can now be planted in the soil as a new plant. This method is used in rose, rubber plant, guavas, pear, apple, mangoes, etc.

Q. 20. State the process of grafting.

Ans. In grafting, stem parts of two different plants are joined to produce a new plant. One part is of *in situ* rooted plant called stock and another part from superior quality plant called scion. Both are obliquely cut and placed over each other and tied with the tape. Part of stock remain rooted but scion is separated from the mother plant. After a month or so, both parts unite with each other and a new plant develops from the scion. Stock provides water and minerals from the soil to the developing plant.



Q. 21. Explain the term 'Regeneration' as used in relation to reproduction of organisms. Describe briefly how regeneration is carried out in multicellular organisms like *Hydra*. [CBSE (AI) 2016]

Ans. Regeneration is the ability of an organism to give rise to a new organism or individual from their body parts.

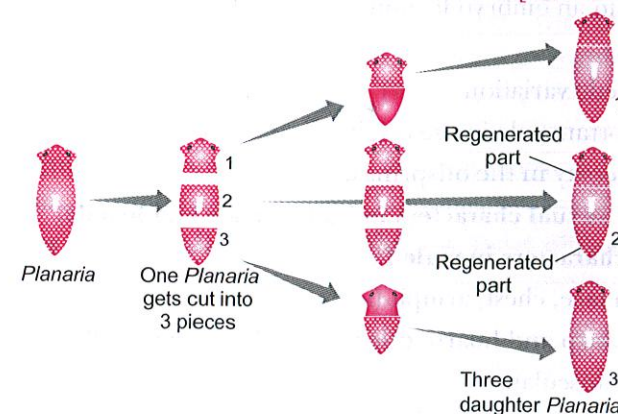
Each part of *Hydra* contains specialised cells which have the ability to proliferate.

When the body of *Hydra* by any means is cut into number of pieces, these pieces proliferate and make large number of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues finally developing into a new organism.

Q. 22. Why are budding, fragmentation and regeneration all considered as asexual types of reproduction? With neat diagrams explain the process of regeneration in *Planaria*.

[NCERT Exemplar] [CBSE (AI) 2015]

Ans.



Budding, fragmentation and regeneration are considered as asexual types of reproduction because all of them involve only one parent and gametes are not involved in reproduction

Q. 23. Explain four advantages of vegetative propagation. [CBSE (F) 2015]

- Ans.** (i) New plants produced by vegetative propagation maintain the desirable characters of the parents. These plants are genetically identical.
(ii) Certain plants like banana, grapes, pineapple, roses, jasmine, etc., do not form seeds. Thus, this is the only method of reproduction and continuation of such species.
(iii) This method is cheap and can be easily employed to reproduce plants, especially fruit plants.
(iv) Only one parent is required for reproduction.

Q. 24. Describe double fertilisation in plants.

Ans. Soon after pollination the pollen grains start germinating and form a pollen tube. The pollen tube grows within the style till it reaches the ovary.

On reaching the ovary it enters the ovule through an opening called micropyle. In the meantime, two male gametes are formed in the pollen tube. One of the male gametes fuses with the egg, the process is called syngamy. The product formed is termed as zygote. The other male gamete fuses with the two polar nuclei, one from each end of embryo sac, to form endosperm nucleus. This process is called triple fusion. In this process three nuclei, two polar nuclei and one male gamete is involved, so it is called triple fusion. Thus, inside each embryo sac two fusions, i.e., syngamy and triple fusion take place. This mechanism of two fusions occurring in an embryonal sac is called double fertilisation. After fertilisation, the ovule develops into seed and the ovary develops into a fruit.

Q. 25. State the basic requirement for sexual reproduction? Write the importance of such reproductions in nature. [CBSE Delhi 2017]

Ans. Formation of male and female gametes and fusion of gametes or syngamy is the basic requirement for sexual reproduction.

Importance: Combination of DNA from two different individuals lead to increase in genetic variation in the organism. This leads to diversity in the population which helps in natural selection.

Q. 26. List any four steps involved in sexual reproduction and write its two advantages. [CBSE Delhi 2017]

Ans. Steps involved in sexual reproduction are as follows:

- Formation of male and female gametes.
- Transfer of male gamete to female gamete.
- Fusion of gametes resulting in zygote formation.
- Zygote grows into an embryo forming a new individual.

Its advantages are:

- It increases genetic variation.
- It plays an important role in the origin of new species.
- It promotes diversity in the offsprings.

Q. 27. Mention secondary sexual characters in human male and female.

Ans. Secondary sexual characters in male :

- Hair growth on face, chest, armpit (axillae) and over pubis.
- Voice becomes deep and hoarse due to growth of larynx called Adam's apple.
- Body becomes muscular.

Secondary sexual characters in female:

- Growth of breasts and hair in axillae and over pubis.
- Pelvis region becomes broad and buttocks become heavy due to deposition of fat.
- Development of accessory sex organs.

Q. 28. (a) Mention the role of the following organs of human male reproductive system:

(i) Testis; (ii) Scrotum; (iii) Vas deferens; (iv) Prostate glands.

(b) What are the two roles of testosterone?

[CBSE (F) 2016]

Ans. (a) (i) Testis: To produce male gametes.

(ii) Scrotum: To provide optimal temperature to testis for the formation of sperm.

(iii) Vas deferens: To deliver the sperms to the urinary bladder.

(iv) Prostrate glands: To secrete the fluid which provides nutrition and medium for transport of sperms.

(b) Testosterone has following roles:

(i) It regulates the formation of sperms.

(ii) It brings about the changes in boys during adolescence.

Q. 29. Explain how, offspring and parents of organisms reproducing sexually have the same number of chromosomes. [NCERT Exemplar]

OR

How do organisms, whether reproduced asexually or sexually maintain a constant chromosome number through several generations? Explain with the help of suitable example. [CBSE Delhi 2016]

Ans. During asexual reproduction organisms undergo only mitotic divisions. The DNA (in the chromosomes) of the cells involved are copied and then equally divided among the two daughter cells formed. Thus, chromosome number remains unchanged.

In sexual reproduction, organisms produce gametes through meiosis, which is called reductional division, in which the original number of chromosomes becomes half. These two gametes combine to form the zygote and the original number of chromosomes is restored.

For example, in humans, the parents (father and mother) each have 46 or 23 pairs of chromosomes. In the gametes, the sperm has half the number of chromosomes, i.e., 23 and the egg also has 23 chromosomes. When the sperm and the egg fuse, the zygote has 46 or 23 pairs of chromosomes.

Thus, the chromosome number remains constant.

Q. 30. What are the male and female gonads in human beings? Mention their functions.

Ans. The male gonads in human beings are a pair of testes. The testis lies in a sac outside the abdominal cavity called scrotum. The function of testis is to regulate the production of sperms and secretion of male hormone, testosterone. The female gonads in human beings are pair of ovaries located in the abdominal cavity near the kidneys. The ovaries perform dual functions of production of female hormones—oestrogen and progesterone and the production of female gamete (ovum/ova).

Q. 31. Name the two types of mammalian gametes. How are these different from each other? Name the type of reproduction they are involved in. Write the advantage of this type of reproduction. [CBSE (F) 2017]

Ans. Two types of mammalian gametes are sperm and ovum or egg. Sperms are motile and are produced by male individuals whereas ova or eggs are non-motile

and produced by female individuals. They are involved in sexual reproduction.

Advantage: Sexual reproduction generates more variations among organisms.

Q. 32. From the internet, gather information about the chromosome numbers of five animals and five plants. Correlate the number with the size of organism and answer the following questions.

- Do larger organisms have more number of chromosomes/cells?
- Can organism with fewer chromosomes reproduce more easily than organisms with more number of chromosomes?
- More the number of chromosomes/cells greater is the DNA content. Justify.

[NCERT Exemplar]

- Ans.**
- No, there is no relationship between size of organism and its chromosome number.
 - No, process of reproduction follows a common pattern and is not dependent on the number of chromosomes.
 - Yes, since the major component of chromosome is DNA, if there are more chromosomes in a cell, the quantity of DNA will also be more.

Q. 33. What happens when

- Planaria* gets cut into two pieces?
- a mature *Spirogyra* filament attains considerable length?
- on maturation sporangia burst?

[CBSE (F) 2016]

- Ans.**
- Each piece regenerates into a new *Planaria*.
 - Its filaments break into smaller pieces or fragments and each fragment gives rise to a new filament.
 - It releases spores which germinate into new mycelium in moist conditions.

Q. 34. What happens when:

- accidentally, *Planaria* gets cut into many pieces?
- Bryophyllum* leaf falls on the wet soil?
- on maturation sporangia of *Rhizopus* bursts?

[CBSE Delhi 2017]

- Ans.**
- On getting cut into many pieces, each piece regenerates into new *Planaria*.
 - When leaf falls on the wet soil, buds are produced in leaf notches and develop into new plants.
 - It releases spores which germinate into new mycelium in moist conditions.

Q. 35. Mention the information source for making proteins in the cell. What is the basic event in reproduction?

- Ans.** The DNA in the nucleus of a cell is the information source for making proteins. If the information is changed, different proteins will be made. The basic event in reproduction is the creation of a DNA copy. Cells use chemical reactions to build copies of their DNA. This creates two copies of the DNA in a reproducing cell and they need to get separated from each other. DNA copying is accompanied by the creation of an additional cellular apparatus, and then the DNA copies separate, each with its own cellular apparatus.

Q. 36. (i) Write the names of those parts of a flower which serve the same function as the following do in the animals.

- | | |
|------------|-----------|
| (a) Testis | (b) Sperm |
| (c) ovary | (d) Egg |

(ii) State the function of flowers in the flowering plants.

- Ans.**
- (i) Testis — anther
 - (ii) Sperm — pollen grains
 - (iii) Ovary — ovary
 - (iv) Egg — ovum

(ii) Flowers are responsible for sexual reproduction as they contain the reproductive organs of the plant.

Q. 37. (a) What is pollination? Give its two types.

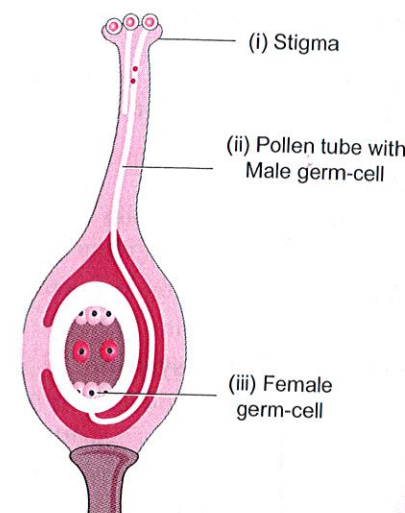
(b) Draw a longitudinal section of female reproductive part of a flower showing germination of pollen grain. Label on it the following:

- Stigma;
- Pollen tube with a male germ cell;
- Female germ cell.

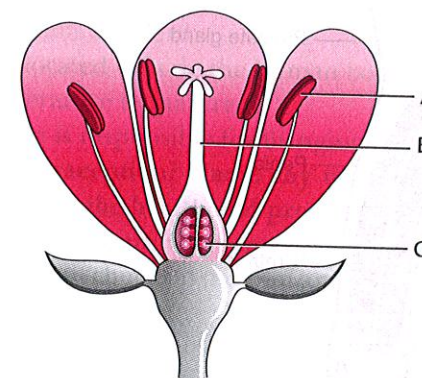
[CBSE Delhi (C) 2017]

Ans. (a) Pollination is the process of transfer of pollen grains from the anther to the stigma of the flower. Two types of pollination are self-pollination and cross pollination.

(b)



Q. 38. Name the parts A, B and C shown in the following diagram and state one function of each.



Ans.

Part	Functions
A	Anther It produces pollen grains.
B	Style It provides the path through which the pollen tube grows and reaches the ovary.
C	Ovary It contains ovules and each ovule has an egg cell. It develops into fruit after fertilisation.

[CBSE Delhi 2016]

Q. 39. What are sexually transmitted diseases? List two examples of each disease caused due to (i) bacterial infection and (ii) viral infection. Which device or devices may be used to prevent the spread of such diseases?

[CBSE Delhi 2015]

Ans. Diseases which are transmitted from an infected person to a healthy person due to unsafe sex are called sexually transmitted diseases.

Two examples:

Bacterial diseases : Gonorrhoea and syphilis

Viral diseases : Warts and AIDS

Preventive measures: Use of condoms or similar coverings.

Q. 40. (i) Name any two sexually transmitted diseases (STDs). How do these infectious diseases spread from one person to another? Give two symptoms of STDs.

(ii) Explain why fertilisation is possible if copulation takes place during the middle of menstrual cycle.

Ans. (i) The two sexually transmitted diseases (STDs) are gonorrhoea and syphilis. These infectious diseases spread from one person to another by sexual contact with an infected person. Two symptoms of STDs are burning sensation at urination and urethral discharge and sores in the genitals.

(ii) Since ovulation, i.e., the release of ovum occurs on the 14th day of the menstrual cycle, i.e., in its middle, chances are more for the sperms to fertilise the egg or ovum during this time.

Q. 41. Write the full form of IUCD, AIDS, HIV, OC.

Ans. IUCD = Intra-Uterine Contraceptive Device

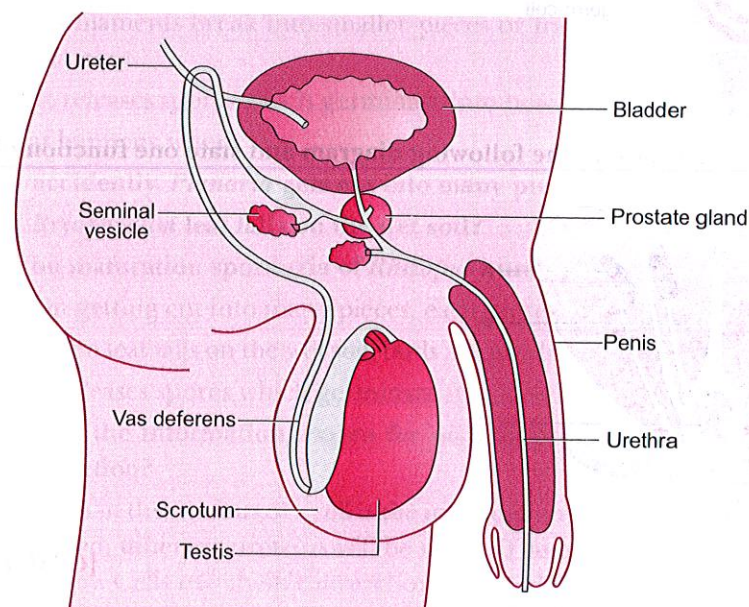
AIDS = Acquired Immune Deficiency Syndrome

HIV = Human Immunodeficiency Virus

OC = Oral Contraceptive

Q. 42. Draw a labelled diagram of a human male reproductive system.

Ans.



Human male reproductive system

Q. 43. What is placenta? Mention its role during pregnancy.

[NCERT Exemplar]

OR

What is placenta? Explain its function in humans.

[CBSE (F) 2015, 2017]

Ans. Placenta is a special tissue connection between embryo and uterine wall. It acts as an endocrine gland.

Role of placenta:

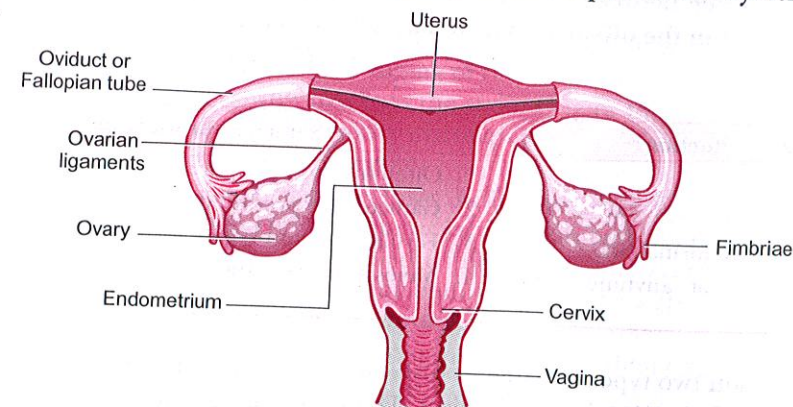
(i) It possesses villi that increase the surface area for absorption of nutrients.

(ii) It facilitates the passage of nutrition and oxygen to embryo from mother through blood.

(iii) Waste substances produced by embryo are removed through placenta into mother's blood.

Q. 44. Draw a labelled diagram of a human female reproductive system.

Ans.



Human female reproductive system

Q. 45. State the changes that take place in the uterus when:

(a) Implantation of embryo has occurred.

(b) Female gamete/egg is not fertilised.

[CBSE Delhi 2017]

Ans. (a) When implantation of embryo has occurred the uterine wall thickens and is richly supplied with blood to nourish the growing embryo.

(b) The thick and spongy lining of the uterus slowly breaks and comes out through the vagina as blood and mucus.

Q. 46. What are the functions of testis in the human male reproductive system? Why are these located outside the abdominal cavity? Who is responsible for bringing about changes in appearance seen in boys at the time of puberty?

[CBSE Delhi 2016]

Ans. Functions of testis:

(i) Production of sperms.

(ii) Production of male hormone/testosterone.

These are located outside the human body, as sperms need lower temperature than the normal body temperature to mature.

Testosterone is responsible for bringing changes at the time of puberty in boys.

Q. 47. What is contraception? Name any two methods. How does the use of these methods have a direct effect on the health and prosperity of a family? State any three points.

[CBSE (F) 2017]

Ans. Any method which prevents conception or pregnancy is called contraception.

Barrier method, chemical method and surgical method are the different contraceptive methods.

Use of these methods have direct effect on the health and prosperity of a family because:

(a) Health of women (mother) is maintained,

(b) Parents can give more attention to their children.

(c) More resources may be made available for improvement of standard of living.

Q. 48. State briefly the changes that take place in a fertilised egg till birth of the child in the human female reproductive system. What happens to the egg when it is not fertilised?

[CBSE Delhi (C) 2017]

Ans. Following changes takes place in fertilised egg:

(a) Zygote or the fertilized egg starts dividing.

(b) Implantation of zygote in the inner uterine wall.

(c) Embryo starts growing with the help of the placenta which results in the development of the child.

(d) Birth of a child as a result of rhythmic contraction of the muscles in the uterus.

When egg is not fertilised, the inner lining of the uterus slowly breaks and comes out through the vagina as blood and mucous (Menstruation).

LONG ANSWER QUESTIONS

[5 marks]

Q. 1. Write two points of difference between asexual and sexual types of reproduction. Describe why variations are observed in the offspring formed by sexual reproduction.

[NCERT Exemplar, CBSE (AI) 2015]

Ans.

Asexual Reproduction	Sexual Reproduction
1. Involves only one parent.	1. Often involves two parents.
2. Gametes are not produced.	2. Gametes are produced.
3. No fertilisation and zygote formation.	3. Fertilisation and zygote formation is observed.
4. Meiosis does not occur at anytime during reproduction.	4. Meiosis occurs at the time of gamete formation.

[Any two]

During sexual reproduction two types of gametes fuse. Although the gametes contain the same number of chromosomes, their DNA is not identical. The difference in the genetic make up of DNA generate variations among the offsprings.

Q. 2. What is multiple fission? How does it occur in an organism? Explain briefly. Name one organism which exhibits this type of reproduction.

[CBSE Delhi 2016]

Ans. Multiple fission is the process of reproduction in which many daughter individuals are formed or produced from the parent cell. In this process, the nucleus divides repeatedly to produce large number of nuclei. Each nucleus gathers a bit of cytoplasm around itself and develops a membrane around each structure. Many daughter cells develop which on liberation grow into adult organisms.

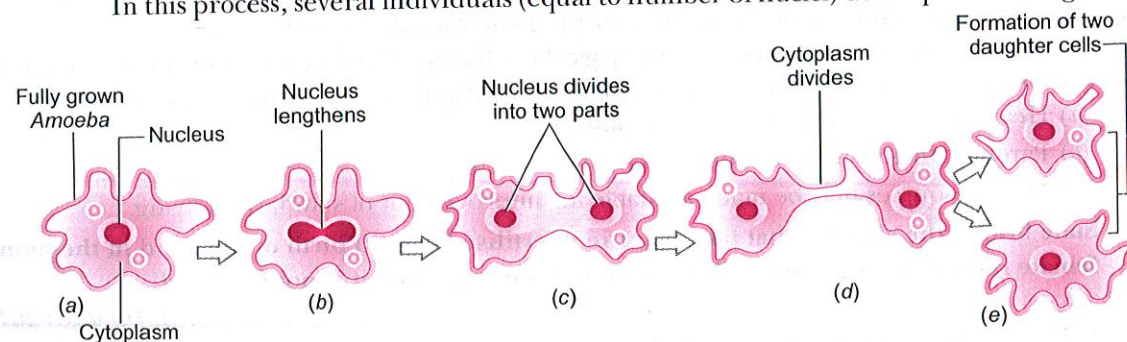
Plasmodium exhibits multiple of fission.

Q. 3. (i) Describe asexual reproduction in *Amoeba*.

(ii) How does sexual reproduction in plants takes place?

Ans. (i) In *Amoeba*, asexual reproduction occurs by fission (binary and multiple). In *Amoeba*, nucleus first divides into two daughter nuclei by mitosis and then body along with the cytoplasm constricts from the middle, which gradually deepens and eventually divides into two individual parts, each part has one nucleus. Thus, two daughter *Amoebae* develop from one. This is called binary fission.

In multiple fission, nucleus repeatedly divides to form a large number of nuclei, which reach at the periphery. Later cytoplasm gathers around each nucleus to form a daughter *Amoeba*. In this process, several individuals (equal to number of nuclei) develop from a single *Amoeba*.



(ii) Sexual reproduction in plants takes place in the following steps:

- The male reproductive organ 'stamen' makes the male gametes.
- The female reproductive organ 'carpel' makes the female gametes.
- The male gametes fertilise the female gametes.
- The fertilised ovules grow and become seeds.
- The seeds produce new plants under favourable conditions like presence of water, warmth, air, light, etc.

Q. 4. (i) Describe the process of fertilisation in a flower.

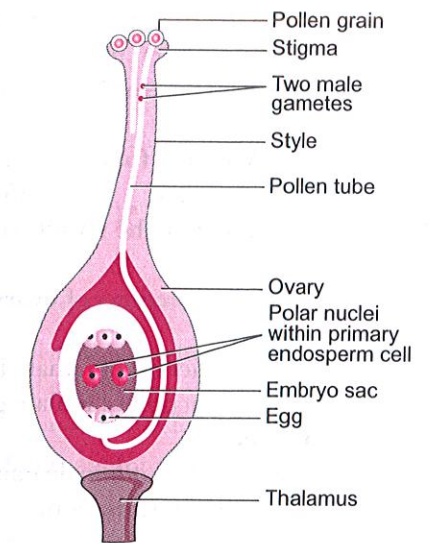
(ii) Why is the number of sperms produced always much more than the number of eggs produced?

Ans. (i) A pollen grain contains two male gametes. When a pollen grain falls on the stigma of the carpel, it grows a pollen tube downwards into the style. One of the male gametes reaches the ovary through pollen tube and fuses with egg to form zygote.

The other male gamete fuses with two polar nuclei one from each end of embryo sac to form endosperm nucleus. This fusion is called triple fusion. The zygote grows into an embryo and an endosperm nucleus grows into endosperm (the food storage tissue of seed).

(ii) Sperms are produced much more in number than eggs because:

- Eggs are non-motile whereas sperms are motile and they may be misdirected while they are travelling towards eggs.
- Sperms may not be able to survive under external environmental conditions for long.
- To increase the probability of fertilisation of eggs.



Longitudinal section of a flower showing growth of pollen tube

Q. 5. Give one example each of unisexual and bisexual flowers.

Differentiate between the two types of pollination that occur in flowers. What happens when a pollen lands on a suitable stigma? Write about the events that occur till the seed formation in the ovary.

[CBSE (F) 2017]

Ans. Unisexual Flower: papaya, watermelon

Bisexual Flower: hibiscus, rose

The two types of pollination are self pollination and cross pollination.

Self pollination: The pollen grains are transferred from the anther to the stigma of the same flower or to the flower of the same plant.

Cross pollination: The pollen grains are transferred from the anther to the stigma of a flower of a different plant.

The following events takes place:

- After pollen lands on a suitable stigma, a pollen tube grows out of pollen grain and travels through the style to reach the ovary.
- The male germ cell fuses with the female germ cell to form a zygote.
- Zygote divides several times to form an embryo within the ovule.
- The ovule develops tough coat and gradually gets converted into a seed.

Q. 6. (i) State in brief the functions of the following organs in the human female reproductive system: Ovary, Fallopian tube, Uterus

(ii) What is menstruation? Why does it occur?

[CBSE (F) 2017]

Ans. (i) Functions of ovary are:

- Production of female gamete.
- Production of female hormone.

Functions of fallopian tube are:

- It is the site of fertilisation.
- Transfer of female gamete from ovary takes place through it.

Functions of uterus are:

- Implantation of zygote.
- Nourishment of developing embryo.

(ii) **Menstruation:** It is the periodic breakdown of uterine lining and its removal along with

blood and mucous in (post pubertal stage of a) human female.
 Uterine lining is required to nourish the embryo that is formed if fertilisation takes place. In absence of fertilisation, the lining is not required and hence it sheds in the form of menstruation.

Q. 7. Write the functions of the following in human female reproductive system:

Ovary, oviduct, uterus

How does the embryo get nourishment inside the mother's body? Explain in brief. [CBSE Delhi 2015]

OR

(i) Write the functions of the following parts in human female reproductive system:

(a) Ovary (b) Oviduct (c) Uterus

(ii) Describe the structure and function of placenta. [CBSE Delhi 2016]

OR

List two functions of ovary of human female reproductive system. [CBSE (AI) 2016]

Ans. Ovary:

- (i) Production of female hormone (Oestrogen and progesterone).
- (ii) Production of female gamete or egg.

Oviduct:

- (i) Transfer of female gamete from the ovary.
- (ii) Site of fertilisation.

Uterus:

- (i) Implantation of zygote or embryo.
- (ii) Nourishment of developing embryo.

The embryo inside the mother's body gets nourishment through the placenta.

Placenta is a special disc-like tissue embedded in the mother's uterine wall and connected to the embryo. Placenta provides a large surface area for glucose and oxygen, and nutrients to pass from the mother's blood to the embryo.

Q. 8. (i) Name the human male reproductive organ that produces sperms and also secretes a hormone. Write the functions of the secreted hormone.

(ii) Name the parts of the human female reproductive system where

- (a) fertilisation takes place,
- (b) implantation of the fertilised egg occurs.

(iii) Explain how the embryo gets nourishment inside the mother's body. [CBSE (AI) 2015]

OR

(i) Name the organ that produces sperms as well as secretes a hormone in human males. Name the hormone it secretes and write its functions.

(ii) Name the parts of the human female reproductive system where fertilisation occurs.

(iii) Explain how the developing embryo gets nourishment inside the mother's body. [CBSE Delhi 2017]

Ans. (i) Testes produce sperms and secrete a hormone called testosterone. The function of testosterone is to control the development of male sex organs and secondary sexual features.

(ii) (a) Oviduct or fallopian tubes (b) Uterus

(iii) After implantation, a disc-like special tissue called placenta develops between the uterus wall and the embryo which helps in the exchange of nutrients, oxygen and waste products between the embryo and the mother.

Q. 9. Reproduction is essentially a phenomenon that is not for survival of an individual but for the stability of a species. Justify. [NCERT Exemplar]

Ans. (a) Organisms need energy for survival which they obtain from life processes such as nutrition and respiration.
(b) Reproduction needs a lot of energy.
(c) Genetic material is transferred from one generation to the next as a result of reproduction through DNA copying.

(d) DNA copying takes place with high constancy and considerable variations, that is, advantageous to the species for stability in the changing environment.

HOTS (Higher Order Thinking Skills)

Q. 1. What is self sterility mechanism in flowers which allows only cross-pollination?

Ans. In self sterility, pollen grains of the same flower are not capable to fertilise that flower, potato, tobacco, tea, etc. Hence, cross-pollination is the rule applied.

Q. 2. What are the basic differences between male and female germ cell?

Ans.

Male Germ Cell	Female Germ Cell
1. Produced by male reproductive organ (testes in animals, anther in plants)	1. Produced by female reproductive organ (ovary in animals and plants)
2. Usually smaller in size and motile.	2. Usually larger in size and stores food.

Q. 3. How are general growth and sexual maturation different from each other?

[NCERT Exemplar]

Ans. General growth refers to different types of developmental process in the body like increase in height, weight gain, changes in shape and size of the body but sexual maturation is specific to changes reflected at puberty like cracking of voice, new hair patterns, development of breast in female, etc.

Q. 4. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Give one reason for this. [NCERT Exemplar]

Ans. Sugar provides energy for sustaining all life activities in yeasts. In water, it fails to reproduce because of inadequate energy in its cells.

Proficiency Exercise

Very Short Answer Questions

[1 mark]

- Mention the name of organ
 - (a) that provides nutrition to embryo.
 - (b) site where fertilised egg gets implanted.
- What is meant by DNA copying?
- What is the shape of sperms and what are the advantages of this shape?
- List any two contraceptive methods practiced only by women.
- Why are papaya flowers called unisexual?
- Name the organ in humans which produces (i) male germ cell, and (ii) female germ cell.

[CBSE (F) 2017]

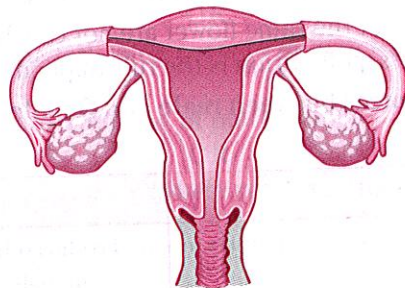
Short Answer Questions-I

[2 marks]

- Fallen leaves of *Bryophyllum* on the ground produce new plants whereas the leaves of rose do not? Explain this difference between the two plants.
- How does the embryo get nourishment inside the mother's body?
- What changes are observed in the uterus if the fertilisation does not occur?
- Distinguish between the functions of ovaries and testis.

11. In the given figure label the parts and mention their functions

- (i) Production of egg
- (ii) Site of fertilisation
- (iii) Site of implantation
- (iv) Entry of the sperms

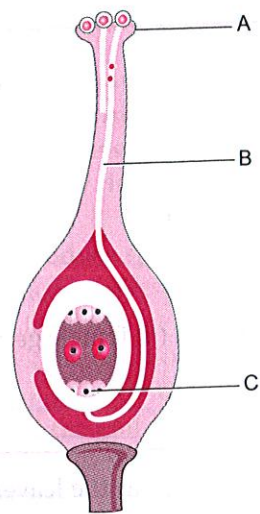


[NCERT Exemplar]

Short Answer Questions-II

[3 marks]

12. Explain the phenomenon of regeneration with the help of a diagram. How is regeneration different from reproduction?
13. What is vegetative propagation? State two advantages and two disadvantages of this method. [CBSE (AI) 2017]
14. (a) How do organisms reproduce by fission? Write names of any two organisms which reproduce by this method.
 (b) Differentiate between the fission of *Leishmania* and *Plasmodium*.
15. Draw a diagram of the longitudinal section of a flower exhibiting germination of pollen on stigma and label (i) ovary, (ii) male germ-cell, (iii) female germ-cell and (iv) ovule on it. [CBSE (F) 2015]
16. (a) Draw the longitudinal section of a flower and label the following parts.
 (i) Stigma (ii) Style (iii) Anther (iv) Ovary
 (b) After fertilisation in a flower, mention the structures that develop into the embryo and seed.
17. Name the parts A, B and C shown in the diagram and write their functions. [CBSE Delhi 2015; (AI) 2015]



18. What is reproduction? Explain two advantages of sexual reproduction over asexual reproduction. [CBSE Delhi (C) 2017]
19. Describe sexually transmitted diseases and mention the ways to prevent them. [NCERT Exemplar]

Long Answer Questions

[5 marks]

20. Distinguish between pollination and fertilisation. Mention the site and product of fertilisation in a flower.
 Draw a neat, labelled diagram of a pistil showing pollen tube growth and its entry into the ovule. [NCERT Exemplar]
21. What is menstrual cycle? Describe different changes during the menstrual cycle occurring in a woman.
22. Why is meiosis needed in species that reproduce sexually?
23. What are the various adaptations found in plants for cross pollination? Describe any two of them.
24. Distinguish between a gamete and zygote. Explain their roles in sexual reproduction. [NCERT Exemplar]
25. How does fertilisation takes place? Fertilisation occurs once in a month. Comment. [NCERT Exemplar]
26. (a) Write the functions of each of the following parts in a human female reproductive system:
 (i) Ovary (ii) Uterus (iii) Fallopian tube
 (b) Write the structure and functions of placenta in a human female. [CBSE (AI) 2017]