

CBSE Class 10 Science
NCERT Exemplar Solutions
Chapter 8
How Do Organisms Reproduce?

Exercise

Multiple Choice Questions (MCQs)

1. In the list of organisms given below, those that reproduce by the asexual method are

- (i) banana
 - (ii) dog
 - (iii) yeast
 - (iv) Amoeba
- (a) (ii) and (iv)
- (b) (i), (iii) and (iv)
- (c) (i) and (iv)
- (d) (ii), (iii) and (iv)

Ans. (b) (i), (iii) and (iv)

Explanation: Dog never reproduces asexually. Yeast and amoeba always reproduce asexually. Cultivated varieties of banana always reproduce asexually.

2. In a flower, the parts that produce male and female gametes (germ cells) are

- (a) stamen and anther
- (b) filament and stigma
- (c) anther and ovary
- (d) stamen and style

Ans. (c) Anther and ovary

3. Which of the following is the correct sequence of events of sexual reproduction in a flower?

- (a) pollination, fertilisation, seedling, embryo
- (b) seedling, embryo, fertilisation, pollination
- (c) pollination, fertilisation, embryo, seedling
- (d) embryo, seedling, pollination, fertilization

Ans. (c) Pollination, fertilisation, embryo, seedling

Explanation: Fertilisation cannot happen without pollination. Embryo is formed after fertilization and seedling comes out of embryo.

4. Offspring formed by asexual method of reproduction have greater similarity among themselves because

- (i) asexual reproduction involves only one parent**
- (ii) asexual reproduction does not involve gametes**
- (iii) asexual reproduction occurs before sexual reproduction**
- (iv) asexual reproduction occurs after sexual reproduction**

- (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (ii) and (iv)
- (d) (iii) and (iv)

Ans. (a) (i) and (ii)

Explanation: In asexual reproduction, the single parent divides into offsprings thus they are very similar.

5. Characters transmitted from parents to offspring are present in

- (a) cytoplasm
- (b) ribosome
- (c) golgi bodies
- (d) genes

Ans. (d) Genes

Explanation: Genes are responsible for transmission of characters from one generation to the next generation.

6. Characters that are transmitted from parents to offspring during reproduction show

- (a) only similarities with parents
- (b) only variations with parents
- (c) both similarities and variations with parents
- (d) neither similarities nor variations

Ans. (c) Both similarities and variations with parents

Explanation: A child shows certain similarities and certain variations in characters from parents. This shows characters in a child can be both similar as well as different than parents.

7. A feature of reproduction that is common to *Amoeba*, *Spirogyra* and Yeast is that

- (a) they reproduce asexually
- (b) they are all unicellular
- (c) they reproduce only sexually
- (d) they are all multicellular

Ans. (a) They reproduce asexually

Explanation: Number of cells in an organism does not decide if the organism would reproduce asexually or sexually. Hence options 'b' and 'd' are incorrect. These organisms never reproduce sexually and hence option 'c' is incorrect.

8. In Spirogyra, asexual reproduction takes place by

- (a) breaking up of filaments into smaller bits
- (b) division of a cell into two cells
- (c) division of a cell into many cells
- (d) formation of young cells from older cells

Ans. (a) breaking up of filaments into smaller bits

Explanation: Spirogyra shows reproduction by fragmentation.

9. The ability of a cell to divide into several cells during reproduction in *Plasmodium* is called

- (a) budding
- (b) reduction division
- (c) binary fission
- (d) multiple fission

Ans. (d) Multiple fission

10. The correct sequence of reproductive stages seen in flowering plants is

- (a) gametes, zygote, embryo, seedling
- (b) zygote, gametes, embryo, seedling
- (c) seedling, embryo, zygote, gametes

(d) gametes, embryo, zygote, seedling

Ans. (a) gametes, zygote, embryo, seedling.

Explanation: Gametes fuse during fertilization to form zygote. Zygote develops into embryo. Embryo produces seedling after germination of seed.

11. The number of chromosomes in parents and offsprings of a particular species remains constant due to

(a) doubling of chromosomes after zygote formation

(b) halving of chromosomes during gamete formation

(c) doubling of chromosomes after gamete formation

(d) halving of chromosomes after gamete formation

Ans. (b) halving of chromosomes during gamete formation

Explanation: During gamete formation, number of chromosomes becomes half. Due to this, number of chromosomes in zygote becomes same as in somatic cell of the organism. This ensures constant number of chromosomes in a particular species.

12. In Rhizopus, tubular thread-like structures bearing sporangia at their tips are called

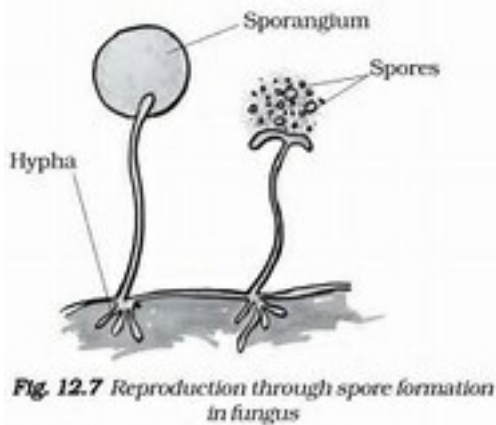
(a) filaments

(b) hyphae

(c) rhizoids

(d) roots

Ans. (b) Hyphae



13. Vegetative propagation refers to formation of new plants from

- (a) stem, roots and flowers
- (b) stem, roots and leaves
- (c) stem, flowers and fruits
- (d) stem, leaves and flowers

Ans. (b) Stem, roots and leaves

Explanation: Vegetative propagation happens from vegetative parts of a plant. Stem root and leaves are vegetative parts.

14. Factors responsible for the rapid spread of bread mould on slices of bread are

- (i) large number of spores
- (ii) availability of moisture and nutrients in bread
- (iii) presence of tubular branched hyphae
- (iv) formation of round shaped sporangia

- (a) (i) and (iii)
- (b) (ii) and iv)
- (c) (i) and (ii)
- (d) (iii) and (iv)

Ans. (c) (i) and (ii)

Explanation: Large number of spores ensures survival of some spores even in adverse conditions. Moisture and nutrients in bread provide conducive environment for spores to produce new bread mould.

15. Length of pollen tube depends on the distance between

- (a) pollen grain and upper surface of stigma
- (b) pollen grain on upper surface of stigma and ovule
- (c) pollen grain in anther and upper surface of stigma
- (d) upper surface of stigma and lower part of style

Ans. (d) upper surface of stigma and lower part of style

Explanation: To ensure pollination. Pollens should be able to reach the upper surface of stigma. This can be ensured by suitable length of pollen tube.

16. Which of the following statements are true for flowers?

- (i) Flowers are always bisexual**
- (ii) They are the sexual reproductive organs**
- (iii) They are produced in all groups of plants**
- (iv) After fertilisation they give rise to fruits**

- (a) (i) and (iv)
- (b) (ii) and (iii)
- (c) (i) and (iii)
- (d) (ii) and (iv)

Ans. (d) (ii) and (iv)

Explanation: Some flowers are unisexual and hence statement (i) is incorrect. Flowers are

produced by angiosperms only and hence statement (iii) is incorrect.

17. Which among the following statements are true for unisexual flowers?

- (i) They possess both stamen and pistil**
- (ii) They possess either stamen or pistil**
- (iii) They exhibit cross pollination**
- (iv) Unisexual flowers possessing only stamens cannot produce fruits**

- (a) (i) and (iv)
- (b) (ii), (iii) and (iv)
- (c) (iii) and (iv)
- (d) (i), (iii) and (iv)

Ans. (b) (ii), (iii) and (iv)

Explanation: Since a unisexual flower has either stamen or pistil, hence cross pollination is necessary in them. Fruit is a mature ovary and hence a flower possessing only stamens cannot produce fruit.

18. Which among the following statements are true for sexual reproduction in flowering plants?

- (i) It requires two types of gametes**
- (ii) Fertilisation is a compulsory event**
- (iii) It always results in formation of zygote**
- (iv) Offspring formed are clones**

- (a) (i) and (iv)
- (b) (i), (ii) and (iv)
- (c) (i), (ii) and (iii)
- (d) (i), (ii) and (iv)

Ans. (c) (i), (ii) and (iii)

Explanation: Offspring produced after sexual reproduction are never clones of their parents. Hence, statement (iv) is incorrect.

19. In Figure 8.1, the parts A, B and C are sequentially

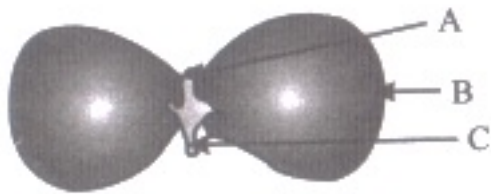
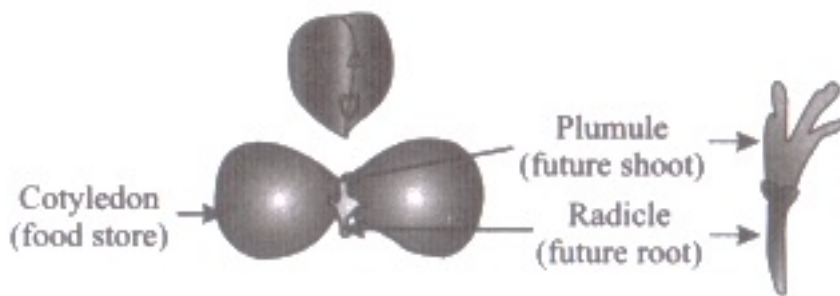


Fig. 8.1

- (a) cotyledon, plumule and radicle
- (b) plumule, radicle and cotyledon
- (c) plumule, cotyledon and radicle
- (d) radicle, cotyledon and plumula

Ans. (c) Plumule, cotyledon and radicle

Explanation:



20. Offspring formed as a result of sexual reproduction exhibit more variations because

- (a) sexual reproduction is a lengthy process
- (b) genetic material comes from two parents of the same species
- (c) genetic material comes from two parents of different species

(d) genetic material comes from many parents

Ans. (b) genetic material comes from two parents of the same species

Explanation: In sexual reproduction, genetic materials are contributed by two parents. Members of two different species cannot interbreed and hence option 'c' is incorrect.

21. Reproduction is essential for living organisms in order to

(a) keep the individual organism alive

(b) fulfill their energy requirement

(c) maintain growth

(d) continue the species generation after generation

Ans. (d) continue the species generation after generation

Explanation: Other life processes are essential for keeping the organism alive. Reproduction is essential to continue the lineage of an organism.

22. During adolescence, several changes occur in the human body. Mark one change associated with sexual maturation in boys

(a) loss of milk teeth

(b) increase in height

(c) cracking of voice

(d) weight gain

Ans. (c) cracking of voice

Explanation: Other changes; as shown in options happen in girls also.

23. In human females, an event that reflects onset of reproductive phase is

- (a) growth of body
- (b) changes in hair pattern
- (c) change in voice
- (d) menstruation

Ans. (d) Menstruation

Explanation: Other changes; as shown in options happen in boys also.

24. In human males, the testes lie in the scrotum, because it helps in the

- (a) process of mating
- (b) formation of sperm
- (c) easy transfer of gametes
- (d) all the above

Ans. (b) Formation of sperm

Explanation: The fact that testes lie in the scrotum ensures that the temperature of testes is below body temperature. It ensures optimum production of sperms.

25. Which among the following is not the function of testes at puberty?

- (i) formation of germ cells**
- (ii) secretion of testosterone**
- (iii) development of placenta**
- (iv) secretion of estrogen**

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (iii) and (iv)

(d) (i) and (iv)

Ans. (c) (iii) and (iv)

Explanation: These events take place in females and not in males. Testes are present in males.

26. The correct sequence of organs in the male reproductive system for transport of sperms is

(a) testis → vasdeferens → urethra

(b) testis → ureter → urethra

(c) testis → urethra → ureter

(d) testis → vasdeferens → ureter

Ans. (a) testis → vasdeferens → urethra

Explanation: Ureter is connected to kidneys only.

27. Which among the following diseases is not sexually transmitted?

(a) Syphilis

(b) Hepatitis

(c) HIV - AIDS

(d) Gonorrhoea

Ans. (b) Hepatitis

Explanation: It is a water-borne disease.

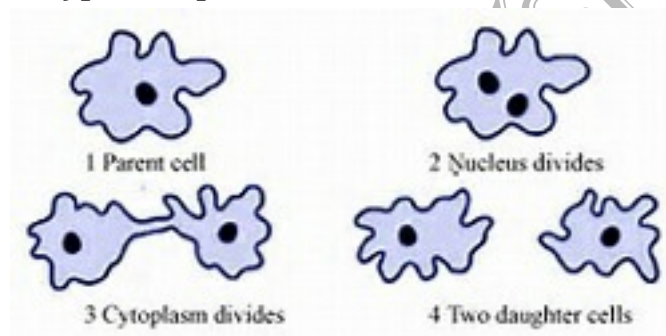
Short Answer Questions

28. In a bisexual flower inspite of the young stamens being removed artificially, the flower produces fruit. Provide a suitable explanation for the above situation.

Ans. When the stamens of a bisexual flower are removed artificially, cross pollination takes place. This ensures fertilization. Due to this, flower is able to produce fruit.

29. Can you consider cell division as a type of reproduction in unicellular organism? Give one reason.

Ans. In unicellular organism, new individual is created after cell division. Creation of new individual is called reproduction. Hence, cell division in unicellular organism can be termed as type of reproduction.



30. What is a clone? Why do offsprings formed by asexual reproduction exhibit remarkable similarity?

Ans. A true copy of anything is called a clone. In case of asexual reproduction, genes are contributed by a single parent. Due to this, offsprings produced by asexual reproduction are clones of their parent.

31. Explain how, offspring and parents of organisms reproducing sexually have the

same number of chromosomes?

Ans. Sexual reproduction involves gamete formation. Number of chromosomes is halved during gamete formation. As a result, when two gametes fuse during fertilization, the number of chromosomes in zygote becomes same as in somatic cell of the organism. This ensures that offsprings produced by sexual reproduction have the same number of chromosomes as their parents.

32. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Give one reason for this.

Ans. Yeast is a fungus and needs a supply of energy for its living and growth. Sugar supplies this energy. (Your body also gets much of its energy from sugar and other carbohydrates.) Water does not provide required nutrition.

Yeast can use oxygen to release the energy from sugar

33. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread?

Ans. Spores of bread mould need nutrition and moisture for germination and further growth. A dry slice of bread can provide nutrition but it lacks moisture. Due to this, bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread.

34. Give two reasons for the appearance of variations among the progeny formed by sexual reproduction.

Ans. Two reasons for the appearance of variations among the progeny formed by sexual reproduction are:

(a) Genes are contributed by two parents

(b) Crossing over during meiosis also results in variations.

35. Would a Planaria cut vertically into two halves regenerate into two individuals?

Complete Figure 8.2 D and E by indicating the regenerated regions.

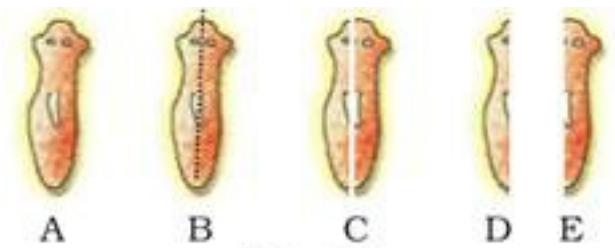
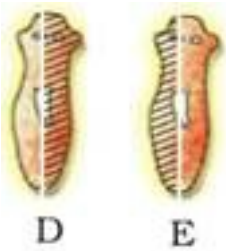


Fig. 8.2

Ans. Planaria has the capability of regeneration. Due to this, a cut portion of planaria would develop complementary portion to become a new individual. Following figures show new individuals from D and E:



36. 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.

Ans.

Plant	No. of chromosomes (2n)	Animal	No. of chromosomes (2n)
Black mulberry	308	Mouse	40
Rattlesnake fern	184	Humans	46
Pineapple	50	Gorilla	48
Oat	42	Elephant	56
Mango	40	Goat	60

(a) Do larger organisms have more number of chromosomes/cells?

Ans. Mango (40) and rattlesnake fern (184) show that size of organism has nothing to do with number of chromosomes.

(b) Can organism with fewer chromosomes reproduce more easily than organisms with more number of chromosomes?

Ans. Gestation period in elephant is much longer than that in goat. Goat has a larger number of chromosomes than elephant. This shows that an organism with fewer number of chromosomes need not reproduce more easily than organisms with more number of chromosomes.

(c) More the number of chromosomes/cells greater is the DNA content. Justify.

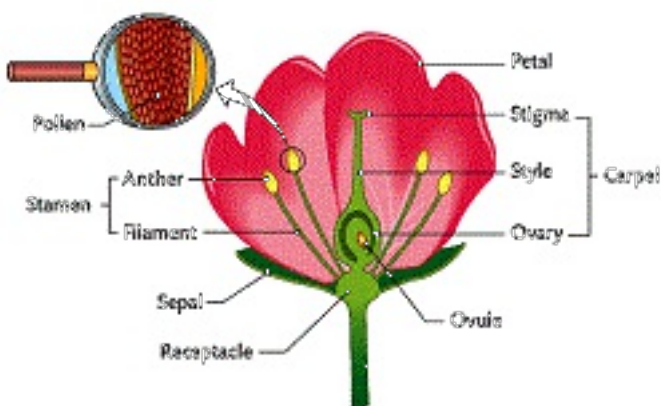
Ans. Chromosomes are composed of DNA. Hence, it can be said that more the number of chromosomes/cells greater is the DNA content.

37. 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?

Ans. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.

38. Why cannot fertilisation take place in flowers if pollination does not occur?

Ans. Pollination is the process by which pollen grains are transferred to the stigma. Once pollen grains land on stigma, they germinate to produce pollen tubes and subsequently to facilitate fertilization. Hence, fertilization cannot take place in flowers if pollination does not occur.

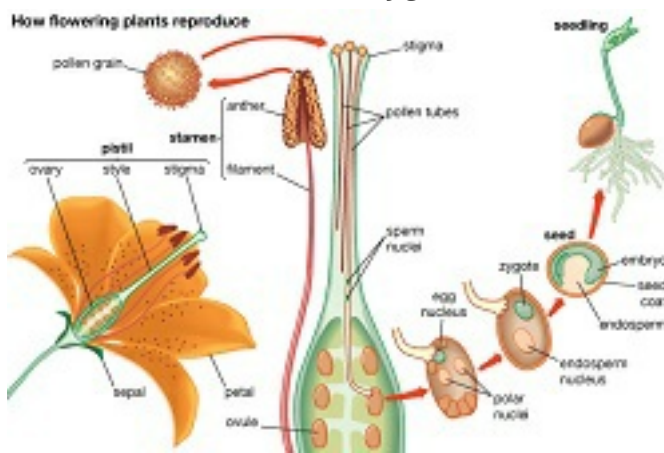


39. Is the chromosome number of zygote, embryonal cells and adult of a particular organism always constant? How is the constancy maintained in these three stages?

Ans. After the formation of zygote, further development takes place through mitosis. We know that after mitosis, the number of chromosomes in daughter cells is same as in mother cell. Due to this, number of chromosomes in embryo is same as in zygote. For the same reason, number of chromosomes in an organism is same as in zygote or embryo. So, it is clear that the chromosomes number of zygote, embryonal cells and adult of a particular organism is always constant.

40. Where is the zygote located in the flower after fertilization?

Ans. After fertilization, zygote is located in the ovary.



41. Reproduction is linked to stability of population of a species. Justify the statement.

Ans. Every organism faces a lot of competition for survival. Barring a very few, most of the organisms end up being food for some other organism. Competition and predation result in drastic reduction in population of a species. But reproduction ensures that population of a species is maintained at optimum level. So, it can be said that reproduction is linked to stability of population of a species.

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

Ans. General growth is about growth in size of an organism. Sexual maturation is about the accomplishment of ability to reproduce. General growth begins right from the time an organism comes into this world. Sexual maturity begins at a later stage called Adolescence. In most of the animals, general growth stops after a certain age and this coincides with attainment of sexual maturity.

43. Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system.

Ans. Path of sperm during ejaculation: testes -> epididymis -> vas deferens -> prostate -> urethra.

Glands associated with male reproductive system	Function
Testes	Secretion of testosterone
Prostate gland	Makes the medium of semen alkaline
Seminal vesicle	Addition of fluid content to semen
Cowper's gland	Lubricates urethra and neutralizes acidic traces of urine

44. What changes are observed in the uterus if fertilisation does not occur?

Ans. Following changes take place in uterus if fertilization does not occur:

- The extra lining of uterus degenerates.
- Fragments of the uterine lining are discharged through vagina.
- Unfertilized egg is also discharged.
- Menstruation take place.

45. What changes are observed in the uterus subsequent to implantation of young embryo?

Ans. Following changes take place in uterus after implantation of young embryo:

- Uterine lining thickens to support to developing embryo.(PLACENTA)
- Uterine lining is richly supplied with blood vessels so that nutrition and oxygen could be supplied to the developing foetus.

46. What are the benefits of using mechanical barriers during sexual act?

Ans. Following are the benefits of mechanical barriers during sexual act:

- Prevention of unwanted pregnancy.(Fertilisation)
- Prevention of STDs.

47. In the given Figure 8.3 label the parts and mention their functions

- (a) Production of egg
- (b) Site of fertilisation
- (c) Site of implantation
- (d) Entry of the sperms

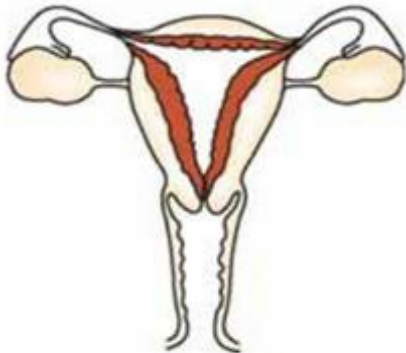
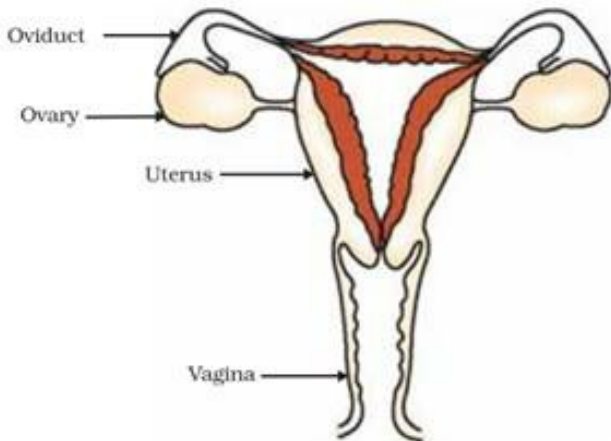


Fig. 8.3

Ans.



48. What would be the ratio of chromosome number between an egg and its zygote?
How is the sperm genetically different from the egg?

Ans. The ratio of chromosome number between an egg and its zygote is 1:2, because the zygote matures into embryo with halving of the number of chromosomes.

Long Answer Questions

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

Ans. A single parent is involved and gamete formation does not take place in reproduction through budding, fragmentation and regeneration. Hence, all of these are considered as asexual types of reproduction.

Regeneration in Planaria: The body of planaria may get divided into many pieces. Each piece has the ability to develop complementary portion to become a new individual. The given figure shows a planaria getting divided into three pieces. Subsequently, each piece develops into a new individual.



Regeneration in Planaria

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

Ans.

Asexual Reproduction	Sexual Reproduction
A single parent is involved.	Two parents are involved.
Gametes are not formed.	Gametes are formed.

Variations are observed in the offspring formed by sexual reproduction, because of following reasons:

- Gene pool is contributed by two parents.
- Crossing over during meiosis results in variations.
- DNA replication also plays some role in variation.

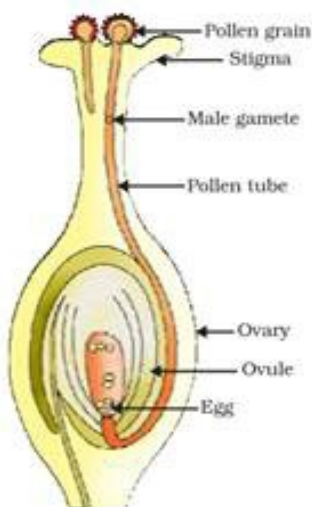
51. Distinguish between pollination and fertilisation. Mention the site and product of fertilisation in a flower. Draw a neat, labelled diagram of a pistil showing pollen tube growth and its entry into the ovule.

Ans.

Pollination	Fertilisation
Pollen grains are transferred from another to stigma.	Fusion of male and female gametes takes place.
Happens outside the ovary.	Happens inside the ovary.
It happens before fertilization.	It is the next step after pollination.

Site of fertilization: Ovary

Product of fertilization: Zygote



Pollen tube growth and its entry into the ovule

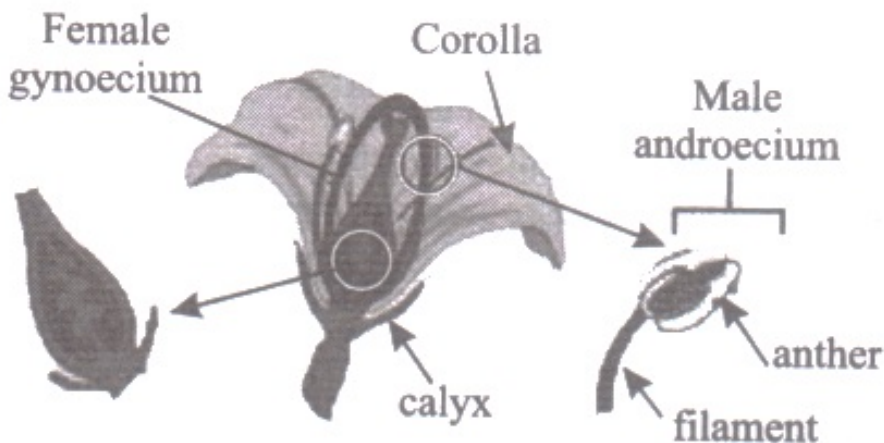
52. Distinguish between a gamete and zygote. Explain their roles in sexual reproduction.

Ans.

Gamete	Zygote
Formed after meiosis	Formed after fusion of two gametes.
Has haploid number of chromosomes.	Has diploid number of chromosomes.
Produced by male and female parts:	Formation takes place in female part.
Role in sexual reproduction: Gamete are necessary for sexual reproduction to take place, because zygote cannot be formed without gametes. Brings gene pool from two individuals.	Role in sexual reproduction: Zygote formation is a precursor of embryo formation.

53. Draw the diagram of a flower and label the four whorls. Write the names of gamete producing organs in the flower.

Ans.



- Ovary: Produces female gametes
- Anther: Produces male gametes

54. What is placenta? Mention its role during pregnancy?

Ans. Placenta is a disc-like structure embedded in the uterine wall. It contains villi on the

embryonal side. Blood spaces are present on the mother's side. Following are the functions of placenta:

- Supplying nutrients to the foetus.
- Supplying oxygen to the foetus.
- Taking away carbon dioxide from the foetus.
- Taking away excretory products from the foetus.

55. What are various ways to avoid pregnancy? Elaborate any one method.

Ans. Various ways to avoid pregnancy are as follows:

(a) Physical barrier

(b) Copper -T

(c) Hormone pills

(d) Surgical procedure

Hormone Pills: Many hormones pills are available in the market. These pills stop ovulation and thus prevent conception. Many new pills are available which need to be taken in fewer number of doses. These are more convenient and have least side effects.

Copper T: Copper T is a very effective method of contraception. Its success rate in preventing pregnancy is high. It is inserted high in the uterus by a physician, and is effective for about 10 years. It does not provide protection against sexually transmitted diseases.

56. How does fertilisation take place? Fertilisation occurs once in a month. Comment.

Ans. In human beings, one egg is released from either of the ovaries once in a month. The egg is transferred to the fallopian tube from the ovaries. Sperms swim up to the fallopian tube. Only one sperm is able to penetrate the egg. That is how fertilization takes place.

A menstrual cycle is composed of about 28 days. This means only one egg is available for fertilization in one menstrual cycle. Hence, it can be said that fertilization can occur only once in a month.

57. Reproduction is essentially a phenomenon that is not for survival of an individual but for the stability of a species. Justify.

Ans. Survival of an individual depends on many factors. An individual can survive if he/she gets food and shelter. An individual can survive if he/she is not killed by a predator. An individual can survive if he/she is not killed by a competitor. In biological sense, an individual can survive if all the life processes continue in the body.

But reproduction creates a new individual and the new individual carries the lineage of the species even after the death of parents. Moreover, a good rate of reproduction ensures a large population which counterbalances mortality in the population. We know that a higher birth rate and lower mortality rate helps in growth of population. If mortality rate becomes more than birth rate, then a population can be wiped out. Thus, reproduction helps in maintaining the stability of a species.

58. Describe sexually transmitted diseases and mention the ways to prevent them.

Ans. Sexually Transmitted Diseases: Diseases which spread from one person to another through sexual act are called sexually transmitted diseases. The organisms that cause sexually transmitted diseases may pass from person to person in blood, semen, or vaginal and other bodily fluids.

HIV, Gonorrhoea, Herpes, etc. are examples of STDs.

Ways to prevent STDs:

- Use of condoms or other physical barriers.
- Avoiding sexual contacts with unknown partners.
- Avoid sharing towels or underclothing.
- Get a vaccination for hepatitis B. This is a series of three shots.