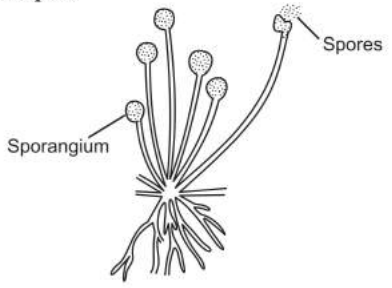
How do Organisms Reproduce

TOPIC COVERED

Modes of Reproduction Used by Single Organisms

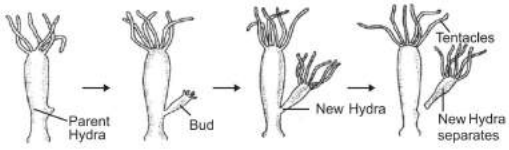
Multiple-Choice Questions 1 Mark

1. **Which is the most common method of reproduction in bacteria?**
   (*a*) Budding (*b*) Spore formation
   (*c*) Binary fission (*d*) Multiple fission
2. **Which of the following is not an artificial method of vegetative propagation?**
   (*a*) Cutting (*b*) Layering
   (*c*) Budding (*d*) Grafting
3. **Many unicellular organisms reproduce by the process of**
   (*a*) fission (*b*) ovulation
   (*c*) regeneration (*d*) non-disjunction
4. **The ability of an organism to develop whole body from a broken piece or fragment is called**
   (*a*) binary fission (*b*) budding
   (*c*) multiple fission (*d*) regeneration
5. **While studying binary fission in *Amoeba* from a permanent slide under a microscope,**
   (*i*) unicellular and uninucleate organisms showing irregular outline is observed under low power.
   (*ii*) unicellular and uninucleate organisms showing irregular outline is observed under high power.
   (*iii*) division of cells of *Amoeba* are observed under high power.
   (*iv*) division of cells of *Amoeba* are observed under low power.
   (*a*) (*i*) and (*iii*) (*b*) (*i*) and (*iv*)
   (*c*) (*ii*) and (*iii*) (*d*) (*ii*) and (*iv*)
6. **The image shows the formation of spores in *Rhizopus*.**



How spores develop into *Rhizopus*? [CBSE T.E.R.M.*]
(*a*) Spores divide and grow into new individual.
(*b*) Spores combine with other spores and grow.
(*c*) Spores enlarge in size for the growth of new individual.
(*d*) Spores land on other organising and increase with their growth in size.

7. **The image shows a bud developing a *Hydra*.**



What is the likely purpose of this division in *Hydra*? [CBSE T.E.R.M.*]
(*a*) To increase the body size.
(*b*) To recover lost body parts.
(*c*) To induce variation in body.
(*d*) To develop new independent individual.

Answers

1. (*c*) Binary fission is the method of asexual reproduction in which the formation of two daughter cells take place from one parent cell. It is the most common method of reproduction in bacteria.
2. (*c*) Buds occur naturally.
3. (*a*) For unicellular organisms cell division or fission leads to the creation of new individuals.
4. (*d*) 5. (*d*) 6. (*a*) 7. (*d*)

VSA Very Short Answer Type Questions 2 Marks

8. **Rajesh observed a patch of greenish black powdery mass on a stale piece of bread.**
   (*a*) Name the organism responsible for this and its specific mode of asexual reproduction.
   (*b*) Name its vegetative and reproductive parts.
   [CBSE Sample Paper 2022]

Ans. (*a*) The greenish black powdery mass on a stale piece of bread is due to bread mould *Rhizopus*, which reproduces by spore formation.
(*b*) Hyphae or thread like structures are the vegetative part and tiny blob like **structures or sporangia** are the reproductive parts.

9. Write two differences between binary fission and multiple fission in a tabular form. [Delhi 2015]

Ans. Differences between:

Binary fission	Multiple fission
(*i*) It is the division of the parent into two nearly equal sized daughter individuals.	(*i*) It is the division of the parent into many small daughter individuals.
(*ii*) Nucleus of the parent cell divides to form two nuclei.	(*ii*) Nucleus of the parent cell divides to form a number of nuclei.

10. How do *Plasmodium* and *Leishmania* reproduce? Write one difference in their mode of reproduction. [Foreign 2014]

Ans. *Plasmodium* and *Leishmania* reproduce through fission–an asexual method of reproduction. *Leishmania* reproduce with the help of binary fission. *Plasmodium* reproduce by multiple fission dividing itself into many daughter cells inside its cell wall.

11. Define multiple fission. Give its one example. [Foreign 2014]

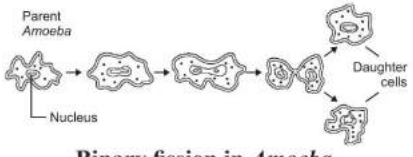
Ans. Multiple fission is a type of cell division in which a single cell divides into many daughter cells simultaneously, inside a protective covering called cyst, *e.g.* in *Plasmodium*.

12. List two advantages of growing grapes or banana plants through vegetative propagation. [AI 2013]

Ans. (*i*) Traits of the parent plants are preserved.
(*ii*) Since they donot possess viable seeds, vegetative propagation helps to reproduce.

13. With the help of a diagram show the different stages of binary fission in *Amoeba*. [Foreign 2013]

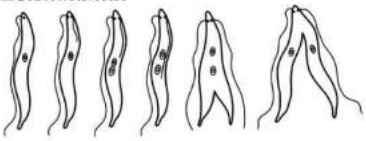
Ans. Binary fission is the division of one cell which cuts into two similar or identical cells.



Binary fission in *Amoeba*

14. Draw the various stages of binary fission of *Leishmania*.

Ans.

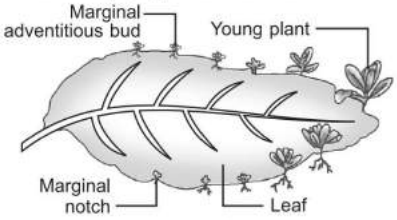


(*a*) (*b*) (*c*) (*d*) (*e*) (*f*)

Binary fission in *Leishmania*

15. Illustrate the following with the help of a suitable diagram:
Leaf of *Bryophyllum* with buds.

Ans.



16. List any four reasons for vegetative propagation being practised in the growth of some type of plants.

Or

List four advantages of vegetative propagation. [DoE, Foreign 2013]

Ans. Advantages of vegetative propagation

(*i*) Vegetative propagation is a cheaper, easier and more rapid method of propagation in plants than growing plants from their seeds.
(*ii*) Better quality of the plants can be maintained by this method.
(*iii*) It results in propagation of those plants which do not produce viable seeds or produce seeds with prolonged period of dormancy.
(*iv*) The plants generated from vegetative means require less time to grow and have the advantage of being more uniform and genetically similar to the parent stock.

17. List two advantages of vegetative reproduction practised in case of an orange plant. [Delhi 2012]

Ans. Two advantages of practising vegetative reproduction in an orange plant are:

(*i*) the oranges produced are similar in size and shape.
(*ii*) many oranges do not produce viable seeds and hence, vegetative method is a good alternative.

18. Explain regeneration. [DoE]

Ans. Regeneration is the process by which fully differentiated organisms give rise to new individual organisms from their body parts. More complex organisms cannot give rise to new individuals through regeneration.

19. What is meant by asexual reproduction? List its any two different forms.

Ans. Asexual reproduction: It is the process of producing new organism from a single parent without the involvement of sex cells.
Fission and fragmentation are two different forms of asexual reproduction.

20. Name an organism which reproduces by spore formation. List three conditions favourable for spores to germinate and grow.

Ans. *Rhizopus* reproduces by spore formation
Conditions favourable for spore formation are:
(*i*) Cool place, (*ii*) Moist place
(*iii*) Dark place.

21. A farmer bought some strawberries and liked the taste. He decided to grow his own strawberries that should have the same taste.
(*a*) Which method of cultivation should the farmer adopt?
(*b*) Why would the farmer choose this method? **[CFPQ, CBSE]**

Ans. (*a*) Asexual reproduction / Vegetative propagation
(*b*) It is because fruit produced through vegetative propagation would carry conserved parental characteristics.

22. What could be the TWO most likely reasons for unicellular organisms to reproduce only through asexual reproduction? **[CFPQ, CBSE]**

Ans. (*i*) They can produce a large number of offsprings in a small period of time.
(*ii*) The offsprings are adapted to survive in the same environment.

Short Answer Type Questions 3 Marks

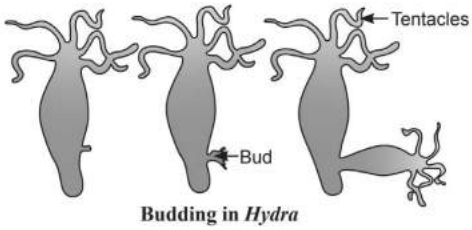
23. The process of spore formation takes place in many simple multicellular organisms. Name the (*a*) organism using this process to reproduce, and (*b*) reproductive and non-reproductive parts of such organisms. List two benefits to an organism that reproduces through spores. **[CBSE 2021 (C)]**

Ans. (*a*) The organism that reproduces by spore formation – *Rhizopus*.
(*b*) Reproductive parts of *Rhizopus* – Sporangia
Non-reproductive parts of *Rhizopus*–Hyphae
Benefits to an organism that reproduces by spores:
- Spores can be spread through air, water or animals and so it is good for spread of rhizopus to more place.
- Spores can remain dormant till favourable conditions become available.
- Spores help an organism to tide over bad phase. (*any two*)

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

Ans. **Asexual reproduction:** A single parent is involved and no formation or fusion of gametes take place. The offspring is the exact copy of the parent.

Reproduction (Budding) in *Hydra*:
- *Hydra* reproduces by budding using the regenerative cells.
- A bud develops as an outgrowth in *Hydra* due to repeated cell division at one specific site.
- When fully mature, the bud detaches itself from the parent body and develops into new independent individual.



Budding in *Hydra*

25. What happens when
(*a*) *Planaria* gets cut into two pieces?
(*b*) A mature *Spirogyra* filament attains considerable length?
(*c*) On maturation sporangia burst? **[Foreign 2016]**

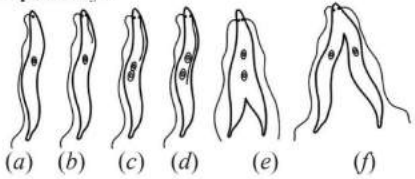
Ans. (*a*) When *Planaria* gets cut into two pieces, each piece grows into a complete organism.
(*b*) A mature *Spirogyra* on attaining considerable length breaks up into two or more small pieces. Each piece then grows into a new individual.
(*c*) When sporangia bursts, spores are released, each one of which develops into new individual.

26. (*a*) List two advantages of growing grapes or banana plants through vegetative propagation. **[AI 2013]**
(*b*) A potato is cut into a number of small pieces. These pieces are then placed only on wet cotton kept in a tray. After few days some of the potato pieces gave rise to fresh green shoots and roots. Why?

Ans. (*a*) (*i*) Traits of the parent plants are preserved.
(*ii*) Since they donot possess viable seeds, vegetative propagation helps to reproduce.
(*b*) The green shoots and roots were produced only those potato pieces which have buds on them pieces of potato without buds were not able produce green shoots and roots.

27. (*a*) Draw the various stages of binary fission of *Leishmania*.
(*b*) What are the changes seen in boys at the time of puberty?

Ans. (*a*)



Binary fission in *Leishmania*

(*b*) At the time of puberty, the changes which are seen in boys are given below:

- Thick hairs grow under armpits and pubic regions. Hairs also grown on other parts of body like chest and face.
- Voice starts to crack (or deepens).
- Penis begins to enlarge and testes start to make sperms.

28. 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 later? **[Foreign 2017]**

Ans. Regeneration is defined as the ability of any small part of the body to give rise to a new individual e.g.

(*i*) *Hydra* and *Planaria* shows regeneration.

(*ii*) Amphibians and human beings do not show regeneration.

– Regeneration is carried out by certain specialised cells, which can proliferate to make a large number of cells and different cells undergo development to become various cell types and tissues.

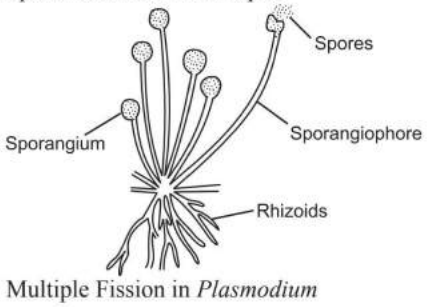
– Such regenerative cells are not found in amphibians and humans.

29. Illustrate the following with the help of suitable diagrams:

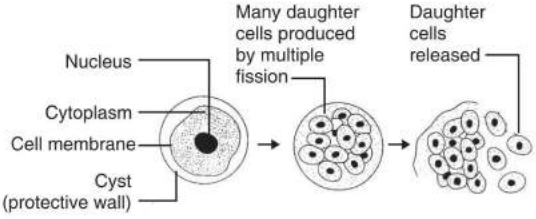
(*a*) Spore formation in *Rhizopus*

(*b*) Multiple fission in *Plasmodium* **[HOTS]**

Ans. (*a*) Spore formation in *Rhizopus*

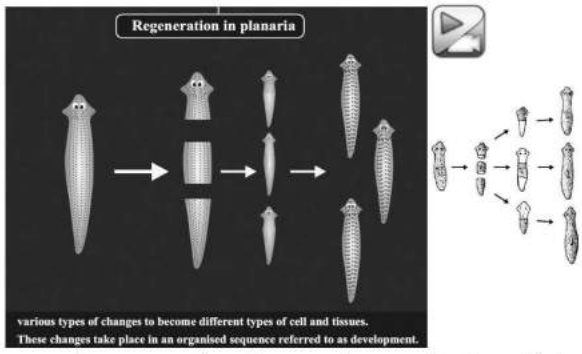


(*b*) Multiple Fission in *Plasmodium*



30. Explain the process of regeneration in *Planaria*. How is this process different from reproduction? **[Foreign 2015; Delhi 2013]**

Ans. If a *Planaria* is cut into any number of pieces, each piece will grow into a complete organism. Regeneration is carried out by specialised cells which proliferate and make large number of cells and then tissues.



In regeneration, the organism need to be cut into pieces to get more organisms. In reproduction, the organism need not to be cut to multiply.

31. (*a*) Name the following: **[Delhi 2015]**

(*i*) Thread like non-reproductive structures present in *Rhizopus*.

(*ii*) 'Blobs' that develop at the tips of the non-reproductive threads in *Rhizopus*.

(*b*) Explain how these structures protect themselves and what is the function of the structures released from the 'blobs' in *Rhizopus*.

Ans. (*a*) (*i*) Hyphae (*ii*) Sporangium

(*b*) Spores are enclosed within sporangia which protects the spores.

Spores when released from sporangia develops into new *Rhizopus*.

32. Explain giving one example of each, the unisexual and the bisexual flowers. When is it used? Name three methods of vegetative propagation

Ans. **Unisexual flowers** contain either stamens or carpels but not both.

Example: Papaya, watermelon.

Bisexual flowers contain both stamens and carpels.

Example: *Hibiscus*, Mustard.

The method of developing new plants from the vegetative parts of a plant, such as root, stem or leaf is called vegetative propagation.

Vegetative propagation can be classified into natural and artificial methods.

The method of vegetative propagation is used when some plants like banana, orange, rose and jasmine have lost the capacity to produce seeds.

The three methods of vegetative propagation are cutting, layering and grafting.

33. What is vegetative propagation? State two advantages and two disadvantages of this method. **[KVS, AI 2017]**

Ans. Vegetative propagation refers to the development of new plants from vegetative parts (roots, stem or leaves) of an existing plant.

Advantages of vegetative propagation

(*i*) Vegetative propagation is a cheaper, easier and more rapid method of propagation in plants than growing plants from their seeds.

(*ii*) Better quality of the plants can be maintained by this method.

(*iii*) It results in propagation of those plants which do not produce viable seeds or produce seeds with prolonged period of dormancy.

(*iv*) The plants generated from vegetative means require less time to grow and have the advantage of being more uniform and genetically similar to the parent stock. (*any two*)

Disadvantages:

(*a*) No genetic variation is created.

(*b*) Continued vegetative propagation can lead to loss of vigour.

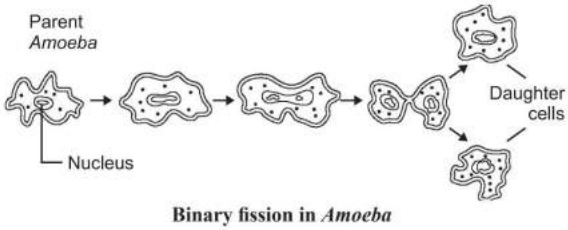
Long Answer Type Questions 5 Marks

34. (*a*) With the help of a diagram show the different stages of binary fission in *Amoeba*. [Foreign 2013]

(*b*) How do *Plasmodium* and *Leishmania* reproduce? Write one difference in their mode of reproduction. [Foreign 2014]

(*c*) Why are budding, fragmentation and regeneration all considered as asexual types of reproduction?

Ans. (*a*) Binary fission is the division of one cell which cuts into two similar or identical cells.



Binary fission in *Amoeba*

(*b*) *Plasmodium* and *Leishmania* reproduce through fission an asexual method of reproduction. *Leishmania* reproduce with the help of binary fission. *Plasmodium* reproduce by multiple fission dividing itself into many daughter cells inside its cell wall.

(*c*) Budding, fragmentation and regeneration are all considered as asexual type of reproduction because they involve the formation of new individuals from single parent without fertilisation or fusion of gametes.

35. (*a*) What is tissue culture? How it is done?

(*b*) Disscuss two advantages of tissue culture.

Ans. (*a*) Tissue culture is the method of developing plants from plant cells or small pieces of plant tissue in a synthetic/artificial medium. Tissue culture for producing new plants is done as follows:

(*i*) The tissue/cells are collected from the shoot tip of a desired plant.

(*ii*) These cells are then grown in a nutritive artificial medium where they divide and form a mass of identical cells known as callus.

(*iii*) The callus are then allowed to grow in another medium containg hormones needed for growth and development.

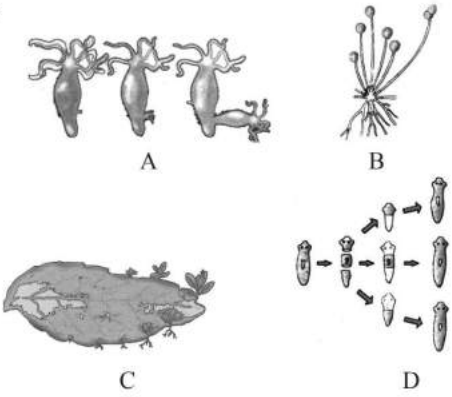
(*iv*) When small plantlets are developed, they are transplanted into soil or pots where they can grow to form mature plants.

(*b*) (*i*) It is a fast technique in which thousands of plantlets can be produced in short span of time.

(*ii*) New plants produced through tissue culture are disease free.

(*iii*) Plantlets can be grown throughout the year, irrespective of weather or season. (*any two*)

36.



(*a*) Identify the organisms in figure A, B, C and D.

(*b*) Identify the life process shown in all the figures.

(*c*) How is this life process advantageous to the organisms? [HOTS]

Ans. (*a*) A. *Hydra* B. *Rhizopus*
C. *Bryophyllum* D. *Planaria*

(*b*) The life process shown in the figures is asexual mode of reproduction.

(*c*) This life process is advantageous to the organisms because

(*i*) Only one individual is required.

(*ii*) Large numbers of offsprings are produced.

37. (*i*) Name and explain the two modes of asexual reproduction observed in *Hydra*.

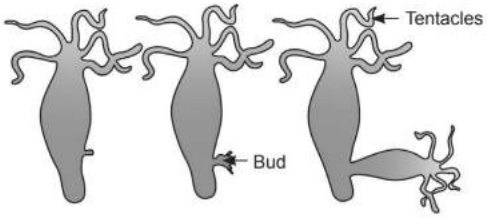
(*ii*) What is vegetative propagation? List two advantages of using this technique. [CBSE 2023]

Ans. (*i*) *Hydra* reproduces asexually by regeneration and budding.

Regeneration in *Hydra*:
If a *Hydra* is cut into any number of pieces, each piece will grow into a complete organism. Regeneration is carried out by specialised cells which proliferate and make large number of cells and then tissues.

Budding in *Hydra:*

- *Hydra* reproduces by budding using the regenerative cells.
- A bud develops as an outgrowth in *Hydra* due to repeated cell division at one specific site.
- When fully mature, the bud detaches itself from the parent body and develops into new independent individual.



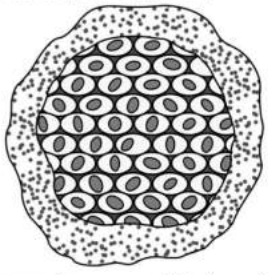
(*ii*) Vegetative propagation refers to the development of new plants from vegetative parts (roots, stem or leaves) of an existing plant.

Advantages of vegetative propagation

- Vegetative propagation is a cheaper, easier and more rapid method of propagation in plants than growing plants from their seeds.
- Better quality of the plants can be maintained by this method.
- It results in propagation of those plants which do not produce viable seeds or produce seeds with prolonged period of dormancy.
- The plants generated from vegetative means require less time to grow and have the advantage of being more uniform and genetically similar to the parent stock. (*any two*)

PRACTICE QUESTIONS

1. The main method of reproduction in yeast is
   (*a*) budding
   (*b*) cutting
   (*c*) sporogenesis
   (*d*) grafting
2. The figure shows that a single celled organism divides into many daughter cells simultaneously by multiple fission. Identify the organism.



   (*a*) *Paramecium* (*b*) *Amoeba*
   (*c*) *Plasmodium* (*d*) *Leishmania*
3. The steps of the process of regeneration are given in a random order. Which of the following is the correct sequence of steps?
   (*i*) Regeneration is carried out by specialised cells.
   (*ii*) From the mass of cells, different cells undergo changes to become various cell types and tissues.
   (*iii*) The specialised cells proliferate and make large number of cells.
   (*iv*) The changes take place in an organised sequence referred to as development.
   (*a*) *i, ii, iii, iv* (*b*) *i, iii, ii, iv*
   (*c*) *i, iv, ii, iii* (*d*) *i, iii, iv, ii*
4. Tissue culture technique is used for
   (*a*) rabi crops (*b*) cash crops
   (*c*) ornamental plants (*d*) fruit trees
5. Vegetative propagation is practiced for growing plants which
   (*i*) produce seeds
   (*ii*) do not produce seed
   (*iii*) produce viable seeds
   (*iv*) produce non-viable seeds
   (*a*) (*i*) and (*iii*) (*b*) (*ii*) and (*iii*)
   (*c*) (*ii*) and (*iv*) (*d*) (*i*) and (*iv*)
6. Leaves of *Bryophyllum* fallen on the ground produce new plants whereas the leaves of rose do not. Why?
7. 'Grafting is a common method of obtaining a superior plant from two different plants'. Explain.
8. How do the ornamental plants propagate? Mention the method of propagation for the following:
   (*i*) Jasmine (*ii*) Rose
   (*iii*) *Bougainvillea* (*iv*) *Hibiscus*
9. What causes joining up of stock and scion in grafting? Name one positive trait that the plant contributing scion should have and one positive trait that the plant contributing the stock should have. **[HOTS]**

10. (*a*) List in tabular form two differences between binary fission and multiple fission.
(*b*) What happens when a mature *Spirogyra* filament attains considerable length? [CBSE 2020]

11. What is meant by tissue culture? How this technique is performed? In which area this technique is finding its application? [DoE]

12. Describe the different methods of asexual reproduction seen in animals with the help of neat labelled diagrams. [KVS]

13. (*a*) How do *Leishmania* and *Plasmodium* reproduce?
(*b*) State one difference in their mode of reproduction.
(*c*) Define the term vegetative propagation
(*d*) List four advantages of vegetative propagation.

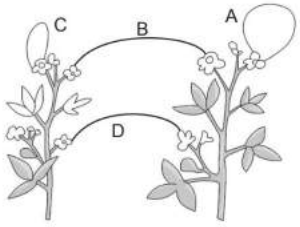
TOPICS COVERED

DNA Copying and Sexual Reproduction

Multiple-Choice Questions 1 Mark

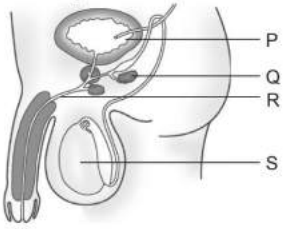
1. **During the process of copying the DNA, some variations are so drastic that**
(*a*) a new born cell divides to give rise to two cells.
(*b*) a new born cell will survive and start multiplying.
(*c*) the new DNA copy will work with the cellular apparatus it inherits.
(*d*) the new DNA copy will not work with the cellular apparatus it inherits.

2. **The diagram shown below depicts pollination. Choose the options that will show a maximum variation in the offspring.** [CBSE Sample Paper 2023]



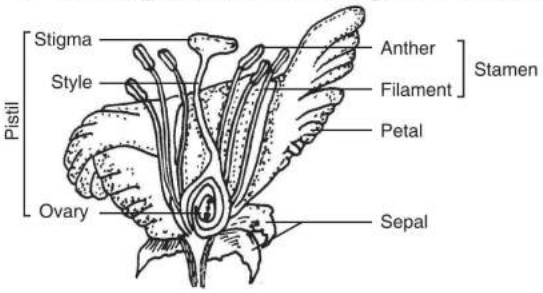
(*a*) A, B and C (*b*) B and D
(*c*) B, C and D (*d*) A and C

3. **The diagram below represents the male human reproductive system.**



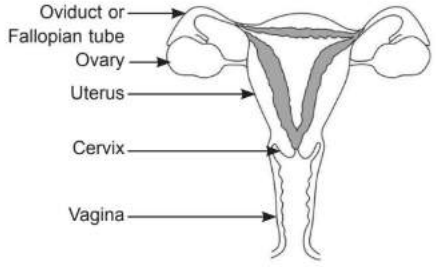
Identify the part that is responsible for the secretion of testosterone.
(*a*) P (*b*) Q
(*c*) R (*d*) S

4. **The image shows the different parts of a flower.**



Which part of the pistil is responsible for receiving pollen from stamen in order to perform reproduction? [CBSE T.E.R.M.*]
(*a*) Anther (*b*) Ovary
(*c*) Petal (*d*) Stigma

5. **The image shows the female reproductive system.**



Which event will be likely affected, if a female's uterus is implanted with intrauterine device? [CBSE T.E.R.M.*]
(*a*) Release of eggs (*b*) Entering of sperms
(*c*) Maturation of eggs (*d*) Implantation of embryo

6. **Pollen grains are produced by**
(*a*) ovary (*b*) ovule
(*c*) anther (*d*) corolla [KVS]

7. **Which of the following is a primary sex organ in a mammal?**
(*a*) Ovary (*b*) Vagina
(*c*) Uterus (*d*) Mammary glands

*Teacher Energised Resource Manuals

8. **The ability to reproduce is lost in a female after**
   (*a*) fertilisation (*b*) menstruation
   (*c*) gamete formation (*d*) menopause

9. **When a sperm is deposited into the vagina which route does it travel?**
   (*a*) Vagina → Oviduct → Uterus → Cervix
   (*b*) Vagina → Ovary → Uterus → Oviduct
   (*c*) Vagina → Cervix → Uterus → Oviduct
   (*d*) Vagina → Uterus → Cervix → Oviduct

10. **In case the ova does not fertilise, which of the following events will take place?**
    (*a*) Menstruation (*b*) Pregnancy
    (*c*) Implantation (*d*) Ovulation

11. **When the foetus is growing inside the uterus it needs nutrients. Which part provides these nutrients?**
    (*a*) Placenta (*b*) Amniotic sac
    (*c*) Oviduct (*d*) Uterus

12. **What marks the beginning of the reproductive life of a woman?**
    (*a*) Menopause (*b*) Menarche
    (*c*) Fertilisation (*d*) Ovulation

13. **Where does fertilisation take place?**
    (*a*) Uterus (*b*) Vagina
    (*c*) Oviduct (*d*) Cervix

Answers

1. (*d*) Some variations are so drastic that the new DNA copy cannot work with the cellular apparatus it inherits. Such a newborn cell will simply die.
2. (*d*)
3. (*d*) Testes (S) secrete hormone testosterone.
4. (*d*) Stigma of pistil receives pollens.
5. (*d*)
6. (*c*) Stamen comprising of anther and filament is the male reproductive part and it produces pollen grains.
7. (*a*) Ovary is the primary sex organ as it releases egg.
8. (*d*)
9. (*c*)
10. (*a*) If the egg is not fertilised, the lining of uterus slowly breaks and comes out through the vagina as blood, known as menstruation.
11. (*a*) The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta.
12. (*b*) When the ovary starts producing eggs, the reproductive health of a woman starts and it is called menarche.
13. (*c*) The sperm introduced inside the vagina move up through the cervix into the uterus and then pass into oviduct where it meets the egg.

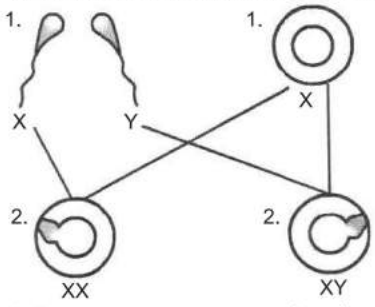
Very Short Answer Type Questions 2 Marks

14. **(*a*) Trace the path a male gamete takes to fertilise a female gamete after being released from the penis.**
    (*b*) State the number of sets of chromosomes present in a zygote. [CBSE Sample Paper 2022]

Ans. (*a*) Male gamete (sperm) travels in the female reproductive tract after being released. The path which it takes to fertilise the female gamete (egg) is vagina, uterus, fallopian tube resulting in a zygote.

(*b*) Zygote has 2 sets of chromosomes

15. **(*a*) Label (1) and (2) in the given diagram showing sex determination in human beings.**
    (*b*) If a child inherits X-chromosome from the father what will be his/her gender? [CBSE 2021 (C)]



Ans. (*a*) 1. Represents sperms having X and Y-chromosomes and an ovum having X-chromosomes.
2. Represent a zygote having XX-chromosomes which will develop into a girl child and a zygote having XY-chromosomes which will develop into a male child.

(*b*) If a child inherits X-chromosome from the father, the gender will be a female.

16. **Justify the statement 'Primary sex organs control the growth, function and maintenance of secondary sex organs'.**

Ans. Primary sex organs produce the gametes and sex hormones - testes secretes testosterone and ovary secretes estrogen and progesterone.

Testosterone controls the growth, maintenance and functions of secondary sex organs like prostate gland, seminal vesicles and penis in a male.

Estrogen and **progesterone** controls the growth, maintenance and functions of secondary sex organs like uterus, fallopian tubes, etc.

Thus, we can justify that the primary sex organs control the growth and development of secondary sex organs.

17. Why is it said that 'sexual reproduction promotes, diversity of characters in the offsprings'? [HOTS]

Ans. It is said that 'sexual reproduction promotes diversity of characters in the offsprings' because sexual reproduction results from the fusion of two gametes coming from two different and sexually distinct individuals. This leads to variation which is necessary for evolution.

Short Answer Type Questions 3 Marks

18. What is placenta? Describe its role during pregnancy. [CBSE 2021 (C)]

Ans. A special tissue placenta is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue and on mother's side are blood spaces which surround the villi.

Role of placenta during pregnancy.

(*i*) Placenta provides a large surface area for glucose and oxygen to pass from the mother's side to the embryo.

(*ii*) It also transports wastes generated by the developing embryo into mother's blood.

19. Describe 'double fertilisation' in plants. [HOTS]

Ans. During fertilisation in plants, the following events take place:

(*i*) One of the male gametes fuses with the female gamete present in the embryo sac.

(*ii*) The other male gamete fuses with the two polar nuclei in the embryo sac.

The first fusion product gives rise to the zygote while the second one forms the endosperm. The process of fusion occurring twice in the embryo sac is called double fertilisaton.

20. What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained. [AI 2015]

Ans. 'Chromosomes' are long thread-like structures which contain hereditary information of the individual and are thereby the carriers of genes. Chromosomes are located in the nucleus of a cell.

The parents are diploid (2n) as each of them has two sets of chromosomes. They form haploid (1n) male and female gametes through the process of meiosis. The haploid gametes have one set of chromosomes. These two gametes fuse during fertilisation and the offspring become diploid (2n) which is same as parents chromosome number.

21. (*a*) Name the two types of germ-cells present in human beings. How do they structurally differ from each other? Give two differences. [DoE]

(*b*) Why are testes located outside the abdominal cavity of the body?

Ans. (*a*) The two types of germ cells present in human beings are sperm and ova. The sperm of human have either X or Y chromosome. The ova always carry X chromosome. The sperm is structurally long with a tail. Whereas the ova is round in structure.

(*b*) Testes are located outside the abdominal cavity because sperm formation requires a lower temperature in comparison to normal body temperature. Testes being outside the abdominal cavity, gets an optimal temperature for the production of sperms.

22. (*a*) Describe why variations are observed in the offspring formed by sexual reproduction.

(*b*) List two preparations shown every month by the uterus in anticipation of pregnancy in human. [Foreign 2014]

Ans. (*a*) Variations are observed in the offspring formed by sexual reproduction. During sexual reproduction, two types of gametes fuse. Even though the gametes contain the same number of chromosomes, their DNA is not identical. This causes variation among offsprings.

(*b*) The uterus prepares itself every month to receive and nurture the growing embryo. The lining thickens and is richly supplied with blood to nourish the growing embryo.

23. (*a*) List the parts of human male reproductive system which contribute fluid to the semen. State two advantages semen offers to the sperms.

(*b*) Describe the role of fallopian tubes in the female reproductive system.

Ans. (*a*) Prostate gland and seminal vesicles add fluid in the vas deferens. Semen makes transportation of sperms easier and also provides nutrition to the sperms.

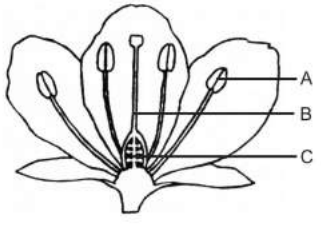
(*b*) Fallopian tubes:

(*i*) They carry eggs from ovaries to uterus.

(*ii*) They allow sperm to travel to meet the egg.

(*iii*) Fertilisation takes place here.

24. Name the three parts A, B and C of the flower shown in the following diagram and state one function of each. [AI 2017(C); Delhi 2016]



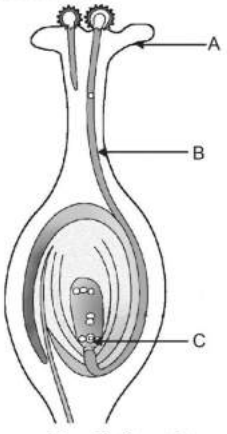
Ans. A = Anther of stamen.
Function: Anther contains two pollen sacs within which numerous pollen grains are produced.
B = Style
Function: It connects the ovary and stigma through which the pollen enters the ovary.
C = Ovule
Function: Ovule contains female gamete, egg.

25. What is meant by pollination? Name and differentiate between the two modes of pollination in flowering plants. **[CBSE 2020, 16]**

Ans. Pollination is the transfer of pollen grains from the anther of a stamen to the stigma of a carpel. The two modes of pollination are self pollination and cross pollination.

Self-pollination	Cross-pollination
(*i*) Self-pollination occurs within a flower or between two flowers of the same plant.	(*i*) Cross-pollination occurs between two flowers borne on different plants of the same species.
(*ii*) Flowers do not depend on other agencies for pollination.	(*ii*) Agents such as insects, water and wind are required for pollination.
(*iii*) Pollen grains are produced in small numbers.	(*iii*) Pollen grains are produced in large numbers.

26. Identify A, B and C in the given diagram and write one function of each. **[AI 2015]**



Ans. A = Stigma B = Pollen tube
C = Female germ cell
Function of stigma: Stigma helps in receiving the pollen grains from the anther of stamen during pollination.
Function of pollen tube: The pollen tube facilitates movement of male germ cell through it to reach female germ cell.
Function of female germ cell: It meets with the male germ cell to form zygote which divides many times to form an embryo.

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

Ans. Sexual reproduction requires male and female individuals of the species.
New genetic variations are created, where each variation would be novel, as sexual reproduction combines DNA (genetic material with accumulated variations) from two different individuals. Such genetic variations are useful in ensuring survival of species.

28. List six specific characteristics of sexual reproduction. **[AI 2015]**

Ans. **Specific characteristics of sexual mode of reproduction.**
(*i*) Sexual reproduction promotes diversity of characters in the offsprings.
(*ii*) It results in new combinations of genes brought together in the gametes and this reshuffling increases genetic variation.
(*iii*) It plays a prominent role in the origin of new species.
(*iv*) The sexual mode of reproduction incorporates process of combining DNA from two different individuals during reproduction.
(*v*) It need two parents to produce an offspring.
(*vi*) Sex cells are used in sexual reproduction.

29. Name the male and female gametes in animals. What is fertilization and where does it take place in human females? **[HOTS]**

Ans. The male and female gametes in animals are sperm and ovum respectively.
Fertilization is defined as the fusion of a male gamete (sperm) with a female gamete (an ovum or egg) to form a zygote during sexual reproduction.
Fertilization takes place in the fallopian tube of a human female.

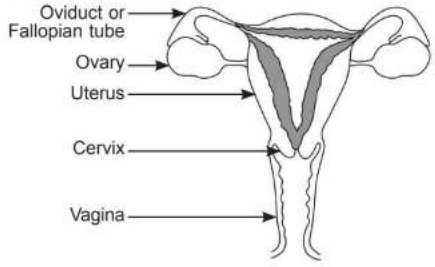
30. State the changes that take place in the uterus when:
(*a*) Implantation of embryo has occurred.
(*b*) Female gamete/egg is not fertilised. **[Delhi 2017]**

Ans. (*a*) After implantation, the cell divisions continue to occur.
A placenta develops and the embryo gets nutrition from the mother's blood through placenta.
The complete development of the foetus occurs in about nine months.

(*b*) When the female gamete is not fertilised, the thickened and spongy lining of the uterus is not required any more.
Hence, the lining along with its blood vessels, breaks and comes out through the vagina as blood and mucus, in the process, called menstruation.

31. Draw a well labelled diagram of human female reproductive system. Explain the menstrual cycle of female. [DoE]

Ans.



The uterus prepares itself every month to receive and nurture the fertilized egg. The lining of the uterus thickens and is richly supplied with blood to nourish the embryo. If the egg is not fertilized, the thick and nourishing lining of the uterus breaks and comes out through vagina as blood and mucus which is called menstruation. The cycle of events taking place in the ovaries and uterus every twenty eight days and marked by menstrual flow is called menstrual cycle.

32. In human females, what happens when
(*a*) egg is fertilised
(*b*) egg is not fertilised? [DoE]

Ans. The lining of uterus becomes thick and spongy before release of an egg.
(*a*) If the egg is fertilized, it moves upto uterus and gets implanted on uterus. The uterine wall thickens and richly supplied with blood. The region between embryo and uterine wall grows into placenta which provides nourishment and oxygen to the embryo. The child is borne as a result of rhythmic contraction of the uterine muscle.
(*b*) If the egg is not fertilized, the thick and nourishing lining of the uterus breaks and comes out through vagina as blood and mucus which is called menstruation.

33. What are sexually transmitted diseases. List two example of each diseases caused due to (*i*) bacterial infection and (*ii*) viral infection. Which device or devices may be used to prevent the spread of such diseases. [DoE, Delhi 2015, 13]

Ans. STDs are diseases which spread by sexual contact from an infected person to a healthy person.
(*i*) Gonorrhoea and Syphilis are STDs caused by bacterial infection.
(*ii*) AIDS and genital Warts are STDs caused by viral infection.
Spread of STDs can be prevented by—
(*a*) Avoiding sexual contact with infected persons.
(*b*) Using condom for penis during sexual act.

34. What is AIDS? Which microbe is responsible for AIDS infection? State one mode of transmission of this disease. Explain in brief one measure for the prevention of AIDS.

Ans. AIDS is the Acquired Immuno Deficiency Syndrome. It is caused by a virus called Human Immunodeficiency Virus.
AIDS is transmitted by sexual contact with an infected person.
AIDS can be prevented by avoiding sexual contact with an infected person or by using condom during sex.

35. What does HIV stand for? Is AIDS an infectious disease? List any four modes of spreading AIDS.

Ans. HIV stands for Human Immunodeficiency Virus.
Yes, AIDS is an infectious disease.
Four modes of spreading AIDS are as follows:
(*i*) By having sexual contact with an infected person.
(*ii*) By the transfusion of blood from an infected person.
(*iii*) Through infected needles used for injection.
(*iv*) Through the placenta from the mother to child during pregnancy.

36. Expand AIDS. List any four methods of prevention (control) of AIDS.

Ans. AIDS stands for Acquired Immuno Deficiency Syndrome.
Four methods of prevention or control of AIDS are as follows:
(*i*) Using condom during sex.
(*ii*) Avoiding sharing of needles or use of disposable needles.
(*iii*) Testing blood for AIDS before transfusion.
(*iv*) Avoiding sexual contact with unknown person.

37. List four categories of contraceptive methods. State in brief two advantages of adopting such preventive methods. [AI 2015]

Ans. Four methods of contraception used by humans are:
(*a*) Mechanical barrier such as condom.
(*b*) Surgical method such as vasectomy or tubectomy.
(*c*) Chemical method such as oral or vaginal pill.
(*d*) Copper-T.
Advantages of using contraceptives.
(*a*) It helps in avoiding unwanted pregnancy.
(*b*) Condom helps in preventing transmission of STDs.

38. List three points of significance of reproductive health in a society.

Ans. (*i*) The mother carrying a child should be physically matured.
(*ii*) The mother should be mentally fit to take care of the child.
(*iii*) There should be at least 3 years gap between 2 children.
(*iv*) Nutritious food should be available to the mother during pregnancy and lactation period.
(*any three*)

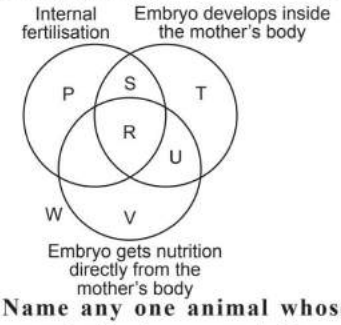
39. List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males? How does the use of these techniques have a direct impact on the health and prosperity of a family? **[AI 2017]**

Ans. The techniques to prevent pregnancy include:
(*i*) Creation of mechanical barriers.
(*ii*) Changing the hormonal balance of the body.
(*iii*) Use of intra-uterine contraceptive devices.
(*iv*) Surgical methods.
Use of intra-uterine devices is not meant for males.
Impact of use of contraceptives:
(*i*) Use of mechanical barriers like condoms can prevent the spread of sexually-transmitted diseases.
(*ii*) Pregnancy will make major demands on the body and mind of the woman and if she is not ready for it, her health will be adversely affected; such a condition can be avoided.
(*iii*) By having a small family, the standard of living can be improved.

40. List any four methods of contraceptions used by humans. How does their use have a direct effect on the health and prosperity of a family.
[Delhi 2015, AI 2013]

Ans. Four methods of contraception used by humans are:
(*i*) Mechanical barrier such as condom.
(*ii*) Surgical method such as vasectomy for male and tubectomy for female.
(*iii*) Chemical method such as oral and vaginal pills.
(*iv*) Copper-T
Sexual act always has the potential to pregnancy. Pregnancy makes major demand on the body and mind of the woman, and if she is not ready for it, her health will be adversely affected. Contraceptive methods help in avoiding pregnancy and also help in keeping gap between two children, so that the woman's body recovers. These methods help in limiting number of children to one or two. If family size is small, the family can save some amount after meeting the day to day expenditure. This will improve the economic condition of the family and the family will prosper.

41. In the diagram below, each labelled region (P to W) represents a certain combination of reproductive processes found in an animal. Each labelled region is characterised by the different circles that it is (or is not) a part of. **[CFPQ, CBSE]**



(*a*) Name any one animal whose mode of reproduction is represented by region P.

(*b*) The description of a species of fish called 'guppy' is given below:

"Guppies are live-bearing fish, with a gestation period of 21-30 days. Once inseminated, female guppies can store sperm in their ovaries, which can continue to fertilise ova up to eight months, meaning the female mate can give birth to the male's offspring long after the male's death."

(*i*) Based on the given information, which labelled regions CAN guppies belong to?
(*ii*) What additional information is required to identify the labelled region in the diagram that guppies ACTUALLY belong to? **[CFPQ, CBSE]**

Ans. (*a*) Animals that lay eggs after internal fertilisation such as birds, lizards, etc.
(*b*) (*i*) R or S
(*ii*) Whether the embryo gets nutrition directly from the mother's body

Long Answer Type Questions 5 Marks

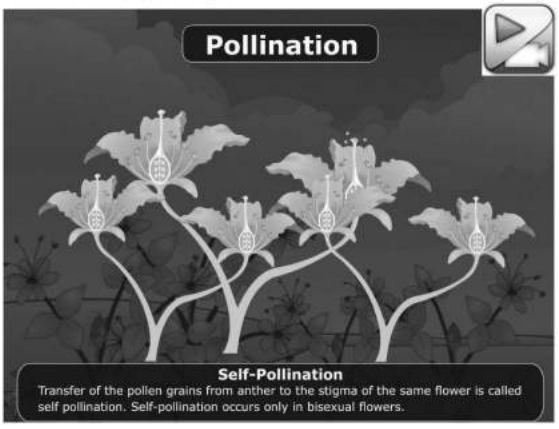
42. (*a*) What is pollination? Explain its significance.
[CBSE 2020]

(*b*) Explain the process of fertilisation in flowers. Name the parts of the flower that develop after fertilisation into
(*i*) seed, (*ii*) fruit.

Ans. (*a*) It is the transfer of pollen grain from the anther of a flower to the stigma of a carpel.
Significance of pollination:
(*i*) It is necessary for seed formation and thus, perpetuation of species.
(*ii*) It stimulates the development of fruits.

(*b*)
- After the pollen lands on a suitable stigma, it has to reach the female germ cells in the ovary.
- The pollen tube grows out of the pollen grain through the style to reach the ovary.
- Male germ cell travels through the pollen tube to reach the female germ cell and fertilizes it.
- After fertilisation, the zygote divides several times to form an embryo within the ovule.

(*i*) Ovule becomes seed.
(*ii*) Ovary becomes fruit.

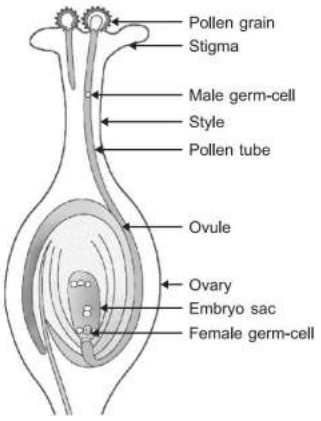


43. (*a*) How does pollination occur in plants?
(*b*) How does pollination lead to fertilisation? Explain.
(*c*) Draw a diagram showing germination of pollen on stigma of a flower. [DoE, KVS]

Ans. (*a*) Pollination is of two types – self-pollination and cross- pollination.
Self-Pollination: It is the transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same plant. It is seen in pea plant.
Cross Pollination: When the pollen grains from the anther of a flower on one plant are transferred to the stigma of a flower on another similar plant, it is called cross pollination.

(*b*) When pollen grains fall on the stimga of the carpel, it grows a polen tube downwards through the style towards the female gamete in the ovary. A male gamete moves down the tube. when the pollen tube enters the ovule, its tip bursts open and male gamete comes out of the pollen tube and combine with the nucleus of the female gamete and forms zygote. This process is known as fertilization.

(*c*)



Fertilisation in a flowering plant

44. (*a*) Name the human male reproductive organ that produces sperms and also secretes hormones. Write the functions of the hormone secreted.
(*b*) Name the parts of the human female reproductive system where (*i*) fertilization and (*ii*) implantation occur respectively. Explain how the embryo gets nutrition inside the mother's body. [Foreign 2014]

Ans. (*a*) The formation of sperms takes place in the testis. It secretes the hormone, called testosterone. In addition to regulating the formation of sperms, testosterone brings about changes in appearance seen in boys at the time of puberty.

(*b*) (*i*) The fertilisation takes place in the fallopian tubes.
(*ii*) The implantation occurs in the uterus.
The uterus prepares itself every month to receive and nurture the growing embryo. The lining thickens and is richly supplied with blood to nourish the growing embryo.
The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. The development of the child inside the mother's body takes approximately nine months. On completion of nine months, the child is born due to a rhythmic contractions of the muscles in the uterus.

45. (*a*) Write the functions of the following parts in human female reproductive system:
(*i*) Ovary (*ii*) Oviduct (*iii*) Uterus
(*b*) Describe the structure and function of placenta. [CBSE 2018, AI 2017, 17(C), Delhi 2016]

Ans. (*a*) (*i*) **Ovary**
- It produces the female gametes or germ cells, called ova.
- It secretes the female sex hormones such as oestrogen and progesterone.

(*ii*) **Oviduct**
- It transports the ova from the ovary to uterus/womb.
- Fertilisation occurs in the oviduct.

(*iii*) **Uterus**
- Implantation of the embryo occurs in the lining of uterus and the complete development of foetus occurs here.
- the contractions of the muscles of uterus help in child birth.

(*b*) **Structure of placenta:**
- Placenta is a disc-like structure embedded in the uterine wall.
- It contains villi on the embryo's side and on the mother's side there are blood spaces, which surround the villi; this arrangement provides a large surface area for exchange of materials.

Functions of placenta:
- It transfers glucose and oxygen from the mother's blood to the foetus.
- It also removes the wastes (CO_2 and nitrogenous wastes) generated by the foetus to the mother's blood.

46. (*a*) Why does fertilisation occur only once in a month in a human female? Explain.
(*b*) Prenatal sex determination has been prohibited by law. State the necessity of enforcement of this law.
(*c*) Where are human testis located and why? State their functions. **[Foreign 2013]**

Ans. (*a*) On attaining puberty, the eggs in the ovaries of a human female starts maturing. Only one egg is produced by one of the ovaries every month. Fertilisation can therefore occur only once in a month in a human female.

(*b*) The most ideal female, male sex ratio for a healthy society is 1000:1000. Because of reckless female foeticide, sex ratio is decreasing at an alarming rate in some sections of our society. It has therefore become necessary to ban detection of sex of the foetus.

(*c*) Testis are located outside the abdominal cavity inside the scrotum in a human male. The scrotum provides optimum temperature for the formation of sperms.

47. Describe in brief the role of (*a*) testis (*b*) seminal vesicle, (*c*) vas deferens, (*d*) ureter and (*e*) prostate gland in human male reproductive system.

Ans. (*a*) **Testis:** Testis are oval-shaped primary reproductive organs in men. The function of testes is to produce sperms and male sex hormone testosterone. The scrotum provides optimal temperature for the formation of sperms.

(*b*) **Seminal vesicle:** Seminal vesicles are a pair of thin-walled muscular elongated sac which secrete fluid for nourishment of sperms.

(*c*) **Vas deferens:** The sperms are carried by a long tube called vas deferens to organs called seminal vesicles where the sperms get nourishment, and stored.

(*d*) **Ureter:** It is the tube that carries urine from kidney to the urinary bladder. In humans, there are two ureters, one attached to each kidney.

(*e*) **Prostate gland:** Prostate gland produce a fluid which is released in the urethra along with the secretion of seminal vesicles for nourishment and transportation of sperms.

48. (*a*) Name the organ that produces sperms as well as secretes a hormone in human males. Name the hormone it secretes and write its functions.
(*b*) Name the parts of the human female reproductive system where fertilisation occurs.
(*c*) Explain how the developing embryo gets nourishment inside the mother's body.
[Delhi 2017]

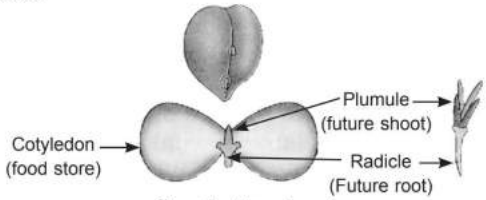
Ans. (*a*) The male organ is testis. It secretes the hormone testosterone and regulates the formation of sperms.
It brings about changes in the appearance of boys at the time of puberty.

(*b*) Fertilisation occurs in the oviduct.

(*c*) The developing embryo gets nourishment from the mother's blood with the help of a special tissue, called placenta.
The placenta provides a large surface area for the passage of glucose and oxygen from the mother's blood to the embryo.

49. What is a seed? What are the parts of a seed? Explain with the help of a labelled diagram. What are the advantages of seed formation for the plant?

Ans. A seed is the reproductive unit of a plant.
A see has following parts:
Seed coat: It is the protective covering of the seed.
Cotyledons: These are the embryonic leaves that store food for the germination of young plant.
Plumule: It is the part of embryo that gives rise to shoot.
Radicle: It is the part of embryo that gives rise to roots.



Germination of seed

Seed provide the following advantages to a plant:
(*i*) Seed provide protection to young embryo.
(*ii*) Seed formation is more dependable, therefore, it helps the species to spread in other areas by different modes of dispersion.
(*iii*) Seeds stores food for embryo to be nourished.

50. List two sexually transmitted diseases in each of the following cases:
(*a*) Bacterial infections
(*b*) Viral infections
(*c*) State the role of placenta in the development of embryo.
(*d*) What happens when the egg is not fertilized?

Ans. (*a*) Bacterial infections: Gonorrhoea, Syphilis
(*b*) Viral infections: Warts, AIDS (Acquired Immuno Deficiency Syndrome)
(*c*) **Role of placenta.**
After implantation, a disc like special tissue develops between the uterus wall and the embryo called placenta.
The exchange of nutrients, oxygen and waste products between the embryo and the mother takes place through the placenta.
(*b*) If the egg does not get fertilised (due to non-availability of sperms in the female body) then the thick and soft inner lining of uterus along with the blood vessels and the dead egg comes out of the vagina in the form of bleeding called menstruation.

PRACTICE QUESTIONS

1. What provides oxygen and nutrition to the developing embryo in the female body? [KVS]
(*a*) Fallopian tube
(*b*) Ovary
(*c*) Uterus
(*d*) Placenta
2. Which of the following is caused by Virus? [KVS]
(*a*) AIDS (*b*) Gonorrhoea
(*c*) Syphilis (*d*) All of these
3. The time period for the development of fetus inside the mother's body is called: [KVS]
(*a*) Gestation (*b*) Ovulation
(*c*) Menarche (*d*) Menopause
4. A pair of duct arising from testis, which carry sperms are
(*a*) fallopian tube (*b*) vas deferens
(*c*) oviduct (*d*) urethra
5. "DNA copies generated will be similar, but may not be identical to the original." Explain. [HOTS]
6. What is a seed? How does it help in reproduction in plants?
7. Fertilisation is possible if ovulation has taken place during middle of the menstrual cycle. Give reasons. [HOTS]
8. What changes are noticed on sexual maturity of human beings?
9. How does the embryo get nourishment inside the mother's body? [KVS]
10. Name two bacterial diseases which are sexually transmitted. Name their causal organisms, symptoms and preventive measures.
11. (*a*) How are variations useful for species if there is drastic alteration in the niches?
(*b*) Explain how the uterus and placenta provide necessary conditions for proper growth and development of the embryo after implantation? [CBSE Sample Paper 2023]

INTEGRATED (MIXED) QUESTIONS

1. Differentiate between the following: **(3 Marks)**
(*a*) Bud of *Hydra* and bud of *Bryophyllum*
(*b*) Fragmentation and regeneration
(*c*) Fertilization and germination
2. Define reproduction. How does it help in providing stability to the population of species? [DoE, AI 2016] **(3 Marks)**
3. Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement. [AI 2017] **(3 Marks)**
4. Write one 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? Give reason to justify your answer. [CBSE 2018] **(3 Marks)**
5. (*a*) Which are the two main types of reproduction in living organisms?
(*b*) Classify the following under these two types:
Amoeba, Frog, Earthworm, Yeast [HOTS] **(3 Marks)**

6. Planarians can regenerate lost body parts due to the presence of specialised cells called neoblasts. These specialised cells multiply and make a large mass of cells from which different cells undergo changes to become different types of cells and tissues.
   (*a*) In plants, in which type of tissue are cells that have a function similar to neoblasts found?
   (*b*) How do the characteristics of a planarium formed by regeneration compare with the characteristics of the original planarium? Justify your answer. **[CFPQ, CBSE]**
   (3 Marks)

7. (*a*) Why is it not possible to reconstruct the whole organism from a fragment in complex multicellular organisms?
   (*b*) Sexual maturation of reproductive tissues and organs are necessary link for reproduction. Elucidate. **[CBSE Sample Paper 2023]**
   (5 Marks)

ASSERTION AND REASON QUESTIONS

Direction: In the following Questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:

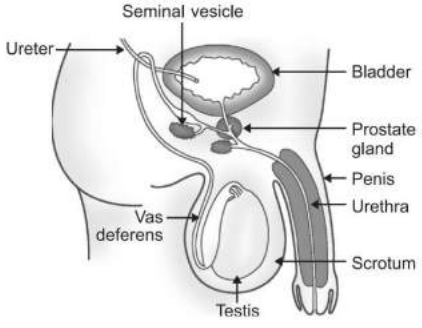
(*a*) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
(*b*) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
(*c*) Assertion is true but the Reason is false.
(*d*) The statement of the Assertion is false but the Reason is true.

1. **Assertion:** *Amoeba* reproduces by fission.
   Reason: All unicellular organisms reproduce by asexual method.
2. **Assertion:** In human beings, the female play a major role in determining the sex of the offspring.
   Reason: Women have two X chromosomes.
3. **Assertion:** In male reproductive system, transport of sperm takes place in a fluid which also provide nutrition.
   Reason: Prostate glands and seminal vesicles secrete in the vas deferens.
4. **Assertion:** Plants raised by vegetative propagation can bear flower and seed earlier than those produced from seeds.
   Reason: Plants which lost capacity to bear viable seeds, can propagate through vegetable propagation.
5. **Assertion:** Ovary releases one egg every month.
   Reason: The lining of uterus is always thick and spongy.
6. **Assertion:** In human beings the female produces two types of gametes.
   Reason: Female has two X chromosomes. **[KVS]**
7. **Assertion:** A bisexual flower produces ova as well as the pollen.
   Reason: Ova and pollen are produced in the carpel. **[KVS]**
8. **Assertion:** Oral contraceptive pills and copper-T do not prevent sexually transmitted diseases.
   Reason: Sexually transmitted disease are transmitted by contact with mucous membranes of infected organs.

CASE-BASED QUESTIONS

The following questions are case-based with 2-3 short sub-parts.

1. The male reproductive system consists of portions that produce the germ cells and other portions that deliver the germ cells to the site of fertilisation. Testes are located outside the abdominal cavity in the scrotum. Vas deferens unites with a tube coming from the urinary bladder. The urethra is a common passage for sperms and urine. The prostate gland and seminal vesicles add their secretions so that sperms are now in a fluid.



(*a*) Name the site of production of sperm in males.
(*b*) State the function of testosterone hormone.
(*c*) What is the significance of human testis being located in the scrotum?

Or

(*c*) Human testis is known as extra abdominal. Give reason.

2. The human immunodeficiency virus (HIV) targets the immune system and weakens people's defence systems against infections. As the virus destroys and impairs the function of immune cells, infected individuals gradually become immunodeficient. Immunodeficiency results in increased susceptibility to a wide range of infections, cancers and other diseases that people with healthy immune systems can fight off.

The most advanced stage of HIV infection is acquired immunodeficiency syndrome (AIDS), which can take from 2 to 15 years to develop if not treated, depending on the individual. The symptoms of HIV vary depending on the stage of infection. Though people living with HIV tend to be most infectious in the first few months after being infected, many are unaware of their status until the later stages. In the first few weeks after initial infection people may experience no symptoms or an influenza-like illness including fever, headache, rash or sore throat.

(*a*) Do contraceptive pills prevent transmission of STD?
(*b*) Name one STD caused by bacteria.
(*c*) What happens when a person is infected by HIV?

Or

(*c*) Mention two modes of transmission of HIV.

3. Reproduction is the process by which organisms increase their population. It is of two types – asexual and sexual reproduction. The rates of birth and death determine the size of human population. An expanding population makes it harder to improve everybody's standard of living. If we look around us, we can identify that expanding population is the most important reason for poor living standards. The process of reproduction also introduces new variations. These variations introduce changes which enable species to survive in even adverse environment.

(*a*) Give one advantage of asexual reproduction.
(*b*) Name two modes of reproduction used by single organisms.
(*c*) Write two significance of reproduction.

Or

(*c*) What is the importance of variation in a species?

4. The growing size of the human population is a cause of concern for all people. The rate of birth and death in a given population will determine its size. Reproduction is the process by which organisms increase their population. The process of sexual maturation for reproduction is gradual and takes place while general body growth is still going on. Some degree of sexual maturation does not necessarily mean that the mind or body is ready for sexual acts or for having and bringing up children. Various contraceptive devices are being used by human beings to control the size of population. **[CBSE 2020]**

(*a*) List two common signs of sexual maturation in boys and girls.
(*b*) Write two factors that determine the size of a population.
(*c*) What is the result of reckless female foeticide?

Or

(*c*) Which contraceptive method changes the hormonal balance of the body?

5. Vegetative propagation refers to the development of new plants from vegetative parts (roots, stem or leaves) of an existing plant. It is generally preferred for growing those plants which cannot produce their seeds or those which produce non-viable seeds (or seeds with prolonged period of dormancy). It is cheaper, easier and more rapid method of propagation in plants than growing plants from their seeds.

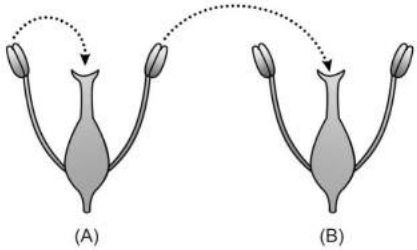
(*a*) Name the part of *Bryophyllum* where the buds are produced for vegetative propagation.
(*b*) Name the plant parts that are used in vegetative propagation.
(*c*) List two disadvantages of vegetative propagation.

Or

(*c*) State what type of method is used for growing
(*i*) jasmine plant (*ii*) rose plant

6. Angiospermic plants rely on pollination before fertilization. Pollination is the transfer of pollen from anthers to the stigma of a flower/s. The major pollinators are honey bees but other pollinating agents like wind, water and other insects also help in pollination.

(*a*) Observe the given figures, identify them and write one similarity and one dissimilarity between these.



(*b*) (*i*) What are the disadvantages of self pollination and cross pollination?
(*ii*) Draw a germinating seed and label the future root and shoot.

Or

(*b*) Outline the journey of pollen after landing on a suitable stigma to the formation of seeds.

7. Ankita started feeling changes in her body and also observed similar changes taking place in all the girls of her class. She is curious to know about it. Her mother explained that changes are seen both in boys and girls. But in girls, the changes are more important as they become mothers to babies and the baby is carried in mother's body for a long period and will be breast fed later.

(*a*) How long the baby is carried in mother's womb? Draw a diagram of human reproductive system and mark where the baby is carried in mother's womb for a long time.

(*b*) What are some of the changes that are seen in girls but not in boys?

Or

(*b*) Ankita also wants to know how does embryo get nutrition from mother's blood?

NCERT ZONE

NCERT INTEXT QUESTIONS

Page 114

1. What is the importance of DNA copying in reproduction? [KVS]

Ans. DNA contains information for inheritance of characters from parents to the next generation. As a result of DNA copying, blueprints of body design are produced which passes from parents to the offsprings. Thus, DNA copying maintains the body features in different generations of a species. Sometimes DNA copying also creates variation which are useful for the survival of species over time.

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

Ans. A species include a large number of individuals of the same kind. All the organisms of a species have similar body design and well adapted to a niche or place. If a variation arises in the individual, it may not be of much benefit to it; even this variation may lead to the death of the individual. But the variation may be beneficial if the species faces a drastically altered condition. In this condition, the population may be wiped out completely. But if some variations are there in few individuals of these populations, there could be chances for survival and thus, variation is beneficial for the species. For example, if there is a population of certain bacteria living in water which is neither hot or cold and if the temperature of water increases suddenly, then most of the bacteria living in that water would die. But some bacteria which are resistant to heat would be able to survive. However, if these variation were not there, then the entire species of bacteria would not have been survived.

Page 119

1. How does binary fission differ from multiple fission? [CBSE 2020]

Ans. Differences:

Binary fission	Multiple fission
(*i*) It is the division of the parent into two nearly equal sized daughter individuals.	(*i*) It is the division of the parent into many small daughter individuals.
(*ii*) Nucleus of the parent cell divides to form two nuclei.	(*ii*) Nucleus of the parent cell divides to form a number of nuclei.
(*iii*) *Ameoba* and *Leishmania* divide by binary fission.	(*iii*) *Plasmodium* and yeast divide by multiple fission.

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

Ans. There are some benefits for the organisms which reproduce through spore formation. They are given below:

(*i*) Reproduction through spores is a simple as well as faster mode of reproduction.

(*ii*) The spores are light in weight and thus, they keep floating in the air. This helps in the dispersal of the organism.

(*iii*) The spores are covered with thick layer which enable them to survive in the unfavourable conditions like extreme temperatures lack of food and water.

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

Ans. More complex organisms cannot give rise to new individuals through regeneration because:

(*i*) Simple organisms reproduce through regeneration as their entire body is made up of similar kind of cells whereas complex organisms have a very high degree of organisation in their body.

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

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

Ans. Vegetative propagation is generally preferred for growing those plants which cannot produce their seeds or those which produce non-viable seeds (or seeds with prolonged period of dormancy).

5. Why is DNA copying an essential part of the process of reproduction? [DoE]

Ans. The process of reproduction results in the production of offsprings which resemble to their parents. This means during the reproduction there must be a transfer of the blueprint of the body design from parent to the offsprings. DNA copying is essential as it passes generic information from parents to offspring. It determines the body design of an individual. The reproducing cells produce a copy of their DNA through some chemical reactions and results in two copies of DNA. Out of these two copies, one copy is passed to the newly formed individual.

Page 126

1. How is the process of pollination different from fertilisation? [KVS]

Ans. Differences between:

Pollination	Fertilisation
(*a*) It is the transfer of pollen grains from anther to the stigma of a flower.	(*a*) It is the fusion of male and female gametes.
(*b*) Pollination precedes fertilisation.	(*b*) Fertilisation occurs only after pollination when the pollen grain has germinated and sent the male gametes to ovule.
(*c*) Pollination carries the male gamete producing pollen grains to the female sex organ.	(*c*) Fertilisation brings about fusion of gametes.

2. What is the role of the seminal vesicles and the prostate gland? [DoE, KVS]

Ans. (*i*) Seminal vesicles are a pair of thin-walled muscular elongated sac which secrete fluid for nourishment and smooth transport of sperms.
(*ii*) Prostate gland also produce fluid which is released in the urethra along with the secretion of seminal vesicles to make transportation of sperms easier and also provides nutrition.

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

Ans. At the time of puberty, the changes which are seen in girls are given below:
- Thick hair grows in armpits and in the pubic region.
- Mammary glands develop and begin to enlarge.
- The hips broaden.
- Fat is deposited in various parts of the body as thigh, hips and shoulders.
- Menstruation starts and the ovaries also start to release eggs.

4. How does the embryo get nourishment inside the mother's body? [Delhi 2012]

Ans. The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall. The embryo receives the oxygen and nutrients from the mother's blood through placenta. The waste materials produced by the embryo are also cleared away through placenta.

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

Ans. If a woman is using a copper-T, it will not help in protecting her from sexually transmitted diseases. STDs transmit due to exchange of body fluid and copper-T cannot prevent from exchanging body fluid.

NCERT EXERCISES

1. Asexual reproduction takes place through budding in

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

Ans. (*b*) Yeast reproduces asexually by budding.

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*) Except vas deferens, all others are parts of female reproductive system in human beings.

3. The anther contains

(*a*) sepals. **(*b*) ovules.**

(*c*) carpel. **(*d*) pollen grains.**

Ans. (*d*) Anther contains pollen grains.

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

Ans. Advantages of sexual reproduction:

(*i*) Sexual reproduction promotes diversity of characters in the offsprings.

(*ii*) The sexual mode of reproduction incorporates process of combining DNA from two different individuals during reproduction. It plays a prominent role in the origin of new species.

(*iii*) The genetic variations that arise as a result of sexual reproduction also provide wider adaptability to the offsprings which ensures survival advantage.

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

Ans. The functions performed by the testis in human beings are as follows:

(*i*) Formation of sperms takes place in testis.

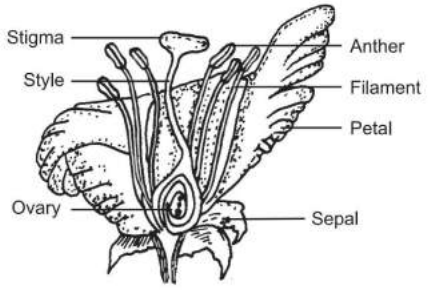
(*ii*) It secretes the hormone testosterone which regulates the formation of sperms and brings about secondary sexual characters in boys at the time of puberty.

6. Why does menstruation occur?

Ans. Menstruation is a process in which thick blood flows out in the form of vaginal bleeding. This process take place every month because every month an egg is received from the ovary and uterus prepares itself to receive the fertilized egg. Thus, the inner lining of the uterus gets thickened and is supplied with blood to nourish the embryo. If the egg is not fertilised, then the lining of the uterus breaks down slowly and gets released in the form of blood and mucous from the vagina.

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

Ans.



Longitudinal section of a flower

8. What are the different methods of contraception? **[KVS]**

Ans. The different methods of contraception are:

(*i*) **Mechanical Barrier Methods:** In these methods, physical devices such as condoms, diaphragm and cervical caps are used. These devices prevent the entry of sperms in the female genital tract during copulation, thus acting as a barrier between them.

(*ii*) **Chemical Methods:** In these methods, specific drugs are used by females, which are of two types — oral pills and vaginal pills.
It contains hormones which stop the ovaries from releasing ovum into the Oviduct. These pills act by changing the hormonal balance of the body, so that eggs are not released and fertilisation cannot occur.

(*iii*) **Use of Intra Uterine Contraceptive Devices (IUCDs):** Copper-T is very effective in preventing pregnancy. It prevents implantation in the uterus. It is placed safely inside the uterus by a doctor or a nurse.

(*iv*) **Surgical Methods:** In these methods, a small portion of vas deferens in male and the fallopian tube in female is surgically removed or tied. It is called vasectomy in males and tubectomy in females. If the vas deferens in male is blocked, sperm transfer will be prevented and if the fallopian tube in the female is blocked, the egg will not be able to reach the uterus, thus fertilisation will not take place.

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

Ans. The modes of reproduction are different in unicellular and multicellular organisms. The unicellular organisms have only one cell. There is no separate tissue for reproduction. So, they can reproduce by the process of fission, i.e. binary or multiple fission, or by budding as in Yeast.
The multicellular organisms contain various cells and separate system for reproduction, so that they can reproduce by both sexual and asexual methods.

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

Ans. Reproduction helps in providing stability to populations of species because it helps living organisms to produce new individuals that resembles to the parents.
The process of reproduction also introduce new variations. These variations introduce changes which enable species to survive in even adverse environment.

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

Ans. Contraceptive methods are adopted for the following reasons.

(*i*) **For preventing unwanted pregnancy:** Childbirth affects the health of a woman. So, there should be a gap between the two issues and contraceptives are used to prevent and delay the unwanted pregnancy.

(*ii*) **For preventing STDs:** Condom is used to prevent the transmission of fatal diseases like AIDS which transmits through sexual act

SELECT NCERT EXEMPLAR PROBLEMS

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*)

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*)

3. 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*)

4. Characters transmitted from parents to offspring are present in:

(*a*) cytoplasm (*b*) ribosome
(*c*) Golgi bodies (*d*) genes

Ans. (*d*)

5. 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*)

6. 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*)

7. 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*)

8. 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*)

9. 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*)

10. 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*)

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

(*a*) testis → vas deferens → urethra
(*b*) testis → ureter → urethra
(*c*) testis → urethra → ureter
(*d*) testis → vas deferens → ureter

Ans. (*a*)

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

(*a*) Syphillis (*b*) Hepatitis
(*c*) HIV - AIDS (*d*) Gonorrhoea

Ans. (*b*)

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

Ans. Removal of stamens of a bisexual flower will not affect pollination as its pistil is inact. Therefore, formation of fruit will take place as transfer of pollen grains from the anther of another flower to the stigma of flower will take place which causes cross-pollination.

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

Ans. Yes, because cell division in a unicellular organism results in the formation of two daughter cells, which means it produces more individuals of the organisms. For example, *Amoeba* is a simple unicellular organism that splits into two daughter cells.

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

Ans. Clone is the exact genetic replica of another individual. All the offsprings formed from a parent through asexual method of reproduction are same. The remarkable similarity of asexually produced daughter individuals is due to genetic similarity as they possess exact copies of DNA of their parent.

16. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Give one reason for this. [HOTS]

Ans. Energy is essential for any activity in living organisms. Sugar provides this energy for sustaining all life activities in yeasts. In water, it fails to reproduce because of inadequate energy in its cells. So, colonies of yeast fail to multiply in water but multiply in sugar solution.

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

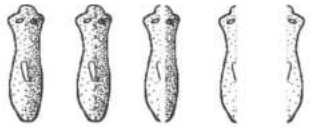
Ans. Bread mould require moisture and nutrients for its growth. A moist slice of bread contains both moisture and nutrients, hence it grows profusely as compared to a dry slice of bread which contains only nutrients but no moisture.

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

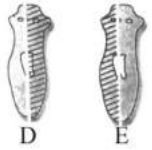
Ans. (*i*) In sexual reproduction, two parents have different sets of characters.

(*ii*) Gene combinations are different in gametes.

19. Would a *Planaria* cut vertically into two halves regenerate into two individuals? Complete figure D and E by indicating the regenerated regions.



Ans. Yes, a *Planaria* cut vertically into two halves regenerate into two individuals. The shaded parts in figures D and E represent the regenerated halves.



20. 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.

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

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

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

Ans. (*a*) No, there is no correlation between chromosome number and size of the individual.

(*b*) No, chromosome number does not affect reproduction. Reproduction depends on environmental factors like nutrients availability, water source, etc.

(*c*) Yes, since major component of chromosome is DNA, if there are more chromosomes in a cell means more DNA.

21. 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? [HOTS]

Ans. The number of chromosomes in the female gamete is 24. The number of chromosomes in the zygote is 48.

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

Ans. Pollination is essential for bringing the male gametes to meet the female gamete. Only after the arrival of pollen grains on stigma and entry of pollen tube into ovary, male gamete fuse with female gamete. In absence of pollination, there will be no male gamete to bring about fertilisation.

23. 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? [HOTS]

Ans. Yes, the chromosome number of zygote, embryonal cells and adult of a particular organism is always constant. The constancy is maintained because the cells in all these three structures undergo only mitotic divisions.

24. Where is the zygote located in the flower after fertilisation?

Ans. Zygote is located inside the ovule which is present in the ovary part of the pistil.

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

Ans. In reproduction, DNA passes from one generation to the next. The copying of DNA takes place with consistency but with minor variations and this consistency leads to stability of species.

26. How are general growth and sexual maturation different from each other? [HOTS]

Ans. **General growth** is the growth of different types of developmental process in the body like increase in height, weight gain, changes in shape and size of the body. Reproductive organs are less active during this phase.

Sexual maturation is a set of changes in the body of an individual at puberty like cracking of voice, new hair patterns, development of breast in female, etc.

27. Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system. [DoE]

Ans. The sperms comes out from testis into the vas deferens and then pass through urethra before ejaculation.

The secretions of seminal vesicle and prostate glands provide nutrition to the sperms and also facilitate their transport.

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

Ans. The thick and spongy lining of the uterus slowly breaks and comes out through the vagina as blood and mucous if fertilisation does not occur. This is known as menstruation and it lasts for about two to eight days.

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

Ans. The changes observed in the uterus subsequent to implantation of young embryo are —

The uterine wall thickens and is richly supplied with blood. The contact region between embryo and uterine wall grows into placenta which provides nourishment and oxygen to the embryo. Waste material of developing embryo are removed by transferring them into the mother's blood through the placenta.

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

Ans. The benefits of using mechanical barriers during sexual act are —

(*i*) **Prevention of pregnancy** – Mechanical barriers like condom prevents the sperms from reaching the egg, which is an effective method to avoid pregnancy.

(*ii*) **Non-transmission of Infections** – There is no transfer of diseases from the infected person to non-infected person.

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

Ans. The ratio of chromosome number between an egg and its zygote is 1: 2. Egg is produced through meiosis and therefore, contains half number of chromosomes of its parent cell whereas zygote is the product of fertilization between male and female gamete and thus, contains double the number of chromosomes with respect to egg.

Sperm is genetically different from the egg in the way that it contains either X or Y chromosome whereas, an egg always contains an X chromosome.

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

Ans. **Differences between:**

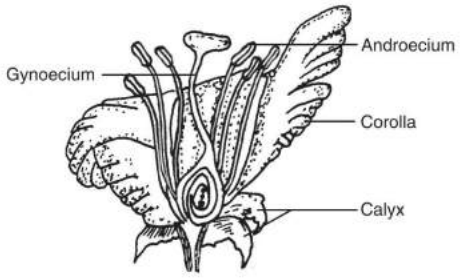
Gamete	Zygote
(*i*) It is a germ cell that takes part in fertilisation.	(*i*) It is a product of fertilisation.
(*ii*) There are two types of gametes – male and female.	(*ii*) Zygote is of one type.
(*iii*) A gamete has haploid or 1*n* chromosome number.	(*iii*) Zygote has diploid or 2*n* chromosome number.
(*iv*) A gamete carries charac-teristics of only one parent.	(*iv*) It carries characteristics of both the parents.
(*v*) Gamete is the last cell of its generation.	(*v*) It is the first cell of new generation.

Role of Gamete in sexual reproduction — Gamete is the sex or germ cell specialised to take part in sexual reproduction. Fusion of male gamete with a female gamete produces a zygote.

Role of Zygote in sexual reproduction — Zygote develops into embryo that later forms the new individual.

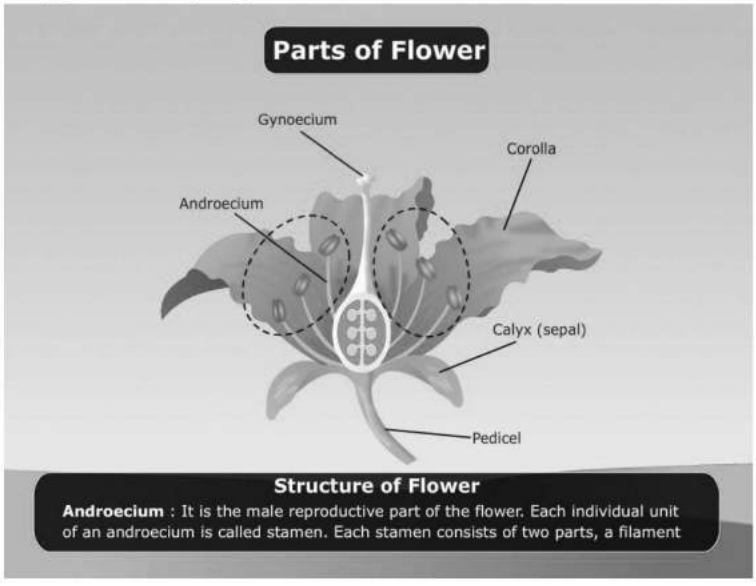
33. Draw the diagram of a flower and label the four whorls. Write the names of gamete producing organs in the flower.

Ans.



Parts of a Flower

Male gamete forming part – Anther of stamen.
Female gamete forming part – Ovary of pistil



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

Ans. Fertilisation takes place in the following ways:

(*i*) The sperm enters through the vaginal passage during sexual intercourse and moves upward.
(*ii*) Egg released from the ovary reaches the oviduct.
(*iii*) Sperm encounters egg in the oviduct and fertilisation takes place.

Fertilisation occurs once in a month because egg is released by female ovary once every month in the middle of menstrual cycle.