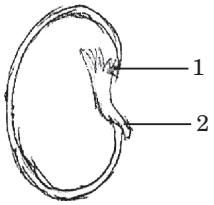
How do Organisms Reproduce?

OBJECTIVE TYPE QUESTIONS

Multiple Choice Questions (MCQs)

1. If there is no formation of egg cell during the development of ovule, then after fertilisation which of the following structure will not develop?
(a) Embryo (b) Endosperm
(c) Seed (d) Fruit

2. Identify the parts labeled 1 and 2 in the given figure.



(a) 1- micropyle, 2- epicotyl
(b) 1- cotyledon, 2- embryo
(c) 1-radicle , 2-plumule
(d) 1-plumule, 2-radicle

3. Which of the following statements are incorrect about puberty?
(i) Body shows starting of sexual maturity at this stage.
(ii) The rate of general body growth begins to proceed faster as the reproductive tissues begin to mature.
(iii) Changes taking place in the body parts are different in boys and girls.
(iv) All the changes during puberty takes place very fast.
(a) (iii) and (iv) (b) (ii) and (iv)
(c) (i), (ii) and (iii) (d) (i), (ii), (iii) and (iv)

4. Which of the following match is correct?
(a) Cotyledon – Food store
(b) Plumule – Future shoot
(c) Radicle – Future root
(d) All of these

5. Select the incorrect statement regarding seeds.
(a) Seeds have tough seed coat that protects them from external environment.
(b) Cotyledons store food.
(c) Plumule develops into the root system.
(d) Seeds contain the future plant called embryo.

6. Which of the following is not a surgical method of birth control?
(i) Copper-T (ii) Tubectomy
(iii) Vasectomy (iv) Using condoms
(a) (i) and (iv) (b) Only (iv)
(c) (ii), (iii) and (iv) (d) (i), (ii) and (iii)

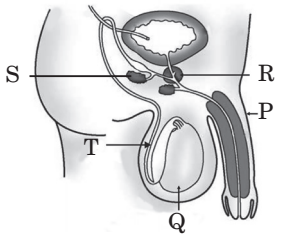
7. IUCD is for
(a) vegetative propagation (b) contraception
(c) increasing fertility
(d) avoiding miscarriage.

8. Which of the following diseases is transmitted sexually?
(a) Sleeping sickness (b) Jaundice
(c) Elephantiasis (d) Syphilis

9. DNA copying is necessary during reproduction because
(a) it leads to the transmission of characters from parents to offsprings
(b) it leads to variation
(c) it helps in survival of the species over time
(d) all of these.

10. Which of the following is a sexually transmitted viral disease?
(i) Gonorrhoea (ii) Syphilis
(iii) Warts (iv) HIV-AIDS
(a) (i), (iii) and (iv) (b) (ii) and (iv)
(c) (iii) and (iv) (d) (i) and (ii)

11. The given figure shows the male reproductive system in humans. Select the correct statements regarding the given figure.

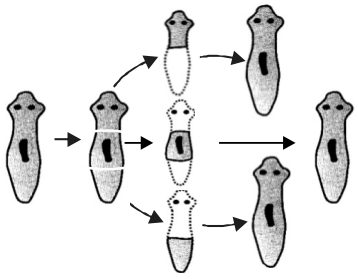


(i) Part labelled as Q produces the sperms.
(ii) The hormone testosterone is produce in the part labelled as S.
(iii) Parts labelled as R and S produce secretions that regulate the production of sperms.
(iv) The part labelled as T is called vas deferens which carries the sperms from testis to the urethra.
(v) Part labelled as P serves as the common passage for both sperms and urine.
(a) (i), (ii), (iii) and (v) (b) (iii), (iv) and (v)
(c) (i), (iv) and (v) (d) (i), (iii) and (iv)

12. Unisexual flowers contain
(a) both stamen and carpel
(b) only stamen
(c) only carpel
(d) either stamen or carpel.

13. Sexual reproduction is the mode of reproduction that
(i) depend on the involvement of two different gametes.
(ii) incorporates a process of combining DNA from two gametes.
(iii) gives better chances of variations as compared to asexual reproduction.
(iv) gives rise to genetically identical offspring.
(a) (i) and (ii) (b) (i), (iii) and (iv)
(c) (i), (ii) and (iv) (d) (i), (ii) and (iii)

14. The type of reproduction shown in the figure is



(a) budding (b) agamogenesis
(c) regeneration (d) fission.

15. 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.
Which of the above statements are true?
(a) (i) and (iii) (b) (ii) and (iv)
(c) (i) and (ii) (d) (iii) and (iv)

16. The number of chromosomes in parents and offsprings of a particular species remains constant due to
(a) doubling of chromosomes before zygote formation
(b) halving of chromosomes during gamete formation
(c) doubling of chromosomes during gamete formation
(d) halving of chromosomes after gamete formation.

17. Which of the following is not a vegetative propagule?
(a) Root (b) Stem
(c) Leaf (d) Seed

18. Which of the following layers of uterus breaks off during menstruation?
(a) Epimetrium (b) Myometrium
(c) Endometrium (d) Perimetrium

19. Which of the following is celebrated as "World AIDS Day"?
(a) September 1 (b) October 1
(c) November 1 (d) December 1

20. Select the correct match.

	Organism		Mode of reproduction
(a)	*Bryophyllum*	–	Leaf bud
(b)	*Hydra*	–	Binary fission
(c)	*Paramecium*	–	Multiple fission
(d)	*Spirogyra*	–	Vegetative propagation

21. In humans, gestation is completed in
(a) 40 weeks (b) 60 weeks
(c) 120 weeks (d) 240 days.

22. Which of the following plants possess unisexual flowers?
(a) Watermelon (b) *Hibiscus*
(c) Mustard (d) Both (b) and (c)

23. Which of the following is the correct sequence regarding sexual reproduction in a flowering plant?
(a) Pollination, fertilisation, seedling, embryo
(b) Seedling, embryo, fertilisation, pollination
(c) Pollination, fertilisation, embryo, seedling
(d) Embryo, seedling, pollination, fertilisation

24. Which of the following organisms does not depend on reproduction to exchange genetic material?
(a) Lion (b) Papaya
(c) Bacterium (d) Cockroach

25. ———— is the portion on which grafting is done and it provides the roots.

(a) Stock (b) Scion
(c) Bud (d) None of these

26. External fertilisation takes place in

(a) fish and frog (b) frog and monkey
(c) dog and goat (d) goat and fish.

27. Match the columns and select the correct option from the given codes.

	Column I		Column II
A.	Parturition	(i)	The act of expulsion of fully grown foetus from mother's uterus
B.	Menopause	(ii)	Release of one ovum from one of the ovaries every month
C.	Gestation	(iii)	Phase during which menstruation ceases
D.	Ovulation	(iv)	Complete development of the fetus inside the womb

(a) A - (iv), B - (ii), C - (i), D - (iii)
(b) A - (i), B - (iii), C - (iv), D - (ii)
(c) A - (iv), B - (iii), C - (i), D - (ii)
(d) A - (i), B - (ii), C - (iv), D - (iii)

28. Tissue culture technique is used for

(a) growing disease free plant
(b) rapid multiplication of plant
(c) multiplication of sterile plants
(d) all of these.

29. Human seminal plasma, the fluid part of semen, is produced by contributions from which of the given part?

A. Prostate gland B. Bulbourethral gland
C. Urethra D. Seminal vesicles
(a) A and D only (b) A only
(c) A, B, C and D (d) A, B and D only

30. Examples of vegetatively reproducing plants are

(a) tomato, okra, onion, cauliflower
(b) potato, ginger, onion, sugarcane
(c) cauliflower, onion, potato, tomato
(d) okra, onion, ginger, sugarcane.

Case Based MCQs

Case I : Read the following passage and answer questions from 31 to 35.

P and Q are two monoecious plants. P bears bisexual flowers whereas Q bears unisexual flowers. P does not need a pollinating agent whereas pollinating agent is required in case of Q.

31. Select the option that correctly identifies plant P and Q.

(a) P - Papaya, Q - Marigold
(b) P - Pea, Q - Cucurbit
(c) P - Sunflower, Q - Orchid
(d) P - Tulip, Q - Daffodil

32. Select the correct option regarding plants P and Q.

(a) Seed setting is assured in plant P even if all its flowers are emasculated.
(b) Male flowers of plant Q always open only after the female flowers of the plant are pollinated.
(c) Female flowers of plant Q can reproduce by cross pollens or self pollens depending upon the genus to which plant Q belongs to.
(d) P is a cross pollinated plant whereas Q is a self pollinated plant.

33. How can self pollination be avoided in plant P?

(a) By removing all the flowers of plant P
(b) By removing all the anthers of all the flowers
(c) By removing all the carpels of all the flowers
(d) None of these

34. Which of the following holds true for plant Q?

(a) Plant Q bears complete flowers.
(b) Plant Q bears either male flowers or female flowers but never both.
(c) Sexual reproduction in plant Q may or may not give rise to genetic variations.
(d) All of these

35. Select the correct statement.

(a) Flowers of plant P produce large number of pollen grains as compared to flowers of plant Q.
(b) Sexual reproduction in plant P does not bring variations.
(c) Sexual reproduction in plant P often gives rise to new varieties due to accumulation of genetic variations.
(d) Both (a) and (b)

Case II : Read the following passage and answer questions from 36 to 40.

X, Y and Z are three sexually transmitted diseases (STDs). X and Z are caused by bacteria whereas Y is caused by virus P. Virus P lowers the

immunity of a person and leads to an incurable disease. X starts as painless sores on genitals rectum or mouth. Z causes painful urination and abnormal discharge from genitals.

36. Select the option that correctly identifies disease X, Y and Z?

	X	Y	Z
(a)	AIDS	Syphilis	Gonorrhoea
(b)	Syphilis	AIDS	Gonorrhoea
(c)	Gonorrhoea	Syphilis	AIDS
(d)	Syphilis	Gonorrhoea	AIDS

37. Identify virus P from the given paragraph.
(a) Human papilloma virus
(b) Human adenovirus
(c) Human immunodeficiency virus
(d) Human cytomegalovirus

38. What are the symptoms of disease Y?
(a) Weight loss
(b) Fever or night sweats
(c) Fatigue and weakness infections
(d) All of these

39. Select the incorrect statement regarding diseases X and Y.
(a) Both X and Y can spread from infected mother to unborn baby during pregnancy.
(b) Both X and Y can spread from infected partner to healthy partner by unprotected sex.
(c) Y can also spread through use of contaminated needles and blood transfusion.
(d) None of these

40. How can disease Y be prevented?
(a) By following polygamy and having protected sex.
(b) Use of sterilised needles for injecting medicines, blood tests, etc.
(c) Collecting blood from unknown donors without background check by blood bank professionals.
(d) All of these

Assertion & Reasoning Based MCQs

For question numbers 41-50, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Both assertion and reason are true, and reason is correct explanation of the assertion.
(b) Both assertion and reason are true, but reason is not the correct explanation of the assertion.
(c) Assertion is true, but reason is false.
(d) Assertion is false, but reason is true.

41. Assertion : In human male, testes are extra abdominal and lie in scrotal sacs.
Reason : Scrotum acts as a thermoregulator and keeps testicular temperature lower by 2°C for normal spermatogenesis.

42. Assertion : Vagina acts as copulation canal and fertilisation canal both.
Reason : Insemination occurs in vagina of female.

43. Assertion : One pollen mother cell forms four microspores.
Reason : Microspores are formed due to reduction division.

44. Assertion : Regeneration cannot be regarded as reproduction.
Reason : Most organism would not normally depend on being cut up to be able to reproduce.

45. Assertion : Spores of *Rhizopus* can survive under extreme climatic conditions.
Reason : Spores are the reproductive parts in *Rhizopus*.

46. Assertion : Contraceptive pills can cause side effects in females.
Reason : They prevent pregnancy by blocking the incoming sperms.

47. Assertion : Male gametes are motile.
Reason : They are free-living diploid cells.

48. Assertion : Corolla is a floral part.
Reason : It helps in pollination.

49. Assertion : The uterine line in human females becomes thick and spongy every month.
Reason : The lining breaks and comes out through the vagina as blood and mucus if fertilisation does not occur.

50. Assertion : Gametogenesis is the production of gametes through the meiosis.
Reason : In oogenesis polar bodies are formed.

SUBJECTIVE TYPE QUESTIONS

Very Short Answer Type Questions (VSA)

1. What is the function of pollen grains in flowers?

2. What changes occur in the flower after fertilisation?

3. Mention any one limitation of vegetative propagation.

4. Why is fertilisation in flowering plants not possible without pollination?

5. Name the parts in human body where sperms and eggs are produced.

6. Why copper - T cannot protect a woman from sexually transmitted diseases?

7. Why is cell division considered as a type of reproduction in unicellular organisms?

8. How regeneration is carried out?

9. Name any two type of asexual reproduction.

10. Name the parts of a bisexual flower that are not directly involved in reproduction.

Short Answer Type Questions (SA-I)

11. Some flowers of pumpkin and bottle gourd develop fruits whereas other flowers fail to develop fruits. What may be the possible reason?

12. Give reasons for the following :
(i) Oral pills help in birth control.
(ii) Petals of flowers are variously coloured.

13. How population growth can be prevented?

14. State two differences between budding in *Hydra* and budding in yeast.

15. Do you think sex-education is necessary in schools?

16. Pollination brings male gamete in close proximity to the female reproductive part. Justify the statement.

17. How *Spirogyra* reproduces?

18. How do insects help in pollination?

19. Why do multicellular organisms use complex way of reproduction?

20. Describe the role of prostate gland, seminal vesicle and testes in the human male reproductive system.

Short Answer Type Questions (SA-II)

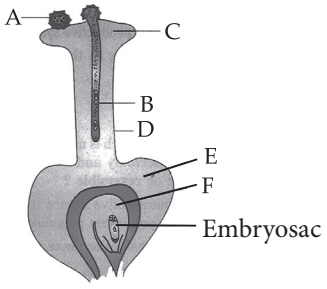
21. Why is variation so important?

22. Name and explain in brief the four different methods of contraception.

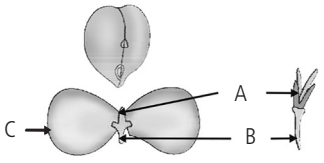
23. List two functions each of the following parts of human female reproductive system.
(a) Ovaries (b) Fallopian tubes (c) Uterus

24. What happens when the egg is not fertilised in human females?

25. Label the parts 'A', 'B', 'C', 'D', 'E' and 'F' in the following figure. Assign the role played by 'B' and 'F'.



26. Answer the following.
(a) What happens to the zygote after fertilisation in flowering plants?
(b) What is germination?
(c) Identify the labelled parts A, B and C of the given figure.



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

28. What is vegetative propagation? How does vegetative propagation take place in potato?

29. (a) Why has Government of India prohibited prenatal sex determination by law? State its

benefits in the long run.
(b) Unsafe sexual act can lead to various infections. Name two bacterial and two viral infections caused due to unsafe sex.

30. (a) List few disadvantages of vegetative propagation?
(b) What is placenta? Explain its functions in humans.

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

32. Differentiate between natural and artificial vegetative propagation in plants.

33. Suppose there is no meiosis and the gametes are formed by mitotic divisions. What kind of situation do you expect under such circumstances?

34. Write a short note on tissue culture.

35. Why does the body show sexual maturation at puberty?

Long Answer Type Questions (LA)

36. Describe the structure of human male reproductive system. Write down the role of each part.

37. What is the significance of sexual mode of reproduction?

38. Answer the following.

(a) Give reasons for avoiding frequent pregnancies by women.
(b) Explain the following methods of contraception giving one example of each.
(i) Barrier method (ii) Chemical method
(iii) Surgical method

ANSWERS

OBJECTIVE TYPE QUESTIONS

1. (a) : In ovule, a male gamete fuses with egg cell to form zygote. The zygote develops into multicellular embryo by repeated cell divisions. Hence, if egg cell will be absent in ovule, then embryo will not formed.

2. (d) : In the given figure 1 is plumule and 2 is radicle.

3. (b) : During puberty a whole new set of changes occurs that cannot be explained simply as body enlargement. All of these changes take place slowly, over a period of months and years and the rate of general body growth begins to slow down, while reproductive tissues begin to mature.

4. (d) : Cotyledon- food store; plumule-future shoot; Radicle - Future root

5. (c) : Plumule develops into the shoot system.

6. (a) : Both copper-T and condoms provide mechanical barrier for the sperms so that they cannot reach to the uterus.

7. (b) : Intrauterine Contraceptive Device (IUCD) is for contraception. It is inserted into the uterus by a doctor where it prevents implantation of the embryo.

8. (d) : Syphilis is a sexually transmitted disease which is caused by a bacterium, *Treponema pallidum*. It affects the genital, rectal and oral regions causing lesions.

9. (d) : DNA copying is important for reproduction. Additional copies of DNA are made during replication, which is necessary for the new cells formed after cell division. Moreover, minor alternations during the process of DNA copying result in the production of variations. Such variations are useful for the survival of species over time.

10. (c) : Many diseases can be sexually transmitted. These include bacterial infections such as gonorrhoea and syphilis, and viral infections such as warts and HIV-AIDS.

11. (c) : Here the parts labelled as P, Q, R, S and T are penis, testis, prostate gland, seminal vesicle and vas deferens, respectively.
The testes of man produce sperms from puberty onwards, throughout his life. The testes also produce the male sex hormone-testosterone. The function of seminal vesicle is to produce viscous fluid which stimulates uterine contraction to help sperms move forward into the Fallopian tube of female. Through small ducts, prostate gland pours its secretion into urethra. Prostate gland secretes milky fluid which helps in the mobility of sperms.
Vas Deferens is a straight tube which carries the sperms to the seminal vesicles. Penis is a long and thick muscular organ made up of mostly erectile tissue. Urethra carries urine from the bladder as well as sperms from the vasa deferentia, through the penis.

12. (d) : A flower which contains either stamen or carpel is called a unisexual flower *e.g.*, papaya and watermelon.

13. (d) : Sexual reproduction may be defined as the production of offsprings (new individuals) by the fusion of two gametes (usually one from male parent and the other from female parent) to form a diploid zygote which develops into a mature organism. The sexual mode of reproduction incorporates such a process of combining DNA from two different individuals during reproduction. It results in re-establishment of the number of chromosomes and the DNA content in the new generation that leads to variation.

14. (c) : Regeneration is the formation of the whole body of an organism from its own small fragment.

15. (c) : A spore is a single or several celled reproductive structure that detaches from the parent and on getting suitable medium like moisture and nutrients as in case of bread mould, gives rise, directly or indirectly, to a new individual.

16. (b) : Gametes formation involves meiosis or reduction division. The gamete mother cell is diploid (2n), *i.e.*, it has two sets of chromosomes. This single diploid cell divides by meiosis to form 4 haploid (n) daughter cells. Each daughter cell becomes a gamete, either male or female. Each gamete possesses single set of chromosomes. Fusion of these gametes results in the formation of a zygote having a double set of chromosomes *i.e.*, diploid (2n) (one set of paternal and the other set maternal). Thus the number of chromosomes in parents and offsprings of a particular species remains constant.

17. (d) : Vegetative reproduction or propagation in plants is a method of asexual reproduction in which the plant parts other than seeds are used as propagules. Among flowering plants, every part of the body such as root, stem, leaf or bud takes part in vegetative reproduction, *e.g.*, in guava, buds present on the roots can grow into leafy shoots.

18. (c) : Endometrium is the inner layer of the uterus which is highly vascular and breaks off during menstruation.

19. (d) : December 1 is celebrated every year as the World AIDS day to spread information about AIDS among the public.

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

21. (a) : In human females, gestation is completed in about 280 days or 40 weeks from the first day of the last menstruation.

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

23. (c) : During sexual reproduction in flowering plants, first of all pollination occurs that brings pollen onto stigma of flower. Pollen germinates to form pollen tube through which male gamete reaches female gamete. Fertilisation occurs resulting in zygote formation which later develops into embryo. Embryo remains inside seed and on getting favourable conditions germinate into seedling.

24. (c) : Bacterium does not depend on reproduction to exchange genetic material.

25. (a) : Grafting is the method of obtaining a superior quality plant from two different plants by taking the root system of one plant and the shoot system of another. The plant whose root system is taken is called stock while the plant whose shoot system is taken is called scion.

26. (a) : External fertilisation is the fertilisation that takes place outside the body of an organism. Aquatic organisms experience this type of fertilisation, *e.g.*, fish and frog in which fertilisation takes place in water.

27. (b) : Release of mature ovum from the ovary is called ovulation.
The complete development of fetus, from the initial stage of conception till the birth of the young one, is called gestation. Parturition is the act of expelling the full-term young one from the mother's uterus at the end of gestation.
The sexual cycle in a woman continues upto the age of 45 to 55 years. After that the ovary becomes dormant and do not release any further egg. This stage is called menopause. On the arrival of menopause, menstruation in female also ceases to occur.

28. (d) : Tissue culture technique is useful in obtaining virus free plants disease free plants homozygous diploids in quick commercial propagation of plants and multiplication of sterile plants.

29. (d) : Seminal plasma is a complex fluid comprised of secretions from bulbourethral glands, seminal vesicles, prostate gland and sperm from testes.

30. (b) : Vegetative reproduction in potato occurs by tuber, in ginger by rhizome, in onion by bulb and in sugarcane by stem cutting.

31. (b) **32. (c)**

33. (b) : If anthers of flowers are removed then chances of self pollination become negligible. Cross pollens can be artificially dusted on stigmas of flower for cross pollination.

34. (c)

35. (b) : Self pollination does not bring about genetic variations.

36. (b) : X could be Syphilis, Y could be AIDS and Z could be gonorrhoea.

37. (c) : Human immunodeficiency virus (HIV) causes immunodeficiency syndrome a condition characterised by progressive failure of immune system allowing life threatening conditions.

38. (d) **39. (d)**

40. (b) : Sterilised needles are free from any kinds of germs.

41. (a) : In males, testes are present outside the body (extra abdominal) in the scrotal sacs. Spermatogenesis takes place in testes. This process needs temperature 2°C lower than the normal internal body temperature. The low temperature is maintained by the scrotal sacs. The scrotal sacs have muscles which constantly contract and relax the loose scrotal skin. It helps to keep the testicular temperature at 35°C. So scrotum acts as a thermoregulator and helps in spermatogenesis.

42. (d) : Vagina is a muscular tube starting from the lower end of uterus upto the outside. The vagina receives the male penis during copulation. The great elasticity of its wall also allows the passage of the baby during childbirth. Hence it acts as copulatory as well as birth canal.
Insemination is the process to introduce semen into the vagina whereas the fusion of gametes occurs in the fallopian tube.

43. (b) : The sporogenous cells of anther may directly function as a microspore mother cells (also called pollen mother cells or PMCs) or they may undergo a few mitosis to add up to their number before entering meiosis. Each PMC, by a meiotic division, gives rise to a group of four haploid microspores. The aggregates of four microspores are referred to as microspore tetrads.

44. (a) : Simple animals like *Hydra* and *Planaria* can be cut into many number of pieces and each piece grows into a complete organism. This is known as regeneration. Regeneration is carried out by specialised cells. These cells proliferate and make large numbers of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues. These changes take place in an organised sequence referred to as development. However, regeneration is not the same as reproduction, since most organisms would not normally depend on being cut up to be able to reproduce.

45. (b) : The spores are covered by thick walls that protect them until they come into contact with another moist surface and can begin to grow. Thus, spores can survive under extreme climatic conditions.

46. (c) : Oral pills are used to check ovulation. These are mainly hormonal preparations and contain estrogen and progesterone. They are called oral contraceptives. They change the hormonal balance of the body so that eggs are not released and fertilisation can not occur.

47. (c) : In humans, the female gametes are large as they contain the food stores and the male gametes are small and motile so that they can easily travel inside the female reproductive system and reach the site of fertilisation. Male gametes are haploid cells.

48. (b) : The corolla adds to the beauty of the flower and is thus an adaptation to attract insects for pollination.

49. (b) : One egg is produced every month by one of the ovaries. 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. If the egg is not fertilised, this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes place roughly every month and is known as menstruation. It usually lasts for about two to eight days.

50. (b) : Gametogenesis is the production of haploid gametes by diploid multicellular organisms through the process of meiosis. The production of female gametes or ova (egg) is called oogenesis and the production of spermatozoa (sperm) is called spermatogenesis. Oogenesis occurs within the follicles of the ovaries. The meiosis of oocytes always results in haploid cells of unequal size. When a primary oocyte undergoes meiosis a large haploid secondary oocyte and a very small first polar body are formed. A second meiotic division produces a large ootid and very small second polar body. The first polar body may or may not divide during the second meiotic division into two additional second polar bodies. All the polar bodies are nonfunctional.

SUBJECTIVE TYPE QUESTIONS

1. Pollen grains produce male gametes which fertilise the egg cell present in the ovule.

2. After fertilisation, the flower withers. The sepals and the petals dry up, the ovary converts into fruit, the ovule forms the seed and the zygote forms the embryo which is enclosed in the seed.

3. One limitation of vegetative propagation is that it does not show genetic variation.

4. Pollination allows pollen grains to reach carpel which contains the egg. Thus, fertilisation which involves fusion of male and female germ cells can occur only after pollination.

5. Sperms are produced in testes (males) and eggs are produced in ovary (female).

6. Copper-T is an intrauterine device which acts as contraceptive but does not provide protection against sexually transmitted diseases as it does not provide any barrier against mixing of body fluids from two individuals.

7. Cell division results in the formation of two daughter cells, *i.e.*, it results in the production of more individuals of the organism like the process of reproduction.

8. Regeneration is carried out by specialised cells which proliferate and make large numbers of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues.

9. (i) Fragmentation (ii) Budding

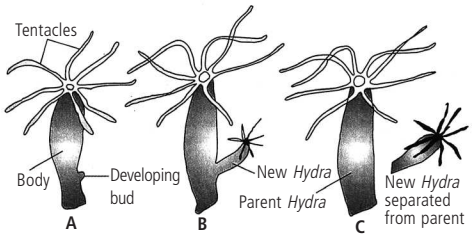
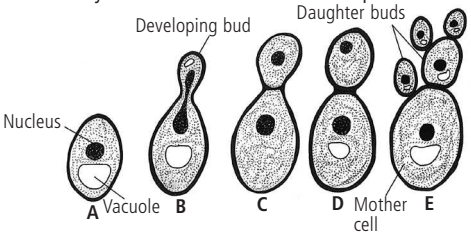
10. The parts of a bisexual flower that are not directly involved in reproduction are : sepals (calyx), petals (corolla) and thalamus.

11. Pumpkin and bottle gourd bear unisexual flowers. Some flowers are male and others are female. Male flowers do not develop fruits. They produce pollen grains. The female flowers posses carpels which develop fruits after fertilisation. Therefore, only female flowers develop fruits but not the males.

12. (i) Oral pills contain the hormone estrogen and progesterone which check ovulation.
(ii) The petals of the flowers are coloured to attract pollinators for cross pollination.

13. Population growth can be prevented by family planning programmes which involve various types of birth control measures like mechanical, chemical, surgical and natural methods.

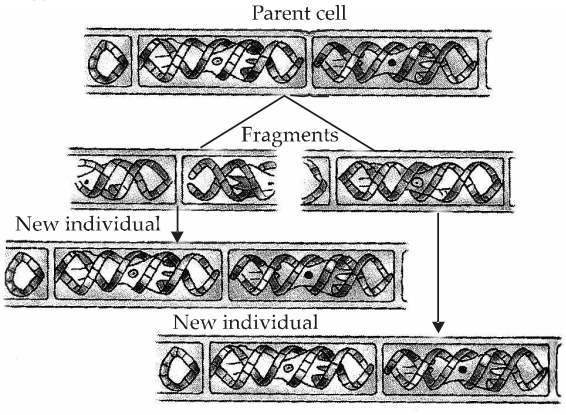
14. Differences between budding in *Hydra* and budding in yeast are as follows:

	Budding in *Hydra*	Budding in Yeast
(i)	Buds produced are multicellular.	Buds produced are unicellular.
(ii)	Buds get detached from parent body soon. 	Buds may remain attached to the parent body 

15. A correct knowledge about reproductive organs, adolescence related changes, sexually transmitted diseases, etc., will save the young minds from myths and misconceptions about sex related aspects and help them to lead a reproductively healthy life. Thus, sex-education is necessary in schools.

16. Pollination is the process of transfer of pollen grains from the anther of a flower to the stigma of the same or another flower. Pollen grains bear male gametes which are carried to the ovary of a flower with the help of pollen tubes. Hence, pollination brings male gametes in close proximity to the female reproductive part.

17. *Spirogyra* reproduces through the fragmentation process.
Fragmentation is the mode of reproduction in which parent body breaks into two or more fragments and each fragment develops into a new individual. It is a method of reproduction in many filamentous algae, mycelial fungi and thalloid bryophytes.
The given figure shows the process of fragmentation in *Spirogyra*.



18. In entomophily (insect pollination), when an insect visits a flower for nectar, the pollen grains get deposited on the body of insect. When this insect visits another flower, some of the pollen grains stick to stigma of another flower. This leads to pollination.

19. In multicellular organisms, cells are organised into specialised groups; tissues, organs or organ systems, each of which occupy specific locations in the body. In such an organised condition cell-by-cell division would be impossible. Hence, multicellular organisms need complex methods of reproduction.

20. Prostate glands - Secretion of the prostate gland nourishes and activates the spermatozoa to swim.
Seminal Vesicles - They produce an alkaline secretion which forms 60% of the volume of semen. Alkaline nature of the removal fluid helps to neutralise the acidic environment of the male urethra as well as that of female reproductive tract which otherwise would inactive and kill sperms.
Testes are responsible for producing sperm and secreting male sex hormones *e.g.*, testosterone.

21. Variation is so important because
(i) Populations of organisms normally live and interact with definite kinds of ecological niches. If there is an alteration in the ecological conditions of such places, the population of organisms will get damaged and may be wiped out. The variants of the organisms, however, may have better chances of survival. The surviving individuals may reproduce and develop a kind of population which is suited to the changed niche.
(ii) It makes some individuals better fitted in the struggle of existence.
(iii) It helps the individuals to adapt themselves according to the changing environment.
(iv) It allows breeders to improve races of useful plants and animals for increase resistance, better yield, quicker growth and lesser input.
(v) Preadaptation caused by the presence of neutral variations are extremely useful for survival against sudden changes in environment *e.g.*, resistance against a new pesticide or antibiotic.
(vi) It constitutes raw material for evolution.
(vii) It gives each organism a distinct individuality.

22. Contraception literally means prevention of pregnancy. Different methods for the prevention of pregnancy are as follow:
(i) Barrier methods in which a mechanical barrier such as condom, cervical cap or diaphragm is used for preventing the entry of sperms in the female genital tract or vagina. Thus, sperms and egg do not meet and fertilisation is prevented from taking place.
(ii) Chemical methods of contraception are those in which release of eggs from the ovary can be prevented by the intake of pills by the female. The oral pills are hormonal preparations and are also termed as oral contraceptives.
(iii) Intra-Uterine Contraceptive Devices (IUCDs) are placed in the uterus to prevent pregnancy. These devices are very effective and popularly used by females. Copper-T and Lippes Loop are examples of IUCDs. These devices are placed in the uterus by skilled personnel.
(iv) Surgical method : Contraception can also be brought about by surgically removing or tying a part of vas deferens (vasectomy) in the male and removing or tying a part of fallopian tube (tubectomy) in the female. Surgery should be performed by well trained doctors under sterile conditions.

23. (a) Ovaries : (i) It produces ovum.
(ii) It secretes female sex hormone.
(b) Fallopian tubes : (i) It conveys the ovum from the ovary to the uterus.
(ii) It acts as site for fertilisation.
(c) Uterus : (i) It nourishes the fertilised ovum which develops into the fetus.
(ii) It holds the fetus till the baby is mature enough for birth.

24. One egg is produced every month by one of the ovaries. 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. If the egg is not fertilised, this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucus. This cycle takes place roughly every month and is known as menstruation. It usually lasts for about two to eight days.

25. In the given figure,
A = Pollen grain
B = Pollen tube
C = Stigma
D = Style
E = Ovary
F = Ovule.
Role of B : Pollen tube acts as carrier of male gametes to the embryo sac.
Role of F : Ovule becomes seed after fertilisation.

26. (a) After fertilisation, the zygote divides several times to form an embryo within the ovule. The ovule develops a tough

coat and is gradually converted into a seed. The ovary grows rapidly and ripens to form a fruit. Meanwhile, the petals, sepals, stamens, style and stigma may shrivel and fall off.

(b) Germination is the process included all changes that take place from the time when a dry, viable seed starts to grow when placed under suitable condition of germination to the time when the seedling becomes established on the substratum.

(c) A – Plumule, B – Radicle, C – Cotyledon

27. HIV stands for Human Immunodeficiency Virus.

Yes, AIDS is an infectious disease. It is transmitted sexually or through exposure to contaminated blood.

Four modes of spreading AIDS are :

(i) Unprotected sex with an infected partner

(ii) Use of contaminated needle and syringes

(iii) Use of contaminated razors for shaving

(iv) Transfusion of infected blood or blood products.

28. Vegetative propagation is the process of formation of the plant from vegetative propagules or units, such as stem, root, leaf, buds, etc. Tuber of potato is the swollen underground stem and bears number of nodes or eyes. Each eye bears one or many buds. New plants are produced from the buds on the eyes of the stem tuber.

29. (a) Prenatal sex determination was banned in India in 1994. This was done to prevent sex selective abortion. It is being used to kill the normal female fetus. This killing of the unborn girl child is called female feticide which is reducing the number of girls drastically in some societies of our country. Due to reckless female feticide, male–female sex ratio is declining at an alarming rate. Its benefit in the long run is that the female-male ratio could be maintained for a healthy society.

(b) Bacterial diseases due to unsafe sex are gonorrhoea, syphilis.

Viral diseases due to unsafe sex are AIDS, genital herpes.

30. (a) Some disadvantages of vegetative propagation are:

(i) Plants produced by this technique possess less vigour.

(ii) They are more prone to diseases.

(iii) They show no genetic variations.

(b) Placenta is a specialised tissue between fetus and uterine wall of mother. It develops finger-like processes called villi, which grows into tissue of the uterus.

Functions of placenta are listed below :

(i) Provides nutrition

(ii) Helps in the exchange of gases such as oxygen and carbon dioxide

(iii) Helps in the excretion, that is the removal of nitrogenous waste material from the fetal blood to that of the mother.

(iv) It secretes hormones such as estrogen and progesterone.

(v) Placenta provides protection by partitioning the blood of the fetus and the mother. Thus, unwanted materials such as germs cannot contaminate the blood of the fetus.

(vi) Acts as a storage of glycogen. This glycogen gets converted to glucose and fulfils the energy requirement of the fetus.

31. Reproduction is the only means to ensure the continuity of a species. During reproduction, DNA passes from one generation to the next. Copying of DNA takes place with consistency but with minor variations. This consistency leads to stability of species. Hence, reproduction is linked to stability of a species population. By reproduction, organisms produce large number of new individuals of their own kind out of which several get perished and only some survive. These surviving organisms replace the naturally dying members of the population. Hence, the population as a whole is not affected and remains stable.

32. Differences between natural and artificial propagation in plants are as follows:

S. No.	Natural propagation	Artificial propagation
(i)	Some most common natural methods of vegetative propagation in plants are:	It includes growing plants by man-made methods. Some common artificial methods are :
(ii)	Modified tuberous roots can be propagated vegetatively when planted in soil (*e.g.*, Sweet potato).	Cutting of stem of sugarcane, grapes, etc., which when grown in soil develop into a new plant.
(iii)	Underground modified stems such as rhizomes (*e.g.*, ginger, banana, etc.), corms (*e.g.*, *Colocasia*, etc.), bulbs *(e.g.*, garlic, onion, etc.), tuber (potato), sucker (mint) and sub-aerial stems such as offset (*Eichhornia*), stolon (strawberry), etc. develop into new plants.	Grafting is a process in which branches of two similar plants, one potted plant and the other of a good quality plant are obliquely cut and placed over each other and tied by a tape and left for a month or so. A new plant thus develops.
(iv)	Some plants develop adventitious buds on their leaves which develop into new plants (*e.g.*, *Bryophyllum*).	In layering, the roots are artificially induced on the stem branches before they are detached from the parent plant for propagation.

33. Normally the two haploid gametes fuse to form one diploid zygote. The zygote develops into a mature organism. At maturity, the organism develops sex organs and gametes are formed from diploid cells by meiosis resulting in the formation of haploid gametes. This process continues generation after generation. Now if there is no meiosis at the time of gamete formation the gametes formed as a result of mitosis will be diploid. The two diploid gametes will fuse to form a 4n zygote which develops in tetraploid organism. Again this 4n organism will develop 4n gametes which fuse to form 8n zygote. The number of chromosomes will continue to double after each generation and a time will come when there will be only DNA on earth.

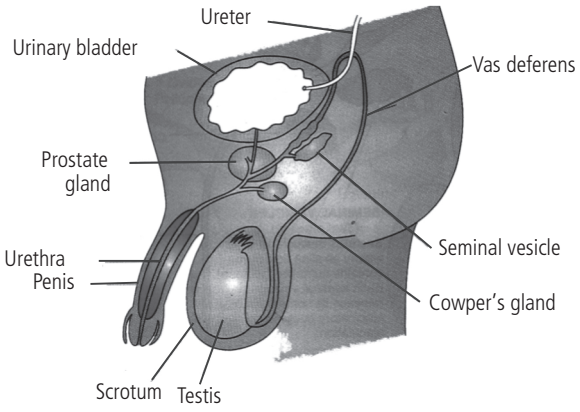
34. Tissue culture is a modern technique of vegetative propagation in which tissues from the growing tip of a plant are removed and placed in an artificial medium where they divide rapidly to form a small group of cells or callus which is again transferred to another medium containing hormones for growth and differentiation. The plantlets are then placed in the soil so that they can grow into mature plants. This technique is commonly used for ornamental plants.

35. There is a need for specialised cell types in multi-cellular bodies to carry out specialised functions. The creation of germ-cells to participate in sexual reproduction is another specialised function. Human beings also develop special tissues for reproduction. However, while the body of the individual organism is growing to its adult size, the resources of the body are mainly directed at achieving this growth and the maturation of the reproductive tissue is not likely to be a major priority. So, during puberty maturation of reproductive tissues takes place to attain sexual maturity and the rate of general body growth slows down.

36. Human male reproductive system consists of testes, scrotum, vas deferens, urethra and penis.

(a) Testes : The human male possesses two testes, which are the primary reproductive organs, lying outside the abdominal cavity. The two testes are the male gonads, which are the sites where male gametes, *i.e.*, sperms are produced. The testes also produce the male sex hormone-testosterone. The testes of man produce sperms from puberty onwards, throughout his life.

(b) Scrotum: The scrotum is a pouch of skin that hangs between the legs. It is divided internally into right and left scrotal sacs by a partition. The two testes lie in respective scrotal sacs. The scrotum acts as a thermoregulator and provides an optimal temperature for the formation of sperms. The sperms develop at a temperature 2 – 2.5°C lower than the normal body temperature.



Human male reproductive system (side view)

(c) Vas deferens : This is a straight tube, about 40 cm long, which carries the sperms from epididymis towards the urethra.

(d) Urethra: It is about 20 cm long tube that arises from the urinary bladder to carry urine. It runs through the penis and opens to the outside through male genital pore. The contents of two seminal vesicles, and sperms from vas deferens also join the urethra. Thus urethra carries urine from the bladder, as well as sperms from the vasa deferentia through the penis.

(e) Penis: Penis is a long and thick muscular organ made up of mostly erectile tissue. At the time of sexual act, the erectile tissue gets filled with blood causing the penis to become erect. It is inserted into the vagina of the female where sperms are ejaculated for the purpose of reproduction.

37. Sexual reproduction may be defined as the production of offsprings (new individuals) by the fusion of two gametes (usually one from male parent and the other from female parent) to form a diploid zygote which develops into a mature organism. Gamete formation involves meiosis or reduction division. The gamete mother cell is diploid (2n), *i.e.*, it has two sets of chromosomes. This single diploid cell divides by meiosis to form 4 haploid (n) daughter cells. Each daughter cell becomes a gamete, either male or female. Each gamete possesses single set of chromosomes. Thus, this division involves copying of the DNA as well as the cellular apparatus. There is a stage in such nuclear division where crossing over of chromosomes take place. This is very important step which results in a slight different composition of chromosomes in gametes. Fusion of these gametes results in the formation of a slightly different individuals which show variations. The variations which lead to the appearance of such characters which fit to the changing environment result in the survival of the species. Chances of variation, therefore, are much more in sexual mode of reproduction

as compared to asexual reproduction. Moreover, chances of the production of compatible generations are also more in sexual reproduction.

38. (a) Having pregnancies too frequently and giving child birth at quick succession reduce mother's health and vitality and cause mental strain. Health of children is also affected due to nutritional deficiencies.

(b) (i) Barrier method: These are physical devices to prevent the entry of sperm into the female genital tract during copulation. They also protect against sexually transmitted diseases, *e.g.*, condoms. Condoms are thin, strong rubber sheaths used by man to cover the erect penis. It is simple but effective and widely used contraceptive that has no side effects. It checks pregnancy by preventing deposition of semen in the vagina.

(ii) Chemical method: Foam tablets, jellies, pastes, creams and spermicides are some common chemicals used by females. These are placed in vagina. These chemicals adhere to the mucous membrane and immobilise and kill the sperms.

(iii) Surgical method: Surgical methods include – vasectomy and tubectomy. Vasectomy is a small surgical operation performed in males. It involves removal of a small portion of the sperm duct (or vas deferens) by surgical operation. The two cut ends are then ligated (tied) with threads. This prevents the sperms from coming out. Tubectomy is done in females where oviducts are cut and the cut ends are tied with threads.