

CONCEPTS

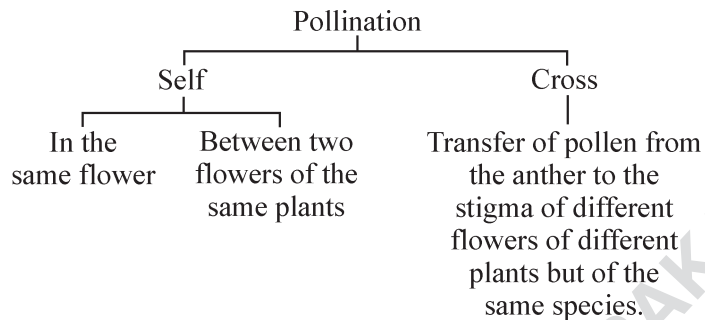
1. In asexual reproduction, certain body cells undergo repeated mitotic divisions and give rise to two or more new organisms of the same kind.
2. Different methods of asexual reproduction are — fission, budding, fragmentation, spore formation, regeneration, vegetative propagation, parthenogenesis and tissue culture.
3. **Fission** is a process of division of a single celled organism into two or many cells (called binary and multiple fission respectively), e.g., *Amoeba*.
4. **Budding** is a method of reproduction in which a protuberance develops on the mature organism's body, attains full maturity and then detaches, e.g., Yeast and *Hydra*.
5. **Spore formation** : Spores are special cells formed within special structures called 'sporangia' that disseminate and can form the entire plant. This is exclusive to the plant kingdom, e.g., mushroom, ferns and mosses.
6. **Vegetative propagation** is a method of reproduction in which a vegetative plant part (i.e., a non-reproductive part or a non-flowering part) produces a new plant.
7. For artificial propagation by man, the commonly used methods are :
 - (i) **Cutting** in which a stem is given an oblique cut and the cut stem is kept under appropriate conditions to give rise to an entirely new plant, e.g., Rose and China rose.
 - (ii) **Layering** is a process in which the stem, while still attached to the mother plant is buried under the soil for a while, till it strikes new roots. It is then detached from the mother plant, e.g., Jasmine. This is called 'soil layering'. The other form of layering is 'air layering' in which incision is made on the bark of a tree and covered with moist soil. When rooting takes place in the cut portion, the entire portion is cut and used for propagation.
 - (iii) **Grafting** is a process in which two parts of different plants are joined by bandaging them tightly. This allows cambial activity to unite the two portions. The one that contributes the root is called 'stock' and the one that contributes the shoot is known as 'scion'.
Bicoloured roses and different varieties of mangoes are made by this method.
8. **Advantages of Vegetative Propagation**
 - (i) It allows quicker and easy propagation.
 - (ii) Better qualities of the plants can be maintained and the quality can even be enhanced as in seedless oranges.
 - (iii) It results in propagation of those plants which do not produce viable seeds or produce seeds with prolonged period of dormancy.
9. **Disadvantages of Vegetative Propagation**

Most of these propagated plants do not produce viable seeds and hence curtail natural reproduction.
10. **Regeneration** is the ability of an organism to replace or repair any lost part. Sometimes, an entire organism can be made from its fragmented body, e.g., *Planaria*. When an unfertilised egg can be

made to develop into an entire organism, it is known as 'Parthenogenesis' in animals and 'Parthenocarpy' in plants.

11. The reproductive part of a plant is its flower. A complete flower has four whorls —sepals, petals, androecium and gynoecium.
12. Male gametes are the pollen grains produced by the anther lobes and the female gametes are the ova within ovules present inside ovaries.
13. The transfer of pollen grains from the anther to the stigma is known as pollination.

14.



15. Upon pollination, pollen gets deposited on the stigma. The pollen germinates by forming pollen tubes. Each tube carries two male nuclei at its tip.
16. The ovary bears ovules. The number of ovules vary from one (as in mango) to many (as in orchid).
17. During syngamy, the first male nucleus fuses with the ovum to form the zygote. The second male nucleus fuses with the polar nucleus to form the **endosperm**.
18. The entire process is summarised as “double fertilisation” and triple fusion.
19. The fertilised ovule develops into a seed and the fertilised ovary into the fruit.
20. Sexual reproduction necessarily requires two gametes usually different from one another. Male gamete is the spermatozoa and female gamete is the ovum.
21. In most animals single individual produces only one type of gamete and hence is unisexual. However, there are organisms that possess both testicles and ovaries and are called bisexuals or hermaphrodites, e.g., earthworm and leech.
22. The fusion of the two gametes is known as ‘fertilisation’.
23. Sexual reproduction provides wider scope for variation between the parents and the offsprings.
24. **Male reproductive system** in human consists of the following organs —
 - (i) Testes in the scrotum
 - (ii) Epididymis
 - (iii) Vas deferens
 - (iv) Urethra
 - (v) Penis
 - (vi) Accessory glands (seminal vesicle and prostate gland)

25. Female reproductive system in humans consists of the following organs —

- (i) Ovaries
- (ii) Fallopian tubes or oviducts
- (iii) Uterus or womb
- (iv) Vagina

26. The attainment of sexual maturity is known as puberty.

27. The gonads control and regulate three major functions :

- (a) Produce the gametes as well as the sex hormones (testosterone is produced by the testicles and estrogen and progesterone by the ovaries).
- (b) They help in the functioning of the accessory sex organs (i.e., organs which are part of the reproductive system but do not directly produce gametes).
- (c) They help in the development of secondary sex characters like breast development in girls and growth of facial hair in boys.

28. In male the testicles are lodged in the scrotum outside the body as the process of sperm formation requires a temperature lower than the normal body temperature. The other parts of this system are :

- (a) Vas deferens
- (b) Urethra, a common passage for the release of urine as well as sperms. Testicles function throughout the life of a man, from puberty onwards, though the quality of the sperms declines with age.

29. The female puberty is considered to be attained with the first menstrual discharge and this is called 'Menarche'. The stoppage of menstruation marks the end of the reproductive life in females and is known as 'Menopause'.

30. The ovaries at birth contain groups of cells called follicles, which mature one at a time throughout the reproductive life of a female in a cyclical manner. Out of a group of follicles only one matures as an ovum or egg. The other cells in the group serve as nourishers. Upon attaining maturity the egg is expelled into the oviduct also known as the fallopian tube.

31. Population control involves measures by which fertilisation is prevented. The three common methods are :

- (a) Physical barrier methods like condoms or placing of IUCDs (Intra Uterine Contraceptive Devices) in the uterus of the female.
- (b) Chemical methods like use of oral or vaginal pills.
- (c) Surgical methods which involves a reversible surgery in which the tubes conducting the gametes are cut and tied. It is known as vasectomy in males and tubectomy in females.

32. STDs are sexually transmitted diseases, also called Venereal Diseases (VDs). They are transmitted from the infected individuals to healthy ones during sexual contacts. Gonorrhoea and syphilis are common STDs. AIDS (Acquired Immune Deficiency Syndrome) is also transmitted by sexual contact. Responsible sexual behaviour and prudence can help to prevent the spread of STDs. Both government (National Population Policy and National Health Policy) and non-government organisations are endeavouring to control the fertility rate.

I. SUMMATIVE ASSESSMENT

NCERT QUESTIONS WITH THEIR ANSWERS

SECTION A : IN-TEXT QUESTIONS

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

Ans. DNA contains special, coded genetic programme with detailed and specific instruction for each organism. DNA is a storehouse of all information not only about building and running cellular machinery but also organisation of cells into tissues, tissues into organs, organs into organ system and organ system into particular body structure. During reproduction there is formation of new cells which must carry the same amount and type of hereditary information as present in the parent cell. This is accomplished by DNA copying, prior to each cell division.

2. Why are variations beneficial to the species but not necessarily for the individual? (V. Imp.)

Ans. Variations act as pre-adaptations to environmental changes which have no immediate benefit to the individuals. However, variations may remain in the population. As drastic changes occur, the population may survive if, in each generation, at least some of its members can cope effectively with the new conditions. Different genetic variations may work better than those that previously prevailed. If there are no variations present in the members of that population, the niche altered drastically. In that case, the population could be wiped out. Therefore, it is not necessary that all variations are beneficial to individuals.

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1. How does binary fission differ from multiple fission?

Ans.	Binary Fission	Multiple Fission
	(i) Formation of two daughter cells from the mother cell.	(i) Formation of multiple daughter cells from the mother cell.
	(ii) Undertaken under optimal conditions.	(ii) Undertaken under adverse conditions.
	(iii) No formation of cyst.	(iii) Cyst formation is common.

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

Ans. (i) Spores are small hence dispersed by air and help in spreading the organisms far and wide.
(ii) All the daughter cells formed through spores are genetically similar.
(iii) Spores can also function as a means of perennation or passage through unfavourable conditions.

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

Ans. Higher animals have limited power of regeneration, e.g. tail of lizard, arm of starfish. The ability to degenerate in fully differentiated organism is due to specialised cells. In complex organisms, these specialised cells can form lost tissues and organs but not the complete individual as the highly differentiated tissues and organs do not allow this. In complex organisms regeneration is under neurohormonal control. Fragments do not have nervous or hormonal stimuli to grow into complete organisms.

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

Ans. Vegetative propagation is generally performed in higher plants of ornamental, horticultural, medicinal and other economic importance. It is practised for growing these plants because

- (i) Good qualities of a variety can be maintained indefinitely.
- (ii) Vegetative propagation gives a genetically uniform population.
- (iii) Vegetative propagation is a quicker method of raising of crops.
- (iv) It is the only known method of multiplication of seedless plants.

5. Why is DNA copying an essential part of the process of reproduction? [2009]

Ans. During reproduction, new cells are formed which must carry the same amount of DNA as present in the parent cell. Hence DNA copying is an essential phenomenon of reproduction through which the organisms pass on their body features to their offsprings.

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

Ans. Pollination is the transfer of pollen grains from anther to the stigma of a flower while fertilisation is the fusion of male gamete with the female gamete.

2. What is the role of seminal vesicle and the prostate gland? [2008, 2009, 2011 (T-II)]

Ans. Role of seminal vesicles — Seminal vesicles secrete alkaline and viscous semen plasma having fructose, prostaglandins, fibrinogen and proteins. Fructose provides energy to the spermatozoa for swimming. The prostaglandin stimulates contractions in the female reproductive tract to help the meeting of sperm and ovum in the oviduct. Its secretion also nourishes and activates the spermatozoa to swim.

Role of prostate gland — It pours an alkaline secretion into the semen. It clots enzyme and chemical essentials for sperm activity.

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

Ans. Changes seen in girls :

- (i) Skin becomes oily. Pimples often develop, mostly on the face.
- (ii) Breast size begins to increase.
- (iii) Menarche or beginning of menstruation occurs.
- (iv) Voice become high pitched.
- (v) Deposition of fat occurs at face, buttocks and thighs.
- (vi) Thinner hair appears on legs, arms and face.
- (vii) Growth of thick hairs in armpit and genital area between the thighs.

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

Ans. The embryo gets nutrition, oxygen, water, etc. from the mother's blood with the help of placenta, through a cord called umbilical cord. In placenta, villi grow into the surrounding uterine tissue from which embryo absorb nutrients. Villi provides a large surface area for exchange of materials between embryo and mother.

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

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

SECTION B : QUESTIONS AT THE END OF THE CHAPTER

1. Asexual reproduction takes place through budding in

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

Ans. (b) Yeast

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) Vas deferens

3. The anther contains

- (a) sepals (b) ovules (c) carpel (d) pollen grains

Ans. (d) Pollen grains

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

Ans. Sexual reproduction has following advantages :

- (i) The offsprings produced by sexual reproduction exhibit diversity of characters because fusing gametes come from two different and sexually distinct individuals.
- (ii) Sexual reproduction involves meiosis which provides opportunities for new combination of genes.
- (iii) It plays a prominent role in the origin of new species and lead to variation required for evolution.

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

[2008]

Ans. Testes perform two main functions in human body :

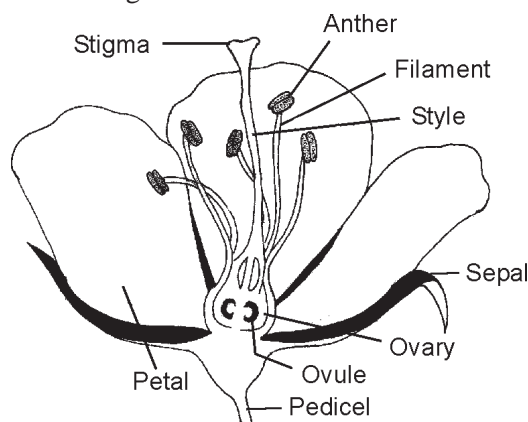
- (i) The formation of germ cells or sperms takes place in the testes.
- (ii) The hormone testosterone is also secreted from testes. Testosterone induces secondary sexual characters at puberty.

6. Why does menstruation occur?

Ans. Every month uterus prepares itself for implantation. Its lining becomes thick and spongy. But if fertilisation does not occur then this lining is not required any more. Hence, the thickened lining of the uterus breaks down along with blood vessels. The degenerated part of uterus along with the blood moves out of the vagina in the form of bleeding, called menstruation. It occurs in response to low level of estrogen and progesterone hormone.

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

Ans.



8. What are the different methods of contraception?

Ans. A number of methods have been developed to prevent and regulate child birth. This has greatly improved the health of women in rural areas.

These methods are broadly of three types :

(i) **Barrier methods**, in which physical devices such as condoms, diaphragms and cervical caps are used. These devices prevent the entry of sperm into the female genital tract and thus fertilisation of ovum is prevented.

In India, **Intrauterine Contraceptive Devices** (IUCDs) like copper-T or loop are very popular. In case of copper-T as a IUCD, it is inserted inside the uterus of the female. As a result, implantation of embryo in the uterus is prevented.

(ii) **Chemical methods**, in which drugs or pills are used by females. Pills are of two kinds—oral or vaginal. Oral pills used by women (like Mala-D) contain hormones which alter the ovulatory cycle. The use of oral pills (commonly called **Oral Contraceptives, OCs**) is a safe method of avoiding pregnancy. OCs inhibit the production of gametes, by the action on hypothalamus, pituitary and the ovaries.

(iii) **Surgical methods**

(a) **Tubectomy** in females – by cutting of fallopian tubes of each side.

(b) **Vasectomy** in males – by cutting of vas deferens of each side.

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

Ans. Unicellular organisms have very simple mode of reproduction. Sex is not differentiated into male and female. They reproduce by budding, fragmentation, fission, etc. In multicellular organisms mode of reproduction is complex. Male and female sex is differentiated in some organisms. Separate organ system for reproduction has been developed.

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

Ans. Stability to populations of species is attained by equalising the birth and death ratio. Reproduction results in birth of infants. The rate of birth should be approximately equal to the rate of death. Reproduction maintains the composition of population of infants, youngsters, adults and old people.

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

Ans. Contraceptive methods are adopted to prevent unwanted conception and to have sufficient gap between successive birth.

ADDITIONAL QUESTIONS (As Per CCE Pattern)

A. Very Short Answer Questions

[1 Mark]

Previous Years' Questions

1. Mention the common mode of reproduction found in (i) *Amoeba* (ii) *Planaria*. [2009]

Ans. *Amoeba* — Binary fission in any plane. *Planaria* — Transverse binary fission.

2. Name any two types of asexual reproduction. [2009]

Ans. (i) Binary fission (ii) Budding

3. State the methods used for growing rose plants. [2009]
Ans. (i) Stem cutting (ii) Bud grafting
4. State what type of method is used for growing jasmine plant. [2009]
Ans. Layering
5. Name the hormone, secretion of which is responsible for dramatic changes in appearance in girls when they approach 10-12 years of age. [2008]
Ans. Estrogen.
6. What is the effect of DNA copying which is not perfectly accurate on the reproduction process? [2008]
Ans. During the process of DNA copying, some mutations are produced which give rise to useful, harmful or neutral variations in the offspring.

Other Important Questions

1. Define reproduction.
Ans. The process of producing new individuals of the same species by existing organisms, *i.e.*, parents, is known as reproduction.
2. Name two organisms that show asexual reproduction.
Ans. *Amoeba* and yeast show asexual reproduction.
3. How does *Hydra* reproduce? Name another organism that reproduces by a similar method.
Ans. *Hydra* reproduces by budding. Another organism that reproduces through budding is yeast.
4. What is a spore?
Ans. Spores are special cells formed within special structures called sporangia, that disseminate and can form an entire plant under favourable conditions.
5. Name two plants which reproduce through spores.
Ans. Mushroom and fern are reproduced by spores.
6. Why is regeneration considered a method of reproduction?
Ans. Regeneration is considered a method of reproduction as sometimes an entire organism developed from its fragmented body.
7. Which vegetative part is used in the propagation of *Bryophyllum* and mint?
Ans. For the propagation of *Bryophyllum*, leaf is used, while for mint the root is used.
8. Name two types of layering.
Ans. The two types of layering are air layering and soil layering.
9. Name some plants where layering is used.
Ans. Layering is used in lemon, guava, *Hibiscus*, bougainvillia, jasmine and several other ornamental plants.
10. Which technique would you use for propagating improved varieties of mango and rose?
Ans. For mango—grafting, a type of artificial vegetative propagation is used.
 For rose—stem cutting, another type of artificial vegetative propagation is used.
11. Name various types of asexual reproduction.
Ans. Fission, budding, fragmentation, spore formation, regeneration, parthenogenesis, tissue culture, etc. are different types of asexual reproduction.

- 12.** Mention the reproductive parts of a flower.
Ans. The reproductive parts of a flower are stamens and carpel.
- 13.** Define fertilisation.
Ans. The process of fusion of two haploid gametes, usually a male and a female gamete leading to the formation of diploid zygote is known as fertilisation.
- 14.** What is self-pollination?
Ans. If the transfer of pollen grain occurs in the same flower, or between two flowers of the same plant it is referred to as self-pollination.
- 15.** What is cross pollination?
Ans. If the pollen is transferred from one flower to another flower of different plant of the same species it is known as cross pollination.
- 16.** What are the agents of pollination?
Ans. The agents of pollination are wind, water and animals especially insects.
- 17.** Which process results in formation of zygote?
Ans. The fusion of germ cells during fertilisation results in formation of zygote.
- 18.** What grows to form a fruit?
Ans. The ovary grows rapidly and ripens to form a fruit.
- 19.** What is carpel?
Ans. Carpel is present at the centre of a flower and is the female reproductive part.
- 20.** Which parts of the flower transform into the seed and fruit?
Ans. The fertilised ovule develops into the seed and the fertilised ovary into the fruit.
- 21.** What are gonads?
Ans. The reproductive organs in animals are called gonads.
- 22.** What is puberty?
Ans. Puberty is the age or period, when the reproductive organs of a child start functioning and the child attains sexual maturity.
- 23.** When is ovum released in human female?
Ans. After attaining sexual maturity, ovum is released from the ovary after every 28 days.
- 24.** What is endometrium?
Ans. Uterus lining is called endometrium.
- 25.** What is implantation?
Ans. The process of fixation of zygote on the wall of the uterus is called implantation.
- 26.** What is parturition?
Ans. The birth of the fully developed foetus is called parturition.
- 27.** What is ovulation?
Ans. The release of ovum from the ovary is called ovulation.
- 28.** Where are the ova produced in woman?
Ans. In ovaries.
- 29.** Name two sex hormones.
Ans. Testosterone and estrogen.

30. What is the normal reproductive life in human female?
Ans. The period between menarche and menopause (12 to 50 years) is the normal reproductive life in human female.
31. What are oral contraceptives?
Ans. The oral contraceptives (OCs) are purely hormonal preparations that inhibit the production of gametes by the action on hypothalamus, pituitary and the ovaries.
32. What is epididymis?
Ans. This is a coiled tube like structure which is firmly attached to the testis.
33. What are the functions of urethra?
Ans. Urethra performs two functions :
 (i) It acts as a passage for urine.
 (ii) It acts as the passage for sperms.
34. What are the secondary sex characters in human male?
Ans. Secondary sex characters in human males are deepening of voice, growth of beard, moustache and pubic hair.
35. Why do testes lie outside the abdominal cavity?
Ans. Testes are present inside a fibrous covering called scrotum or scrotal sac. The scrotum helps in maintaining 1–3°C lower than the body temperature. This is necessary for the development of sperms.
36. When does puberty occur in human male and female?
Ans. In males, puberty is attained at the age of 13-14 years, while in females, it is 10-12 years.

B. Short Answer Questions - I

[2 Marks]

Previous Years' Questions

1. What will happen when :
 (a) A mature *Spirogyra* filament attains considerable length?
 (b) *Planaria* gets cut into two pieces? [2011 (T-II)]
- Ans.** (a) When a mature *Spirogyra* filament attains considerable length it breaks up into smaller pieces (fragments). These fragments grow into new individuals.
 (b) If *Planaria* gets cut into two pieces, both pieces grow into separate individuals.
2. (a) Give reason : Regeneration is not the same as Reproduction.
 (b) State the mode of asexual reproduction in *Plasmodium* [2011 (T-II)]
- Ans.** (a) Regeneration is not the same as reproduction because most organisms would not normally depend on being cut up to be able to reproduce.
 (b) *Plasmodium* reproduce through multiple fission.
3. Name the type of asexual reproduction in :
 (a) *Planaria* (b) *Rhizopus* (iii) *Spirogyra* (iv) *Hydra* [2011 (T-II)]
- Ans.** (a) *Planaria* – Regeneration.
 (b) *Rhizopus* – Spore formation.
 (c) *Spirogyra* – Fragmentation
 (d) *Hydra* – Budding

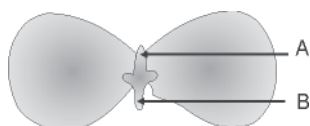
4. (a) Surgical methods can be used to create a block in the reproductive system for contraceptive purposes. Name such parts where blocks are created in :
 (i) males (ii) females
 (b) State any two reasons for using contraceptive devices. [2011 (T-II)]
- Ans.** (a) (i) In males, the vas deferens is blocked.
 (ii) In females, the fallopian tube is blocked.
 (b) Reasons for using contraceptive devices :
 (i) They prevent pregnancies.
 (ii) They help to prevent transmission of many of these infections to some extent.
5. (a) What is vegetative propagation?
 (b) Write any two advantages of practising this method. [2011 (T-II)]
- Ans.** (a) The formation of a new individual from any vegetative part of the plant body is known as vegetative propagation.
 (b) Advantages of practising vegetative reproduction.
 (i) It allows quicker and easy propagation.
 (ii) Better qualities of the plants can be maintained and the quality can even be enhanced as in seedless oranges.
6. How does the process of budding differ from the process of spore formation? [2011 (T-II)]
- Ans.** In budding a protuberance develops on the mature organism's body, attains full maturity and then detaches. While in spore formation, spores are formed within special structures called sporangia that disseminate and can form the entire plant.
7. (a) Out of the following plants which two plants are reproduced by vegetative propagation?
 jasmine, wheat, mustard, banana
 (b) List any one advantage of practising this kind of propagation. [2011 (T-II)]
- Ans.** (a) Jasmine and banana.
 (b) It allows quicker and easy propagation.
8. (a) Why do testes located in scrotum outside the abdominal cavity?
 (b) What will happen to ovary and ovule after fertilization in angiospermic plants. [2011 (T-II)]
- Ans.** (a) Testes located in scrotum outside the abdominal cavity since the production of spermatozoa is feasible at a temperature of 2°C lower than the body temperature.
 (b) After fertilization, the ovary enlarges considerably and becomes the fruit and the ovule develops a tough coat and is gradually converted into seed.
9. The organisms formed by asexual reproduction are considered as clones. Why? State the advantage of sexual reproduction over asexual reproduction. [2011 (T-II)]
- Ans.** In asexual reproduction, the young ones formed are genetically identical to the parents and are considered as clones.
 Sexual reproduction has following advantages :
 (i) The offsprings produced by sexual reproduction exhibit diversity of characters because fusing gametes come from two different and sexually distinct individuals.

- (ii) Sexual reproduction involves meiosis which provides opportunities for new combination of genes.
- (iii) It plays a prominent role in the origin of new species and lead to variation required for evolution.

10. In a bisexual flower inspite of the young stamens being removed artificially, the flower produces fruit. Give reasons.

(a) Name the parts of the flower which ripens to form fruit and seed?

(b) In the following diagram label A and B.



[2011 (T-II)]

Ans. A bisexual flower also contains ovary. The ovary enlarges considerable and becomes the fruit.

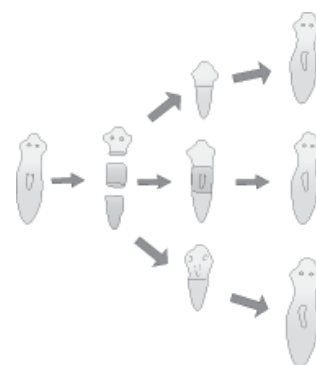
(a) Ovary ripens to form fruit and ovule develops into seed.

(b) A = Plumule

B = Radicle

11. With the help of a diagram only show regeneration in *Planaria*. Regeneration is not possible in all types of animals. Why?

[2011 (T-II)]



Ans. Regeneration is not possible in all types of animals because all organisms will not depend upon being cut or broken for its reproduction.

12. How does the process of seed germination take place in plants? Describe in brief.

[2011 (T-II)]

Ans. Germination starts with the rapid uptake of water by the seed through its micropyle. The first visible indication of germination is the swelling of the seed with a resultant increase in weight. It is also accompanied by the softening of the seed coat. Absorption of water causes a number of physiological changes in the seed. Germinating seeds exhibit increased respiratory activity. The embryo produces enzymes which convert the food material stored in the cotyledons or endosperm into soluble form usable by the growing embryo. Once the food is made available, cell division activity starts in the growing embryo, i.e., radical and plumule. The growth of the embryonic tissue ruptures the seed coat. The radicle is the first to come out of the seed coat and forms the root system. It soon grows towards the soil. The plumule after coming out of the ruptured seed forms the shoot.

13. Name the sex hormones secreted by male and female sex organs in human beings. State one function of each.

[2011 (T-II)]

Ans. Testosterone is produced by the testical (male sex organs) and estrogen and progesterone are produced by ovary (female sex organ).

Function of testosterone

- It brings about changes in appearance seen in boys at the time of puberty.

Function of estrogen

- It helps in the development of secondary sex characters like breast development.

14. State the mode of reproduction in following organisms :

Earthworm, Frog, *Rhizopus*, *Plasmodium*.

[2011 (T-II)]

Ans. Earthworm – Sexual reproduction

Frog – Sexual reproduction

Rhizopus – Spore formation

Plasmodium – Multiple fission

15. State in brief any two functions of copper-T used by some women.

[2011 (T-II)]

Ans. (a) It prevents pregnancy.

(b) It kills the germs.

16. In what respect is the human male gamete different from the female gamete? [2011 (T-II)]

Ans. Male gametes (sperms) are mobile and smaller in size while female gamete (ovum) is immobile and bigger in size.

17. What is reproduction? What are its two types? Which one of the two confers new characteristics on the offsprings and how? [2009]

Ans. Reproduction is the process of formation of new young individuals of the similar type of mature living being.

Reproduction is of two types :

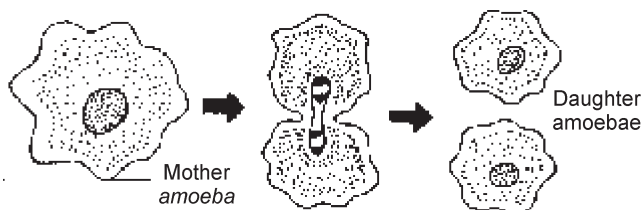
(i) Asexual reproduction

(ii) Sexual reproduction

Only sexual reproduction confers new characteristics on the offspring because the process of DNA replication occurs in sexual reproduction. Mutations occur during DNA replication which give rise to variation, thus confers new characteristics on the offspring.

18. What is binary fission? Draw a diagram to show binary fission in *Amoeba*. [2009]

Ans. Binary fission is a mode of asexual reproduction in many bacteria and protozoans. In it organism simply splits into two equal halves during cell division.



19. What is regeneration? State a reason why a more complex organism cannot give rise to new individuals through this method. [2009]

Ans. Many organisms like *Hydra*, *Planaria*, etc. have the ability to give rise to new organisms from their body parts. This process is called regeneration.

Regeneration does not occur in complex organisms. The ability to degenerate in fully

differentiated organism is due to specialised cells. In complex organisms, these specialised cells can form lost tissues and organs but not the complete individual as the highly differentiated tissues and organs do not allow this. In complex organisms, regeneration is under neurohormonal control. Fragments do not have nervous or hormonal stimulus to grow into complete organisms.

- 20.** Name the male and female gametes in animals. What is fertilisation and where does it take place in human females? **[2009]**

Ans. Male gamete — Sperm

Female gamete — Ovum

Fertilisation is the fusion of male and female gametes to form diploid zygote during sexual reproduction.

In human females fertilisation occurs in fallopian tubes.

- 21.** What is 'reproduction'? Mention the importance of DNA copying in reproduction. **[2008]**

Ans. Reproduction is a process by which the living organisms produce the new organisms of their own kinds.

The process of copying the DNA may have some variations. These variations are the basis for evolution.

- 22.** Mention the information source of making proteins in the cell. What is the basic event in reproduction? **[2008]**

Ans. Ribosome is the information source of making protein in the cell.

The basic event in reproduction is the creation of a DNA copy.

- 23.** Name one sexually transmitted disease each caused due to bacterial infection and viral infection. How can these be prevented? **[2008]**

Ans. Sexually transmitted diseases :

(a) Bacterial disease – Gonorrhoea (b) Viral disease – HIV-AIDS

These diseases can be prevented by using a covering by the males called condom.

- 24.** Describe briefly four ways in which individuals with a particular trait may increase in a population. **[2008]**

Ans. The individuals with a particular trait may increase in a population by :

- (A) Simply break up into smaller pieces and grow into new individuals, i.e., fragmentation.
- (B) Developing a bud which becomes new individual, i.e., budding.
- (C) Giving rise to new individuals from their body parts, i.e., regeneration.
- (D) Using some plant parts (stem, root, leaf, etc.) to develop new individuals, i.e., vegetative propagation.

Other Important Questions

- 1.** Suggest two advantages of asexual reproduction. **(Imp.)**

Ans. Two advantages of asexual reproduction are :

- (i) It is simple and fast.
- (ii) It is useful in cases where organisms produce sterile gametes.

2. Write one disadvantage of asexual reproduction.
- Ans.** Asexual reproduction produces identical organisms generation after generation. New organisms, therefore, carry the defects of their parents.
3. When and how does multiple fission take place? **(Imp.)**
- Ans.** Under unfavourable conditions, multiple fission which results in the formation of many new organisms from a single parent takes place. Multiple fission occurs by the formation of a cyst. Nucleus divides followed by the distribution of cytoplasm around the daughter nuclei. On the return of favourable conditions, daughter cells are released by breaking the cell wall.
4. What is fragmentation?
- Ans.** In some filamentous organisms such as the green alga *Spirogyra*, the filament breaks up into two or more fragments. Each fragment or piece grows into a new individual.
5. Write in brief about regeneration in simple animals.
- Ans.** Simple animals have more power of regeneration. For example, the starfish is a simple animal. It usually has five arms. If one arm is cut off along with parts of the centre, a whole new animal will grow from that arm.
6. Some crop plants can be grown from the seeds as well as vegetatively from stem cutting. List any four advantages of vegetative propagation in such cases. **(V. Imp.)**
- Ans.**
 - (i) The plants that cannot produce viable seeds, can be easily grown by vegetative propagation.
 - (ii) The plants grown from the seeds may show variations.
 - (iii) Easier, less expensive and a rapid method of propagation.
 - (iv) Superior quality of fruits or flowers can be produced.
7. Leaves of *Bryophyllum* fallen on the ground produce new plants whereas the leaves of Jasmine do not, why? **(V. Imp.)**
- Ans.** In *Bryophyllum*, vegetative propagation occurs through leaves. Buds occur in notches of *Bryophyllum* leaf. However, when the leaf falls down and comes in contact with the soil, the buds sprout and produce plantlets. Leaves of rose do not contain buds and cannot give rise to plantlets.
8. What is clone? Why do offspring formed by asexual reproduction exhibit remarkable similarity? **(Imp.)**
- Ans.** Clone is an exact genetic replica of another individual. In asexual reproduction, offspring are produced by a single parent without fertilisation or fusion of gametes. In asexual reproduction, the younger ones are genetically identical to the parents and another young ones as they possess exact copies of DNA. Hence, offspring formed by asexual reproduction exhibit remarkable similarity.
9. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread? **(Imp.)**
- Ans.** Bread mould requires nutrient and moisture for growth. A dry slice of bread has nutrients but it does not have water. A moist bread slice contains both nutrients and water hence bread mould grows on it.
10. Mention the reproductive parts of a flower.
- Ans.** In a flower, stamens and carpels constitute the reproductive parts.

Stamen — It consists of a stalk called filament and a flattened top called anther.

Carpel — It consists of swollen ovary at the base, an elongated middle style and terminal stigma.

11. What is anther?

Ans. An anther is a swollen structure present on the tip of the filament. The anther produces powdery particles called the **pollen grains**. Pollen grains contain the male gamete.

12. What are the advantages of tissue culture?

Ans. (i) Rapid multiplication of plants. (ii) Production of disease free plants.
(iii) Plants can be grown even from sterile hybrids. (iv) Continuous propagation.

13. In tobacco plant, the male gametes have twenty-four chromosomes.

(i) What is the number of chromosomes in the female gamete?

(ii) What is the number of chromosomes in the zygote? **(Imp.)**

Ans. (i) 24 chromosomes (ii) 48 chromosomes.

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

Ans. Pollination is essential for transfer of pollen grain to stigma. In the absence of pollination, there will be no male gamete (pollen grain) for fertilisation. Hence, fertilisation cannot take place in flowers if pollination does not occur.

15. Define sexual reproduction.

Ans. It is a method of reproduction in which an offspring arises from two individuals of different sexes. One individual is of male sex and the other of female sex.

16. Mention any two functions of human ovary.

Ans. Functions of human ovary :

(i) It produces female gamete (called ovum).

(ii) It secretes female sex hormones (estrogen and progesterone).

17. Mention secondary sexual characters in human male and female.

Ans. Secondary sexual characters in Male—Facial, axial and pubic hair, pitch of voice. In female — Pubic hair, pitch of voice and development of mammary glands.

18. What is the role of placenta?

Ans. Developing embryo is attached to the mother's uterus through placenta. The nutritional, respiratory and excretory needs of developing foetus are met by the placenta.

19. Describe the surgical method of birth control.

Ans. The surgical method involves the cutting and tying up a small portion of vas deferens in male and of the fallopian tube in female.

20. Define sexually transmitted disease and give two examples.

Ans. Sexually transmitted diseases are the diseases spread from an infected to a healthy person through sexual contact, e.g., gonorrhoea, syphilis, AIDS and trichomoniasis.

21. Why is it said that “sexual reproduction promotes diversity of characters in the offspring”?

Ans. It is 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.

C. Short Answer Questions - II**[3 Marks]****Previous Years' Questions**

1. State in brief the function of the following organs in the human female reproductive system.

- (a) Ovary (b) Fallopian tube (c) Uterus **[2011 (T-II)]**

Ans. (a) **Ovary** — Ovary produces ova or eggs. Ovary also secretes a hormone estrogen which helps in the development of secondary sexual characters like breast development.

(b) **Fallopian tube** — Fallopian tube conveys the egg from the ovary to the uterus and provides the appropriate environment for its fertilisation.

(c) **Uterus** — After fertilisation, the embryo develops in uterus.

2. (a) Identify the asexual method of reproduction in each of the following organisms :

- (i) rose (ii) yeast (iii) *planaria*

(b) What is fragmentation? Name a multicellular organism which reproduces by this method.

[2011 (T-II)]

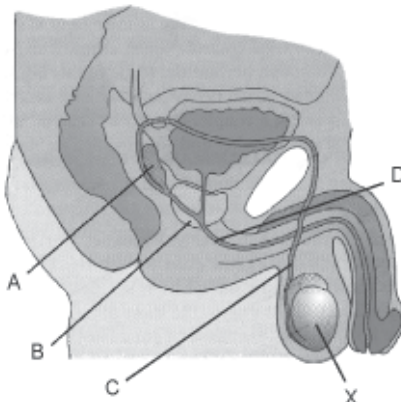
Ans. (a) (i) Rose — Propagates through stem

(ii) Yeast — Budding

(iii) *Planaria* — Regeneration

(b) **Fragmentation** — Some multicellular organisms with relatively simple body organisation reproduce by breaking their bodies into small pieces. Each of these pieces is called a fragment. These fragments grow into new individuals and the mode of reproduction is called fragmentation. *Spirogyra* reproduces by fragmentation.

3. In the diagram of human male reproductive system given below :



(a) Label parts A and B.

(b) Name the hormone produced by organ 'X'. What is the role of this hormone in the human male?

(c) Mention the name of substances that are transported by tubes.

- (i) C (ii) D

[2011 (T-II)]

Ans. (a) A — Seminal vesicle

B — Prostate gland

- (b) X (Testes) secrete hormone testosterone which brings about changes in appearance seen in boys at the time of puberty.
- (c) (i) Sperms are transported by tube C vas deferens.
(ii) Tube D (urethra) transports the urine.

4. Differentiate between :

- (a) Asexual and sexual reproduction.
(b) Plumule and Radicle
(c) Pollination and Fertilisation

[2011 (T-II)]

Ans. (a)	Asexual Reproduction	Sexual Reproduction
	(i) New individual is produced from a single parent. (ii) It involves the union of gametes. (iii) The young ones are genetically identical to the parents.	(i) New individual is produced from two parents. (ii) It does not involve the union of gametes. (iii) The young ones are not genetically identical to the parents.
	Plumule	Radicle
(b)	(i) Plumule is future shoot. (ii) It grow towards the sun.	(i) Radicle is future root. (ii) It grows inside the soil or water
(c)	Pollination	Fertilisation
	(i) It is the transfer of pollen grains from anther to the stigma of a flower. (ii) It is a physical process. (iii) It occurs only in seed plants. (iv) It carries the male gamete to the female sex organs. (v) It precedes fertilisation.	(i) It is the fusion of male and female gametes. (ii) It is a physio-chemical (biological) process. (iii) It occurs in plants and animals of various types. (iv) It actually brings about fusion of gametes. (v) Fertilisation occurs only after pollination when the pollen grain has germinated and sent the male gametes to the ovule.

5. (a) Why is vegetative propagation practised for growing some types of plants?
(b) Name the different parts of a flower that has germ cells.
(c) List any two agents of pollination.

[2011 (T-II)]

Ans. (a) Some plants like banana, seedless grapes, rose, which cannot produce viable seeds, can be easily grown by vegetative propagation. To get genetically identical copies and to maintain and preserve a stock of selected varieties, vegetative propagation is the only means. It is an easier less expensive and rapid method of propagation.

(b) Style and ovule both have germ cells.

(c) Wind and water.

6. (a) What is the difference between self pollination and cross pollination?

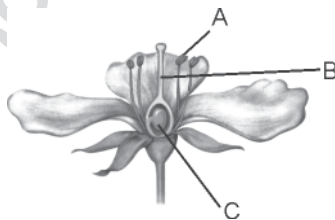
(b) What happens to the pollen which falls on a suitable stigma? Explain. [2011 (T-II)]

Ans. (a)	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 are neither attractive, nor do they produce nectar.	(ii) Flowers attract insects by various means like coloured petals, nectar, etc.
	(iii) Pollen grains are produced in small number.	(iii) Pollen grains are produced in large numbers.
	(iv) No wastage of pollen grains occurs, thus economical.	(iv) Wastage of pollen grains occurs, hence uneconomical.

(b) After the pollen grains are deposited on the suitable stigma, the pollen grains absorb water and sugar from the surface of stigma and swell up. A tube grows out of the pollen grain and travel through the style to reach the ovary. The pollen tube carrying two male gametes which liberated inside the embryo sac. One male gamete fuses with the egg to form **zygote**. The other male gamete fuses with the secondary nucleus to form the **endosperm**, which provides nourishment to the growing embryo.

7. Name the parts A, B and C shown in the given diagram and state one function of each part.

[2011 (T-II)]



Ans. A = anther

Each anther contains two pollen sacs. Many pollen grains are present in each pollen sac. In the pollen grains, male gametes develop.

B = filament

Filament holds anther

C = ovule

Each ovule contains an egg cell. Fertilisation takes place inside it.

8. (a) How do the oral pills function as contraceptives?

(b) The use of these pills may be harmful. Why?

[2011 (T-II)]

Ans. (a) Oral pills acts by changing the hormonal balance of the body so that eggs are not released and fertilisation cannot occur.

(b) Since oral pills change hormonal balances, they can cause side effect too.

9. List and describe in brief any three ways devised to avoid pregnancy. [2011 (T-II)]

- Ans. • Foam tablets, jellies, creams and spermicides are common chemicals used by females. These are placed in vagina.
- Ovulation and fertilisation can be prevented by changing hormonal balance of the body. It can be done by taking oral pills.
 - Intrauterine Contraceptive Device (IUCD) such as the loop or the copper-T are placed in the uterus to prevent pregnancy. The drawbacks with these devices are bleeding and discomfort.

10. Draw a diagram of female reproductive organs and label the following parts :

(a) Production of egg

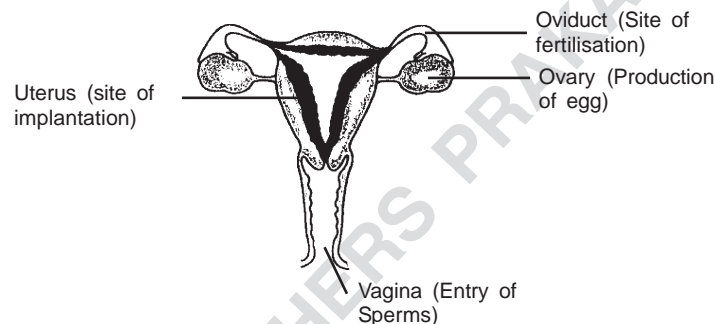
(b) Site of fertilisation

(c) Site of implantation

(d) Entry of the sperms

[2011 (T-II)]

Ans.



11. What are sexually transmitted diseases? Name four such diseases. Which one of them damages the immune system of human body? [2009]

Ans. The diseases which are spread by sexual contact from an infected person to a healthy person, are called sexually transmitted diseases or STDs.

(i) AIDS (Acquired Immuno Deficiency Syndrome)

(ii) Gonorrhoea (iii) Syphilis (iv) Genital herpes

'AIDS' — damages the immune system of human body.

12. (a) Explain the terms :

(i) implantation (ii) placenta

(b) What is the average duration of human pregnancy?

[2009]

Ans. (a) (i) **Implantation** : The embedding of a fertilised mammalian egg into the wall of the uterus (womb) where it will continue developing, is called implantation.

(ii) **Placenta** : After implantation, a disc like special tissue develops between uterus wall and the embryo called placenta. The placenta is responsible for exchange of nutrients, oxygen and waste products between the embryo and mother.

(b) The average duration of human pregnancy is 280 days or 40 weeks.

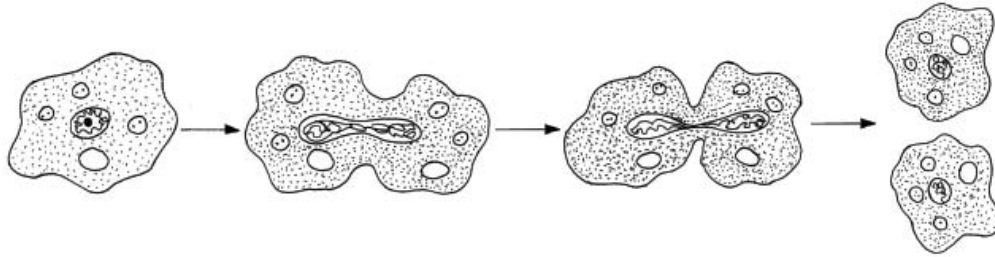
13. Illustrate the following with the help of suitable diagrams :

(i) Binary fission in *Amoeba*.

(ii) Leaf of *Bryophyllum* with buds.

[2008]

Ans. (i)



(ii)



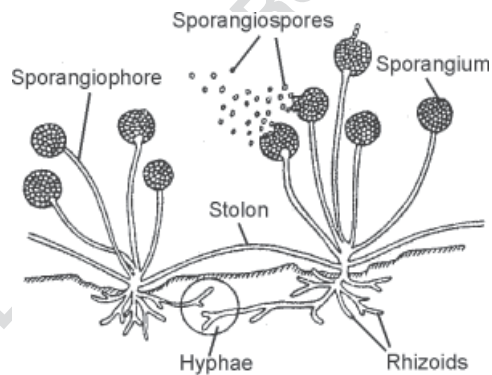
14. Illustrate the following with the help of suitable diagrams :

(i) Spore fermentation in *Rhizopus*.

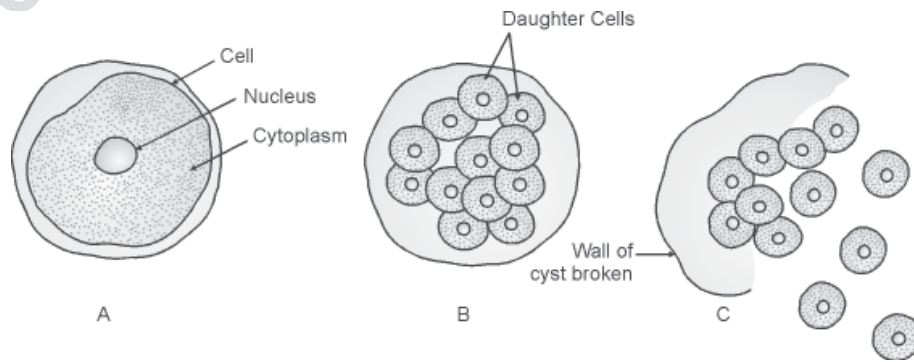
(ii) Multiple fission in *Plasmodium*.

[2008]

Ans. (i)



(ii)



Other Important Questions

1. Discuss briefly the different types of reproduction.

Ans. There are mainly two types of reproduction :

(a) **Asexual reproduction** : In this type, the offspring arise from a single individual parent as a result of repeated mitotic division. It occurs in various ways — fission, budding, spore formation, regeneration, etc.

(b) **Sexual reproduction** : It involves two individuals of different sex — a male and a female.

2. Enumerate the process of binary fission in four steps only.

(Imp.)

Ans. The binary fission involves four steps —

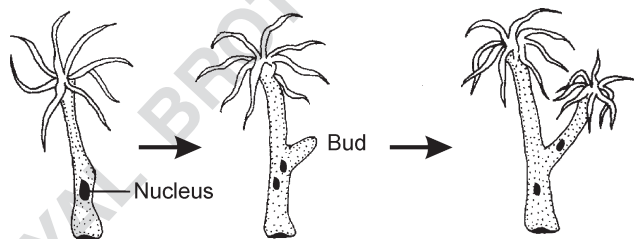
- (i) First the nuclear division takes place.
- (ii) Then a constriction appears in the cell membrane.
- (iii) The constriction gradually increases and the cytoplasm divides.
- (iv) Finally, the two daughter cells are formed.

3. Which type of fission is shown by *Plasmodium*? Describe the same in about 40 words.

Ans. *Plasmodium* shows multiple fission. In multiple fission, the nucleus divides several times into many daughter nuclei. The daughter nuclei arrange along the periphery of the parent cell and a bit of cytoplasm around each daughter nucleus develops an outer membrane. Finally, the multinucleate body divides into as many parts as the number of daughter nuclei forming daughter individuals.

4. Only through labelled diagrammatic representations, represent the process of budding as seen in *Hydra*.

Ans.



5. What is vegetative propagation? Classify giving suitable examples.

(V.Imp.)

Ans. Vegetative propagation is a method of reproduction in which a vegetative part of the plant produces a new plant.

Example : Bryophyllum—Propagates through leaf,

Mint — Propagates through Root,

Rose — Propagates through stem.

The commonly used methods are :

- (1) Cutting → e.g. Rose or China Rose
- (2) Layering → e.g. Jasmine
- (3) Grafting → e.g. Mango

6. Define grafting. Suggest any two advantages and disadvantages of grafting. (V.Imp.)

Ans. Grafting is a process in which the two parts of different plants are joined by bandaging them tightly.

Advantages :

- (i) A young scion can be made to flower when it is grafted on a mature tree.
- (ii) Different varieties can be grafted on the same stock.

Disadvantages :

- (i) Sexual reproduction is a necessity for evolution.
- (ii) Plants produce very few seeds.

7. What do you know about cross pollination?

Ans. The transference of pollen grains from the anther of a flower of one plant to the stigma of a flower of another plant of the same species is called **cross pollination**. Cross pollination occurs both in unisexual and bisexual flowers resulting in intermixing of genetic characters of the two parental plants. It brings about variations in offspring.

8. What do you know about the process of fertilisation?

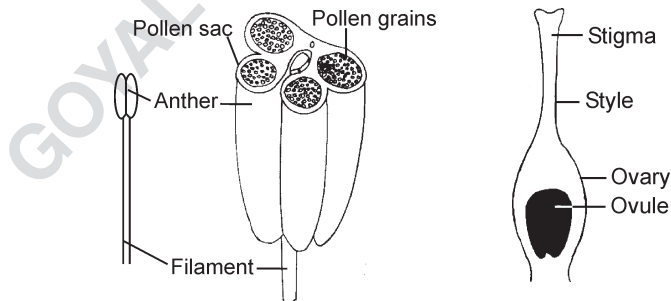
Ans. Fertilisation : After the pollen grains are deposited on the stigma, the pollen grains absorb water and sugar from the surface of stigma and swell up. The pollen grain produces a fine tube called **pollen tube**. Eventually it travels down the whole length of the style into the ovary.

The pollen tube carrying the two male gametes enters the ovule and embryo sac through the micropyle and its tip dissolves. The two male gametes are liberated inside the embryo sac. One male gamete fuses with the egg to form zygote which grows into an embryo and finally into a new plant. The other male gamete fuses with the secondary nucleus (two polar nuclei) to form the **endosperm**, which provides nourishment to the growing embryo.

The fusion of the male gamete with the female gamete is called **syngamy**.

9. Draw a labelled picture of an anther and a carpel of a flower. (Imp.)

Ans.



10. What do you know about the post fertilisation stages in plants? (Imp.)

Ans. Post-fertilisation changes

- (i) After fertilisation the sepals, petals, stamens, style and stigma wither away and usually fall off. In some cases, the sepals may persist in a shrivelled form as in tomato and peas, or become fleshy as in brinjal. The ovary enlarges considerably.

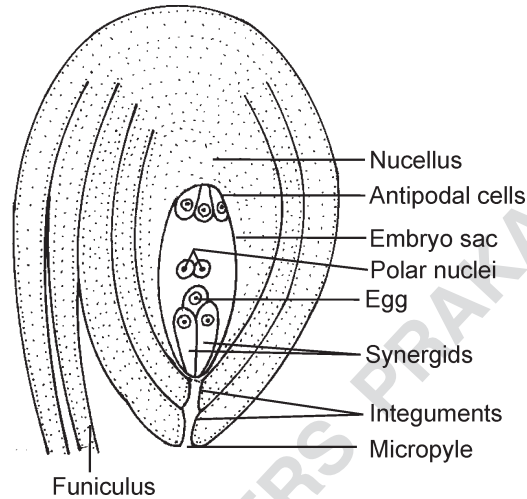
- (ii) Inside the ovule, the zygote undergoes cell division to form the **embryo** and ovule develops into **seed**.

Embryo is the future plant. During seed germination under appropriate conditions, the embryo develops into a seedling and finally the complete plant.

- (iii) The ovary wall develops into the fruit wall and the whole ovary after fertilisation is called the **fruit**.

11. Draw the structure of an ovule.

Ans.



12. Describe menstrual cycle.

Ans. At the time of ovulation, a cycle of events takes place in the uterus and vagina.

- In case, fertilisation occurs, the inner wall of uterus thickens to receive the developing zygote.
- In case, fertilisation does not take place, the thickened wall along with the blood vessels breaks down and moves out of the vagina in the form of discharge called menstrual flow which lasts for 4-5 days.

The cycle of events taking place in the ovaries and uterus every twenty-eight days and marked by menstrual flow, is menstrual cycle.

13. What are the functions of ovary and testes?

(Imp.)

Ans. Ovaries in females and testes in males represent the main reproductive organs. These organs perform two basic functions —

- To produce female gametes (ova) and male gametes (sperms) respectively and
- To secrete sex hormones — testosterone (male hormone from testis) and estrogen (female hormone from ovary).

14. What is the structure of an embryo sac?

Ans. Embryo sac is present within the ovule. The embryo sac contains an egg or female gamete towards the micropyle and two polar nuclei in the centre. The embryo sac, in addition to an egg and a secondary nucleus, also contains two synergids and three antipodal cells. The embryo sac is surrounded by a nutritive tissue called the nucellus.

15. What are the factors responsible for the sharp increase in population? (V.Imp.)

Ans. Human population is increasing everyday and the increase is to the extent that the population doubles in about 35 years. It is estimated that the world human population would be 50 billion in 2100 A.D. Factors responsible for population explosions are ∴

- (i) Sufficient availability of food.
- (ii) Better nutrition.
- (iii) Better health care.
- (iv) Reduction in mortality rate due to better medical facilities and health care.
- (v) More children reaching the reproductive age.

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

Ans. The ratio of chromosome number between an egg and its zygote is 1 : 2

Sperm and egg are genetically different because sperms are genetically of two types, sperm with x-chromosome and sperm with y-chromosome. But eggs are always of one type i.e. x-chromosome.

17. Name any two mechanical barriers of pregnancy. What are the benefits of using mechanical barriers during sexual act? (Imp.)

Ans. **Mechanical barriers of pregnancy :**

- (i) Condoms
- (ii) Diaphragms

Benefits of using mechanical barriers

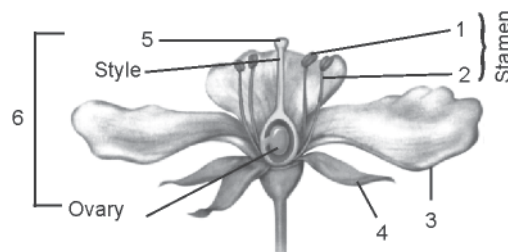
- (i) **Prevention of pregnancy** — Mechanical barriers prevent the passage of sperms into the genital tract of the female. Consequently, pregnancy does not occur.
- (ii) **No transmission of infections** — Mechanical barriers also prevent the transmission of Sexually Transmitted Diseases (STDs) from infected partner to the non-infected partner.

D. Long Answer Questions

[5 Marks]

Previous Years' Questions

1. (a) In the given figure name the parts marked 1 to 6 :



(b) Differentiate between self pollination and cross pollination.

[2011 (T-II)]

Ans. (a) 1. Anther 2. Filament 3. Petal
 4. Sepal 5. Stigma 6. Carpel

(b) 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 are neither attractive, nor do they produce nectar.	(ii) Flowers attract insects by various means like coloured petals, nectar, etc.
(iii) Pollen grains are produced in small number.	(iii) Pollen grains are produced in large numbers.
(iv) No wastage of pollen grains occurs, thus economical.	(iv) Wastage of pollen grains occurs, hence uneconomical.

2. (a) Differentiate between pollen grain and ovule.
 (b) State in brief functions of the following parts of the human female reproductive system.
 (i) Ovary (ii) Fallopian Tube (iii) Uterus [2011 (T-II)]

Ans. (a) Pollen grain	Ovule
(i) It is male reproductive structure.	(i) It is female reproductive structure.
(ii) Pollen grain is a structure contained in the pollen sac.	(ii) Ovule is a structure contained in the ovary.
(iii) Inside the pollen grain the male gamete is present.	(iii) Inside the ovule, embryo sac containing the female gamete (or egg) is present.

- (b) (i) **Ovary** — Ovary produces ova or eggs. Ovary also secretes a hormone estrogen which helps in the development of secondary sexual characters like breast development.
 (ii) **Fallopian tube** — Fallopian tube conveys the egg from the ovary to the uterus and provides the appropriate environment for its fertilisation.
 (iii) **Uterus** — After fertilisation, the embryo develops in uterus.

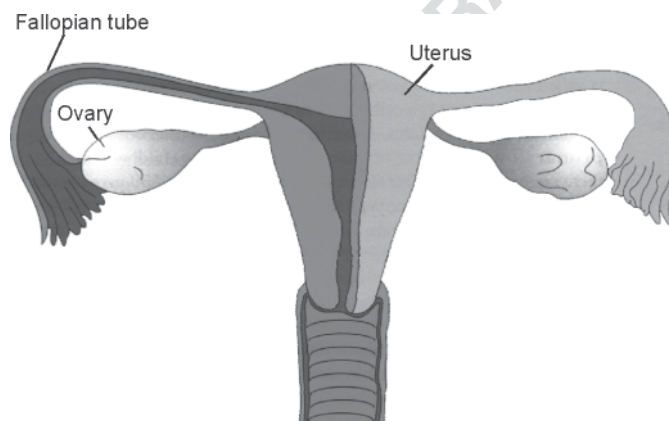
3. (a) Differentiate between germination and fertilisation.
 (b) State in brief the functions of the following parts of the human male reproductive system :
 (i) Scrotum (ii) Testes (iii) Vas deferens [2011 (T-II)]

Ans. (a) Fertilisation	Germination
(i) It is the fusion of male and female gametes.	(i) In it the food reserves present in a seed are broken down and the embryo starts to grow.
(ii) It occurs in plants and animals of various types.	(ii) It occurs only in seed plants.
(iii) It actually brings about fusion of gametes.	(iii) During it, seeds convert into seedling.
(iv) Fertilisation occurs only after pollination when the pollen grain has germinated and sent the male gametes to the ovule.	(iv) It begins when a seed starts to absorb water.

- (b) (i) **Scrotum** : It contains and supports the testes. It is situated outside the body cavity and allows sperm to develop at the optimum temperature, which is slightly lower than body temperature.

- (ii) **Testes** : The formation of male germ cells or sperms take place in it. Leydig cells of testes secrete hormone testosterone which brings about changes in appearance seen in boys at the time of puberty.
- (iii) **Vas deferens** : It ascends into the abdomen, passes over the urinary bladder and receives duct from the seminal vesicles behind the urinary bladder to form the ejaculatory duct.
4. (a) Draw a neat diagram of the reproductive system of a human female and label on it the following :
- reproductive part that produces the female hormone
 - site of fertilisation
 - organ where growth and development of the embryo takes place.
- (b) How does the growing embryo meet with its nutritional requirements?
- (c) What happens if the ovum is not fertilized?
- (d) Mention a contraceptive method that can be used by the human female. [2011 (T-II)]

Ans. (a) (i) Ovary (ii) Fallopian tube (iii) Uterus



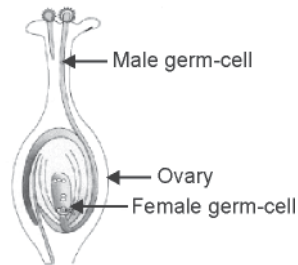
- (b) The embryo gets nutrition, oxygen, water, etc. from the mother's blood with the help of placenta, through a cord called umbilical cord. In placenta, villi grow into the surrounding uterine tissue from which embryo absorb nutrients. Villi provides a large surface area for exchange of materials between embryo and mother.
- (c) The lining of the uterus becomes thick and spongy so as to receive the fertilised egg in the normal situation. If fertilisation does not take place the unfertilised egg lasts for about one day. As the uterine lining breaks the blood vessels also rupture. So the blood alongwith the mucous comes out through the vagina. This period of discharge of blood is called **menstruation**. This happens roughly every month and lasts for about 3-5 days.
- (d) Human female can take oral contraceptive pills to avoid pregnancy.
5. (a) Name the female reproductive part of a flower. Draw diagram of its longitudinal section depicting the process of fertilization of pollen on stigma and label on it the following :
- male germ cell
 - female germ cell
 - ovary

(b) What happens to the following parts after fertilization?

- (i) ovary (ii) ovule (iii) sepals and petals

[2011 (T-II)]

Ans. (a) Carpel is the female reproductive part of a flower.



(b) After fertilization, the ovule develops a tough coat and is gradually converted into seed. The ovary enlarges considerably and becomes the fruit. The sepals and petals wither away and usually fall off. In some cases, the sepals may persist in the shrivelled form as in tomato, peas, etc. or become fleshy as in brinjal.

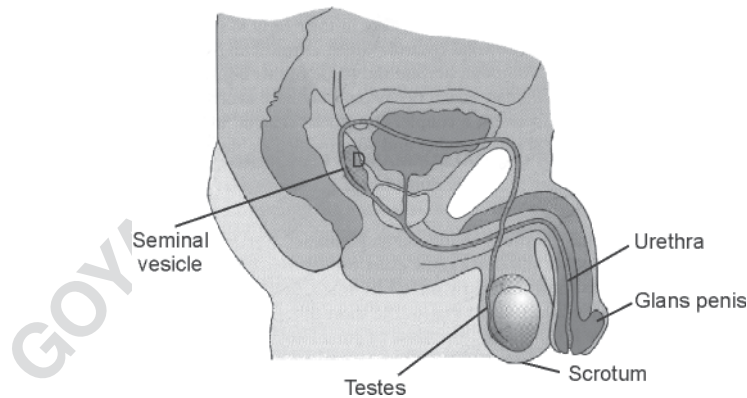
6. Draw a neat diagram of the human male reproductive system and label the parts performing the following functions :

- (a) Production of sperms (b) Gland which provides fluid
(c) Provides low temperature for the formation of sperms
(d) Common passage for sperms and urine.

Name a sexually transmitted disease and a method to avoid it.

[2011 (T-II)]

Ans. (a) Testes (b) Seminal vesicle (c) Scrotum (d) Urethra



AIDS (Acquired Immuno Deficiency Syndrome) is a sexually transmitted disease. Using of condom helps in preventing the transmission of these diseases (STDs)

7. (a) State any two changes seen in boys at the time of puberty?

(b) Define fertilization and implantation.

(c) State the role of ovary and fallopian tube in human body.

[2011 (T-II)]

Ans. (a) Changes seen in boys at the time of puberty :

- (i) There is slow-growth of thick hairs on face (moustaches, beard)
(ii) Their voice begin to crack and their shoulders become broad.

- (b) (i) **Fertilisation** — The fusion of sperm nucleus with the egg nucleus to form a diploid zygote is called fertilisation.
- (ii) **Implantation** — After fertilisation, the embryonic development begins in the fallopian tube. Now zygote moves from the fallopian tube down towards the uterus and implanted in the lining of the uterus. This process is called implantation.
- (c) Ovary produces ova (female gamete) and also produce a hormone estrogen.
Fallopian tube conveys the egg from the ovary to the uterus and also provides the appropriate environment for its fertilisation.

8. (a) Which device prevents implantation by irritating the lining of uterus?
(b) What could be the possible reason for declining female to male sex ratio in our country. Suggest two measures to achieve 1:1 ratio.
(c) Name those parts of a flower which serve the same function as the following do in animals.
(i) Testis (ii) Ovary (iii) Eggs (iv) Sperms [2011 (T-II)]

- Ans.** (a) Copper-T prevents implantation by irritating the lining of uterus.
(b) Because of reckless female foeticides, child sex ratio is declining at an alarming rate in our country.

Measures to achieve 1:1 ratio

- (i) Prenatal sex determination has been prohibited by law. It should be followed strictly.
(ii) Peoples should be literate to understand the importance of girl child.
- (c)
- | In animals | | In flowers |
|-------------|---|---------------|
| (i) Testes | — | Anther |
| (ii) Ovary | — | Ovary |
| (iii) Eggs | — | Ovule |
| (iv) Sperms | — | Pollen grains |

9. (a) Why do multicellular organisms, need to use more complex ways of reproduction?
(b) What is the advantage of reproducing through spores?
(c) How does variation lead to the survival of species overtime?
(d) Is fertilization possible without pollination?
(e) Mention any one difference between self and cross pollination. [2011 (T-II)]

- Ans.** (a) All multicellular organisms cannot simply divide cell-by-cell. The reason is that many multicellular organisms, as we have seen, are not simply a random collection of cells. Specialised cells are organised as tissues and tissues are organised into organs, which then have to be placed at definite positions in the body. In such a carefully organised situation, cell-by-cell division would be impractical. Multicellular organisms, therefore, need to use more complex ways of reproduction.
(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.
(c) If some variations were to be present in a few individuals in these populations, there would be some chance for them to survive. Thus, if there were a population of bacteria living in temperate water and if the water temperature were to be increased by global warming most

of these bacteria would die, but the few variants resistant to heat would survive and grow further. Variation is thus useful for the survival of species over time.

- (d) Fertilisation occurs only after fertilisation when the pollen grain has germinated and sent the male gametes to the ovule.
- (e) The transference of pollen grains from the anther of a flower to the stigma of the same flower or of another flower born on the same plant is called **self pollination** whereas the transference of pollen grains from anther of a flower of one plant to the stigma of a flower of another plant of the same species is called **cross pollination**.

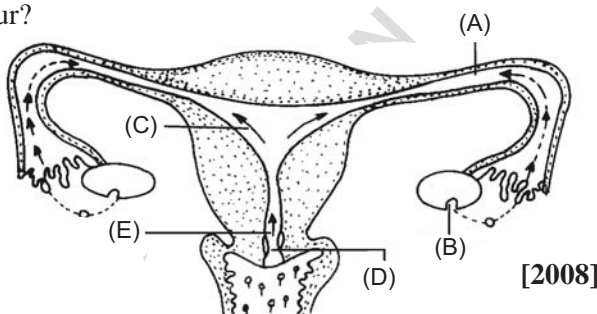
10. (a) Name the parts labelled A, B, C, D and E.

(b) Where do the following functions occur?

- (i) Production of an egg
- (ii) Fertilisation
- (iii) Implantation of zygote

(c) What happens to the lining of uterus;

- (i) before release of a fertilized egg?
- (ii) if no fertilisation occur?



[2008]

OR

Name the parts A to E of human female reproductive system. Name the part in which fertilization takes place in the system.

[2011 (T-II)]

Ans. (a) A – Oviduct or fallopian tube

B – Ovary

C – Uterus

D – Cervix

E – Vagina

(b) (i) Ovary

(ii) Fallopian tube

(iii) Uterus

(c) (i) In human female, before release of fertilised egg uterus prepares itself every month to receive and nurture the growing embryo. The lining of uterus thickens and is richly supplied with blood to nourish the growing embryo.

(ii) If fertilisation does not occur, the lining is not required any more. Hence, the thickened lining of the uterus breaks down along with blood vessels. The degenerated part of uterus along with the blood moves out of the vagina in the form of bleeding, is called menstruation.

11. (a) Explain the role of placenta in the development of human embryo.

(b) Give examples of two bacterial and two viral sexually transmitted diseases. Name the most effective contraceptive which prevents spread of such diseases.

[2010]

Ans. (a) The organ by which the embryo is attached to the wall of the uterus is called **placenta**. The embryo gets nutrition, oxygen, water, etc. from the mother's blood with the help of placenta. In placenta, villi grow into the surrounding uterine tissue from which embryo absorb nutrients. Villi provides a large surface area for exchange of materials between

embryo and mother. The placenta serve as the nutritive, respiratory and excretory organ of the foetus.

(b) Bacterial sexually transmitted diseases—

- (i) Gonorrhoea (ii) Syphilis

Viral sexually transmitted diseases—

- (i) Genital warts (ii) AIDS (Acquired Immuno Deficiency Syndrome)

Mechanical barriers such as condoms, diaphragm, cervical caps, etc., are the most effective contraceptive which prevent spread of such diseases.

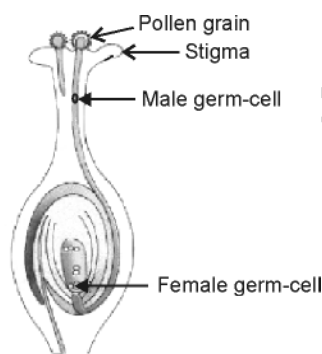
12. (a) Draw a diagram illustrating fertilisation in a flowering plant and label on it :

Pollen grain, Male germ cell, Female germ cell, Stigma.

(b) Describe the process of fertilisation in plants.

[2008]

Ans. (a)



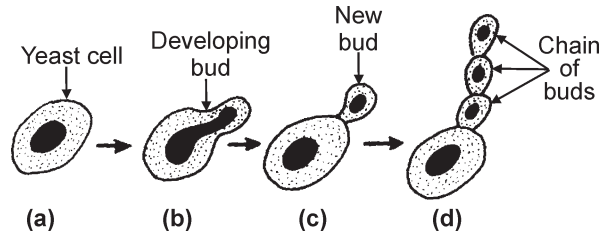
(b) **Process of Fertilisation :** After the pollen grains are deposited on the stigma, the pollen grains absorb water and sugar from the surface of stigma and swell up. The pollen grains produce a fine tube called **pollen tube**. Eventually it travels down the whole length of the style into ovary.

The pollen tube carrying the two male gametes enters the ovule and embryo sac through the micropyle and its tip dissolves. The two male gametes are liberated inside the embryo sac. One male gamete fuses with the egg to form zygote which grows into an embryo and finally into a new plant. The other male gamete fuses with the secondary nucleus (two polar nuclei) to form the **endosperm** which provides nourishment to the growing embryo. The fusion of the male gamete with the female gamete is called **syngamy**.

Other Important Questions

1. With a set of suitable diagrams, describe the process of budding as seen in yeast.

Ans. Yeast is a unicellular organism. Asexual reproduction takes place by the process of budding in yeast. During budding, a small protuberance appears on the upper part of an adult cell. This gradually grows in size. From this newly budded cell, another bud appears at the tip. This process continues 3-4 times, resulting in a chain of yeast cells.



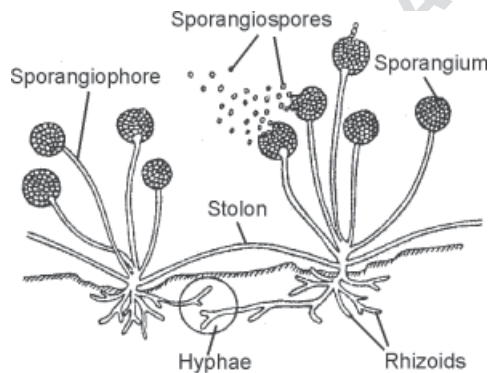
2. With the help of an example describe how non-flowering plants reproduce by spore formation.

(Imp.)

Ans. In non-flowering plants (plants which do not produce seeds) like fungi (*Mucor*, *Rhizopus*, *Penicillium*), bacteria, ferns or mosses, formation of spores is a common method of reproduction.

In fungi, during spore formation, a structure called sporangium develops from the hyphae. The nucleus in the sporangium divides repeatedly. Each nucleus gets surrounded by a small portion of cytoplasm and a spore is formed.

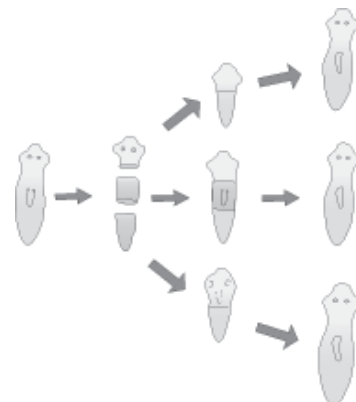
Spores survive in adverse conditions like high temperature, scarcity of water and lack of food. The spores give rise to new organisms under favourable conditions.



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

Ans. Budding, fragmentation and regeneration are considered as asexual types of reproduction because they involve the production of offspring by a single parent without fertilisation or fusion of gametes. In these methods, the young ones are genetically identical to the parents and are known as clones.

Regeneration in *Planaria* — *Planaria* have the ability to give rise to new individuals from their body parts. This process is called regeneration. If the body of *Planaria* is somehow cut or broken up into many pieces, each piece grows into a complete organism.



4. Why does menstruation occur?

Ans. At the time of ovulation, cycle of events takes place in the uterus and vagina.

(i) In case, fertilisation occurs, the inner wall of uterus thickens to receive the developing zygote.

- (ii) In case, fertilisation does not take place, the thickened wall along with the blood vessels breaks down and moves out of the vagina in the form of discharge called menstrual flow which lasts for 4-5 days.

The cycle of events taking place in the ovaries and uterus every twenty-eight days and marked by menstrual flow, is menstrual cycle.

5. What happens when the egg is not fertilised? **(Imp.)**

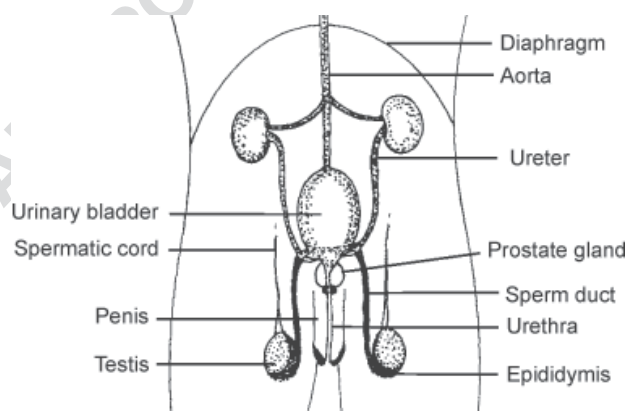
Ans. The lining of the uterus becomes thick and spongy so as to receive the fertilised egg in the normal situation. If fertilisation does not take place, the unfertilised egg lasts for about one day. As the uterine lining breaks the blood vessels also rupture. So the blood alongwith the mucous comes out through the vagina. This period of discharge of blood is called **menstruation**. This happens roughly every month and lasts for about 3-5 days.

6. What do you know about reproductive health of human beings? **(V.Imp.)**

Ans. Reproductive health is a term which deals with the issue of maintaining health after having attained sexual maturity. While the males and females become mature in terms of reproductive organs at the ages of 13 and 12 years respectively, yet their general body growth still goes on and the individuals are not ready mentally, socially or even financially to bear children. They themselves are not settled in life. Because of pressure from parents, friends or society, early age marriages certainly take place in many areas particularly rural ones. In the absence of proper knowledge about sex-related issues and transmission of diseases through sex, the women's health may be adversely affected both physically and mentally.

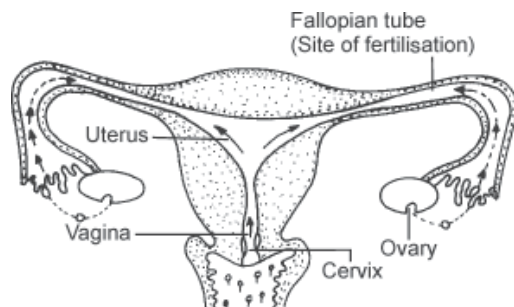
7. Draw a labelled diagram showing reproductive organs in male human body along with its position.

Ans.



8. With the help of a diagram, describe how fertilisation takes place in female reproductive system. **(V.Imp.)**

Ans. During copulation (mating or coitus), the sperms are released in the vagina near the lower end of the uterus. The sperms actively swim with the help of their tails and pass into the uterus. From the uterus, they reach the oviduct. If there is an egg in the oviduct, it gets fertilised by the sperm.



II. FORMATIVE ASSESSMENT

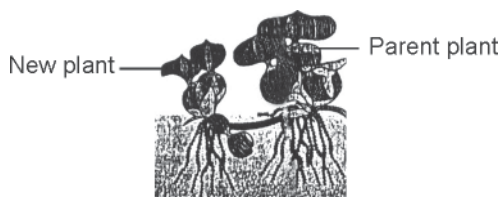
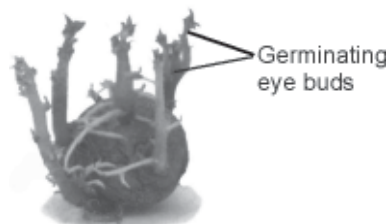
A. Activities

- Aim:** To study vegetative propagation in potato, an aquatic plant and *Bryophyllum*.

Materials Required: A hand lens (magnifying lens), an old potato tuber, an aquatic plant like *Eichhornia* or pistia, a few mature leaves of *Bryophyllum* with young adventitious buds.

Procedure:

- Take an old potato tuber and examine it carefully.
- You will observe 'eyes' or small spots on the potato tuber. These eyes are actually the nodes of the stem.
- With the help of hand lens (magnifying lens), examine each eye. There will be a small adventitious bud in each eye.
- Observe the origin of shoots from the surface of the tuber.
- Draw sketches of a tuber with shoots.
- Observe an aquatic plant carefully.
- Observe the formation of a new plant and the region of attachment of both plants.
- Draw diagram of the aquatic plant depicting the exact origin of a young plant.



- Observe the lamina of *Bryophyllum* leaf, particularly the leaf margins.
- Plantlets will be seen arising from some notches in the margin.
- Draw a diagram of *Bryophyllum* leaf with plantlets attached to its margins.



Observations:

- The surface of potato tuber has several eyes.
- New shoots arise from each eye.
- In aquatic plant, a new plant arises from the stolon of parent plant.
- In *Bryophyllum*, plantlets develop from the margins of intact leaves.

2. **Aim:** To study and describe the parts of a flower and their role in sexual reproduction.

Materials Required: Flowers of *Petunia* or China rose, charts of transverse sections of anther and ovary, permanent slides of the flower chosen, dissecting microscope, beaker, forceps, needle, slides, razor and cover slips.

Procedure:

- (i) Keep the twigs in a beaker containing water to prevent drying of flowers.
- (ii) Examine the position of flower on the twig. Determine whether it is axillary or terminal.
- (iii) Study the following characters of the flower and record the features :
 - (a) Pedicellate – Flower with stalk (pedicel)
 Sessile – Flower without stalk (pedicel)
 - (b) Complete – Flower with all the four whorls sepals, petals, stamens and carpels.
 Incomplete – Flower which lacks one or more floral whorls.
 - (c) Unisexual – Flower with only one sex either stamen or carpel.
 Bisexual – Flower with both stamens and carpels present in it (hermaphrodite).
 - (d) Calyx – Calyx is the outermost green whorl of floral leaves. Observe their colour and shape.
 Sepals – A leaf like division of calyx.
 Polysepalous – All the sepals are free.
 Gamosepalous – All the sepals are fused together.
 - (e) Corolla – Corolla is the second, coloured whorl of the flower made up of petals; count the number of petals; observe their colour and shape.
 Polypetalous – Petals free from each other.
 Gamopetalous – Petals fused with each other.
 - (f) Androecium – This is the third reproductive whorl in a flower made up of stamens. Mount one stamen on the stage of the dissecting

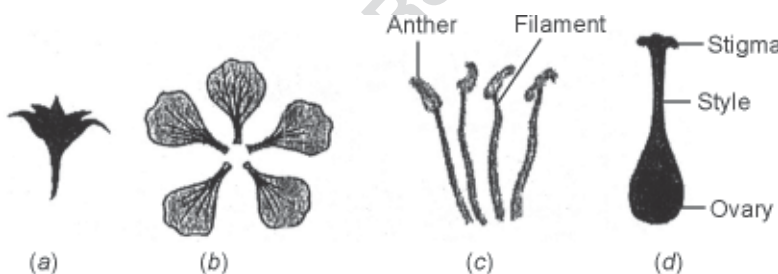
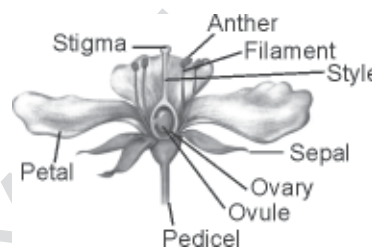
microscope and observe its various parts such as a stalk (short or long) called the filament and a terminal bilobed anther.

- (g) **Gynoecium** – This is the innermost whorl of female reproductive organs made up of pistil. Mount the pistil on the stage of the dissecting microscope and observe its various parts such as the basal swollen portion (ovary), a style and a flattened tip, stigma. Inside the ovary are one or more ovules attached to a flattened cellular cushion known as placenta.

- (iv) Cut a cross section of the anther. Mount the section in a drop of water taken on a slide. Observe it under the dissecting microscope. Locate pollen grains in the slide and the cavities in anther called pollen sacs.

- (v) Cut a cross section of ovary, mount the section in a drop of water taken on a slide. Observe it under the dissection microscope. Count the number of chambers (locules) and locate ovules.

- (vi) Draw diagram of a flower showing all the four whorls—sepals, petals, stamen and pistil.
(vii) Observe the permanent slides of transverse sections of anther and ovary. Identify different parts using the charts provided. Draw their diagrams in your notebook.



Observations

Inflorescence: It is solitary axillary.

Flower: The flower is bell-shaped, occurs in violet, white, pink and many other shades. It is pedicellate, complete and bisexual.

Calyx: Sepals 5, green, gamosepalous.

Corolla: Petals 5, gamopetalous, coloured variable, pink, red, etc.

Androecium: Stamens 5, epipetalous, long filaments of unequal length.

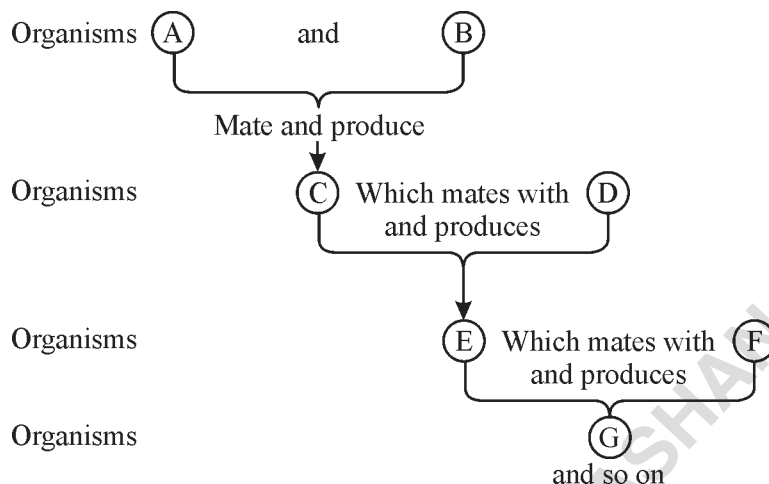
Gynoecium: Bicarpellary, bilocular ovary with many ovules.

B. Quiz

1. A lizard escapes from its enemies by breaking off its tail. What do you think, a new tail will grow after sometime or not? Give reason behind your answer.

Ans A new tail will grow after sometime due to the process of regeneration.

2. Look at the diagram and answer the following questions.



- (i) Which type of reproduction is shown in the diagram?
- (ii) Do the hereditary characteristics remain the same in organism C and E? Why?

Ans. (i) Sexual reproduction.

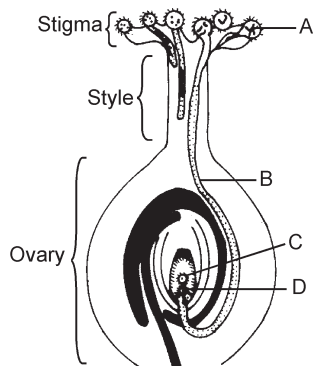
- (ii) No, the hereditary characteristics will be different in organism C and E because variations occur in sexual reproduction.

3. Human population is increasing everyday and the increase is to extent that the population doubles in about 35 years. Name the factors responsible for the sharp increase in human population.

Ans. (i) Sufficient availability of food. (ii) Better health care.
(iii) Reduction in mortality rate due to better medical facilities and health care.
(iv) More children reaching the reproductive age.

4. Look at the picture and answer the following questions:

- (a) Name the process showing in the picture. (b) Name the parts labelled as A, B, C and D.



Ans. (i) Fertilisation

- (ii) A – Pollen grain B – Pollen tube C – Secondary nucleus D – Egg cell.

C. Puzzles

1. Look across, up and down in the grid to find the answers of the following:

- (i) Stalk of an ovule.

- (ii) Stoppage of menstruation in woman.
- (iii) Central tissue of the ovule surrounded by integuments.
- (iv) Product of fusion between two polar nuclei and one male nucleus.
- (v) Fluid that contains secretions of accessory glands together with the sperms.
- (vi) A large oval shaped cell present in the nucellus of the ovule in plants.
- (vii) Period during which the foetus develops inside the uterus.
- (viii) Reproductive age when menstruation begins.

M	G	E	S	T	A	T	I	O	N
S	E	N	D	O	S	P	E	R	M
R	M	N	U	C	L	O	U	F	E
P	B	U	O	N	O	U	T	U	N
N	R	C	S	P	E	M	R	N	A
M	Y	E	P	F	A	G	O	I	R
Y	O	L	E	H	I	U	U	C	C
O	S	L	R	B	C	D	S	L	H
S	A	U	B	U	B	E	R	E	E
A	C	S	E	M	E	N	T	Y	S

- Ans.** (i) Funicle (ii) Menopause
 (iii) Nucellus (iv) Endosperm (v) Semen (vi) Embryo sac
 (vii) Gestation (viii) Menarch

2. Unscramble the following and write down the names of ten such reproductive organs. Sort them as male and female reproductive organs.

- (i) ANGAVI :
- (ii) SERIVOA :
- (iii) SETEST :
- (iv) RAHTURE :
- (v) SIPEN :
- (vi) SSVAEREFNED :
- (vii) YIMSDIPIDE :
- (viii) CTVDIOU :
- (ix) TUEUSR :
- (x) STARPTEO :

- Ans.** (i) Vagina (ii) Ovaries (iii) Testes (iv) Urethra
 (v) Penis (vi) Vas deferens (vii) Epididymis (viii) Oviduct
 (v) Penis (vi) Vas deferens (vii) Epididymis (viii) Oviduct
 (ix) Uterus (x) Prostate

Male Reproductive organs — Testes, Penis, Vas deferens, Urethra, Epididymis, Prostate
 Female Reproductive Organs — Vagina, Ovaries, Oviduct, Uterus

D. Group Activities

- Ask the students to prepare a chart showing the process of reproduction. They can compare the asexual and sexual reproduction.
- Think of the situations in which the word 'reproductive health' is used in our life. Note down the ways in which the reproductive health of a woman become poor. Give the precautions which should be taken to avoid getting poor reproductive health.

E. Seminar

Topic—'Improved reproductive health of women in rural area'.

(Hints—Discuss the following points.)

- Intra-uterine contraceptive devices
- Oral contraceptive
- Surgical method of family planning in women.

F. Debates

1. Disease free plants can be produced by tissue culture.
2. Embryo is the future plant.
3. Because of pressure from the parents, friends or society, early age marriages certainly take place in many areas particularly in rural ones.

G. Group Discussion

1. What happens when the egg is not fertilised?
2. Post fertilisation changes in plant.

H. Survey

The groups of students (5-6) can go to different hospitals where family planning methods are being taken. Find out :

- (a) The number of people taking surgical precautions for family planning, everyday.
- (b) How many ladies are using intrauterine contraceptive devices, everyday?
- (c) What is the rate of failure of contraceptive methods?