CHAPTER

8 HOW DO ORGANISMS REPRODUCE ?

Syllabus

➢ *Reproduction in animals and plants (asexual and sexual), reproductive health-need and methods of family planning. Safe sex HIV/AIDS. Child bearing and women's health.*

Quick Review

- Reproduction is the process by which living organisms produce new individuals similar to themselves. It ensures continuity of life on earth.
- Nucleus of the cell contains DNA (Deoxyribose Nucleic Acid) which is the heredity material.
- DNA replicates and forms new cells causing variation. So, these new cells will be similar but may not be identical to original cell.
- Variations are useful for the survival of the individual and species over time as well as basis for evolution.

Types of Reproduction

(a) Asexual Reproduction

- A single individual give rise to new individual.
- Gametes are not formed.
- New individual is identical to parent.
- Adopted by lower organisms.

(b) Sexual Reproduction

- Two individuals i.e., one male and one female are needed to give rise to new individual.
- Gametes are formed.
- New individual is genetically similar but not identical to parents.
- It is use ful to generate more variations in species.
- Adopted by higher organisms.
- **Asexual reproduction** takes place through fission, fragmentation, regeneration, budding vegetative propagation, spore formation. These modes of reproduction depend on the body design of the organisms.
- Fission is of two types - binary fission and multiple fission.
- **Binary fission is** the division of one cell into two similar or identical cells. The nucleus first divides amitotically into two, followed by the division of the cytoplasm. The cell finally splits into two daughter cells. ***e.g.,*** *Amoeba*
- In **multiple fission,** many individuals are formed from a single individual. ***e.g.,*** *Plasmodium*
- The nucleus divides repeatedly, producing many nuclei and many daughter cells are formed.
- **Fragmentation :** Multicellular organisms with simple body organisation such as filamentous algae—*Spirogyra* breaks up into two or more small pieces of fragments upon maturation. These fragments grow into new individuals.
- **Regeneration :** It is the ability of a fully differentiated organism to give rise to new individual organisms from its body parts. Small cut or broken parts of the organism's body grow or regenerate into separate individuals. For **example :** *Planaria* and *Hydra*.
- In *budding,* a small part of the body of the parent grows out as a bud which then detaches and becomes a new organism. *Hydra* reproduces by budding using the regenerative cells.

Vegetative Propagation : In many plants, new plants develops from vegetative parts such as :

- By roots : *E.g.,* dahlias, sweet potato.
- By stem : *E.g.,* potato, ginger.
- By leaves : *E.g., bryophyllum* (leaf notches bear buds which develop into plants).
- Artificial methods :
  (a) Grafting : *E.g.,* Mango
  (b) Cutting : *E.g.,* Rose
  (c) Layering : *E.g.,* Jasmine

(d) **Tissue culture :** New plants are grown by using growing tip of a plant. These growing cells are kept in a culture medium which leads to the formation of callus. Callus is then transferred to hormone medium which causes growth and differentiation. *E.g.,* ornamental plants, orchid.

Benefits of tissue culture :

- We can grow plants like banana, rose, jasmine etc. that have lost the capacity to produce seeds.
- New plants are genetically similar to parents.
- **Spore Formation :** Spores are small bulb like structures which are covered by thick walls. Under favourable conditions, they germinate and produce new organism.
- Sexual reproduction in flowering plants takes place in the phylum angiosperm. The gametes are produced within the flowers and the ovules are enclosed in a carpel.
- The flowers are usually bisexual *i.e.,* male and female reproductive parts are present in the same plant. The main parts of a flower are : sepals, petals, stamens and carpel.
- Stamens and carpels are the reproductive parts of a flower which contain the germ cells. The male organ of a flower called 'stamen' makes the male gamete which are present in the pollen grain. The female organ of a flower called 'carpel' or 'pistil' makes the female gamete, which are present in ovules of the plant.
- **Pollination** is the transfer of pollen grain from the anther of a stamen to the stigma of a carpel. Pollination is of two types : Self pollination and cross pollination.
- **Embryo :** It is the stage of development between the zygote or fertilized egg and the newly formed offspring.

Reproduction in Human Beings

- Humans use sexual mode of reproduction.
- **Sexual maturation :** The period of life when production of germ cells *i.e.,* ova (female) and sperm (male) start in the body. This period of sexual maturation is called puberty.

Changes at Puberty

(a) Common in male and female

- Thick hair growth in armpits and genital area.
- Skin becomes oily, may result in pimples.

(b) In girls

- Breast size begin to increase.
- Girls begin to menstruate.

(c) In boys

- Thick hair growth on face.
- Voice begin to crack.

These changes signals that sexual maturity is taking place.

Male Reproductive System

(a) Testes : A pair of testes are located inside scrotum which is present outside the abdominal cavity. Scrotum has a relatively lower temperature needed for the production of sperms.

- Male germ cell *i.e.,* sperms are formed here.
- Testes release male sex hormone (testosterone). Its function is :
  (i) Regulate production of sperms.
  (ii) Bring changes at puberty.

(b) Vas deferens : It passes sperms from testes up to urethra.

(c) Urethra : It is a common passage for both sperms and urine. Its outer covering is called penis.

(d) Associated glands : Seminal vesicles and prostate gland add their secretion to the sperms. This fluid provide nourishment to sperms and make their transport easy.

Sperm along with secretion of glands form semen.

Female Reproductive System

(a) Ovary : A pair of ovary is located in both sides of abdomen.

- Female germ cells *i.e.,* eggs are produced here.
- At the time of birth of a girl, thousands of immature eggs are present in the ovary.
- At the onset of puberty, some of these eggs start maturing.

(b) Oviduct or Fallopian tube

- Receives the egg produced by the ovary and transfer it to the uterus.
- Fertilisation *i.e.,* fusion of gametes takes place here.

(c) Uterus : It is a bag-like structure where development of the baby takes place.

- Uterus opens into vagina through cervix.
- The embryo moves down to reach the uterus. The embedding of the embryo in the thick inner lining of the uterus is called **implantation**.
- The time period from the development of foetus inside the uterus till birth is called **gestation period**. The act of giving birth to the fully developed foetus at the end of gestation period is termed as **parturition**.

- The breakdown and removal of the inner, thick and soft lining of the uterus along with its blood vessels in the form of vaginal bleeding is called **menstrual flow** or **menstruation**.
- Reproductive health is all those aspects of general health which help a person to lead a normal, safe and satisfying reproductive life.
- **Sexually Transmitted Diseases (STDs)** are the diseases which are spread by sexual contact from an infected person to a healthy person. Some common STDs are Gonorrhoea, syphilis, trichomoniasis, AIDS.
- There are different methods which are developed to prevent and control pregnancy such as mechanical methods, chemical methods, oral pills and surgical methods.

Contraception

- It is the avoidance of pregnancy, can be achieved by preventing the fertilisation of ova.

Methods of contraception

(a) Physical barrier

- To prevent union of egg and sperm.
- Use of condoms, cervical caps and diaphragm.

(b) Chemical methods

- Use of oral pills
- These change hormonal balance of body so that eggs are not released.
- May have side effects.

(c) Intrauterine contraceptive device (IUCD)

- Copper-T or loop is placed in uterus to prevent pregnancy.

(d) Surgical methods

- In males the vas deferens is blocked to prevent sperm transfer called vasectomy.
- In females, the fallopian tube is blocked to prevent egg transfer called tubectomy.

Know the Terms

- **Reproduction :** It is the process of producing new individuals of the same species by existing organisms of a species *i.e.* parents.
- **Asexual reproduction :** It is the process of producing new organisms from a single parent without the involvement of sex cells or gametes.
- **Fission :** It is the simplest method of asexual reproduction in unicellular forms of life such as *Amoeba, Paramecium* and other protozoan.
- **Binary fission :** It is the division of one cell into two similar or identical cells. The nucleus first divides amitotically into two, followed by the division of the cytoplasm. The cells finally splits into two daughter cells.
- **Fragmentation :** It is an asexual reproduction in which a multicellular organisms breaks up into two or more small pieces of fragment upon maturation.
- **Regeneration :** It is the ability of a fully differentiated organism to give rise to new individual organism from its body parts.
- In vegetative propagation, new plants are obtained from the parts of old plants such as stem, roots and leaves, without help of any reproductive organs.
- **Tissue culture :** It is the production or propagation of new plants from isolated plant cells or small pieces of plant tissue in a synthetic medium of culture solution. This technique is also known as micropropagation, and In vitro culture because it takes place outside the body of the parent plant in a test tube using an artificial environment.
- **Micropropagation technique :** It is being used for the production of ornamental plants like orchids, *Dahlia* and carnation.
- **Sexual reproduction :** It is the process in which two sexes male and female are involved. The male sexual unit is known as male gamete or sperm while female sexual unit is termed as female gamete or ova.
- **Pollination :** It is the transfer of pollen grain from the anther of a stamen to the stigma of a carpel. The pollen grains are transferred by many agents as insects, birds, man, wind and water.
- **Fertilization :** It is defined as the fusion of a male gamete (sperm) with a female gamete (an ovum) to form a zygote during sexual reproduction.
- **Zygote :** The cell which is formed by the fusion of a male gamete and female gamete is called **Zygote**, *i.e.* it is a 'fertilised ovum' or 'fertilized egg.'
- **Sex ratio :** It is the ratio of the number of females to per thousand males in a population. The female-male sex ratio must be maintained for a healthy society.
- **Population size :** Organisms increase their population with the help of reproduction. The rates of birth and death in a given population determines its size.

TOPIC-1
Basics of Reproduction, Asexual Reproduction and Vegetative Propagation

Very Short Answer Type Questions (1 mark each)

R Q. 1. **What is vegetative propagation ?**

Ans. In vegetative propagation, new plants are obtained from the parts of old plants like stems, roots and leaves, without the help of any reproductive organ. 1

R Q. 2. **What is DNA ?**
[Board Term II, Foreign Set III, 2015]

Ans. DNA is the carrier of hereditary information from parents to the next generation. Hereditary material is present in all living cells.
[CBSE Marking Scheme, 2015] 1

R Q. 3. **Name the method by which spirogyra reproduces under favourable conditions. Is this method sexual or asexual ? [Delhi Set I, 2017]**

Ans. Fragmentation, Asexual ½ + ½

R Q. 4. **Name the type of reproduction mostly seen in unicellular organisms.**
[Board Term-II, Delhi Set-6TM6KWC, 2015]

Ans. Asexual reproduction.
[CBSE Marking Scheme, 2015] 1

R Q. 5. **Name the plant that reproduces vegetatively by leaf. [Board Term II, Set AIS, 2013]**

Ans. *Bryophyllum.* 1

R Q. 6. **Name two simple organisms having the ability of regeneration. [Board Term II, O.D. Set III, 2015]**

Ans. *Planaria* and *Hydra.* ½ + ½
[CBSE Marking Scheme, 2015]

U Q. 7. **How does Plasmodium reproduce. Is this method sexual or asexual ? [Delhi 31/1/3, 2017]**

Ans. Plasmodium reproduces by a process known as multiple fission. Multiple fission is a type of asexual reproduction. 1

R Q. 8. **Name the causative agent of the disease "Kala-azar" and its mode of asexual reproduction.**
[Board Term-II, Foreign Set I 2015]

Ans. *Leishmania,* Binary fission. 1
[CBSE Marking Scheme, 2015]

R Q. 9. **Name the part of *Bryophyllum* where the buds are produced for vegetative propagation.**
[Board Term II, Delhi I 2016]

Ans. Leaf notches. **[CBSE Marking Scheme, 2016]** 1

R Q. 10. **Name the life process of an organism that helps in the growth of its population.**
[Board Term-II, O.D. Set I, 2015]

Ans. Reproduction. **[CBSE Marking Scheme, 2015]** 1

A Q. 11. **Newly formed DNA copies may not be identical at times. Give one reason. [OD 31/2, 2017]**

Ans. If there is an error in DNA copying then newly formed DNA copies may not be identical at time. 1

R Q. 12. **What are those organisms called which bear both the sex organs in the same individual ? Give one example of such organism.**
[Board Term-II, O.D. II, 2016]

Ans. Bisexual; Example, Hydra/Earthworm/Mustard/Hibiscus. **(Any one)** ½ + ½
[CBSE Marking Scheme, 2016]

R Q. 13. **Name the method by which *Hydra* reproduces. Is this method sexual or asexual ?**
[Board Term-II, Foreign Set I, 2016]

Ans. *Hydra* reproduces by Budding. ½
It is an asexual reproduction. ½
[CBSE Marking Scheme, 2016]

R Q. 14. **An organism which is a worm has very simple eyes, that are really eye spots which detect light. Name the organism.**
[Board Term II Set QNA4XWT, 2014]

Ans. *Planaria.* **[CBSE Marking Scheme, 2014]** 1

R Q. 15. **Mention the mode of reproduction used by**
(i) *Amoeba* (ii) *Planaria*.
[Board Term II, Delhi, Set-C 2009]

Ans. Mode of reproduction used by
(i) *Amoeba* is Binary fission.
(ii) *Planaria* is Regeneration. ½ + ½

A Q. 16. **What happens when a *Planaria* gets cut into two pieces ? [Board Term II, Delhi Set III, 2016]**

Ans. When a *Planaria* gets cut into two pieces, each piece regenerates into a new *Planaria.* 1
[CBSE Marking Scheme, 2016]

K Q. 17. **What happens when a mature *Spirogyra* filament attains considerable length ?**
[Board Term II, O.D. Set I 2016]

Ans. Its filament breaks up into smaller fragments or pieces, and each fragment grows into a new individual. **[CBSE Marking Scheme, 2016]** 1

A Q. 18. **State the method used for growing rose plants and jasmine plants.**
[Board Term II, (Set 2009 A1) 2012]

Ans. (i) Artificial methods of vegetative propagation like cutting are used to grow rose plants.
(ii) Artificial methods of vegetative propagation like layering is used for growing jasmine plant. ½ + ½

R Q. 19. **Where is the Zygote located in the flower after fertilisation ? [NCERT Exemplar, 2017]**

Ans. Zygote is located inside the ovule which is present in the ovary. 1

A Q. 20. **Why is DNA copying necessary during reproduction ?[Board Term II, O.D. Set II, 2013]**

Ans. DNA copying is necessary during reproduction because it leads to the transmission of characters from parents to offsprings and variations. 1

A Q. 21. **Malarial parasite divides into many daughter individuals simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction.**

[Board Term II SQP, 2009]

Ans. Progeny is identical like parent and single individual can reproduce in large number. 1

A Q. 22. **"Cell division is a type of reproduction in unicellular organism". Justify.**

[Board Term II, Delhi Set III, 2013]

Ans. During cell division in unicellular organisms, the nucleus of the parent cell divides only once to form two daughter nuclei along with the cytoplasm that undergoes cleavage. In this way, two daughter cells are formed from one single parent. 1

U Q. 23. **Name the information source of making proteins in the cell. State two basic events in reproduction. [Board Term II, Set 2009 (C) 2012]**

Ans. The DNA in the cell nucleus is the information source of making proteins.

The two basic events of reproduction are :

(i) Creation of a DNA

(ii) Additional cellular apparatus by the cell involved in the process. ½ + ½

Short Answer Type Questions-I

(2 marks each)

U Q. 1. **(i) What is meant by vegetative propagation?**

(ii) How will a plant be benefitted if it reproduces by vegetative propagation ?

[Board Term II, Foreign Set III 2014]

Ans. (i) Propagation by parts such as the root, stem and leaves. 1

(ii) Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds. Such method also makes possible the propagation of plants that have lost the capacity to produce seeds. 1

U Q. 2. **List four advantages of vegetative propagation.**

[Board Term II, Delhi Set I, 2014]

Ans. (i) Only one parent is required for reproduction, this eliminates the need of special mechanisms.

(ii) Many plants are able to tide over unfavourable conditions.

(iii) Plants that do not produce seeds are propagated by this method.

(iv) The trait of the parent plant is preserved.

½ + ½ + ½ + ½

R Q. 3. **List four modes of asexual reproduction.**

[Board Term II, Delhi Set II, III, 2014, O.D. Comptt 31/1 2017]

Ans. Four modes of asexual reproduction are :

(i) Binary fission **(ii)** Budding

(iii) Multiple fission **(iv)** Fragmentation.

½ × 4 = 2

U Q. 4. **Write two differences between binary fission and multiple fission in a tabular form.**

[Board Term II, O.D. Set I 2014]

OR

How does binary fission differ from multiple fission ?

Ans. Two differences between binary fission and multiple fission are :

S. No.	Binary Fission	Multiple Fission
(i)	It is the division of one cell into two similar or identical cells.	It is the process, in which many individuals are formed from a single individual.
(ii)	The nucleus first divides amitotically into two, followed by the division of the cytoplasm.	The nucleus of the cell divides repeatedly, producing many nuclei.

1 + 1

U Q. 5. **What is the importance of DNA copying in reproduction ?**

[Board Term II, Set-QNA4XWT, 2014]

Ans. DNA is a macromolecule present in the chromosome. Genes are segments of the DNA. DNA has the information to create proteins which lead to body design of the organism. If a similar individual has to be reproduced, the DNA should replicate to make an exact copy of itself. 2

[CBSE Marking Scheme, 2014]

U Q. 6. **(i) How do *Leishmania* and *Plasmodium* reproduce?**

(ii) State one difference in their mode of reproduction.

[Board Term II Foreign Set I, 2014]

Ans. (i) *Leishmania* reproduces by binary fission and *Plasmodium* reproduce by multiple fission.

(ii) Difference between Binary and Multiple fission :

S. No.	Binary Fission	Multiple Fission
1.	It occurs under favourable conditions and gives rise to two individuals.	It occurs under both favourable and unfavourable conditions and forms several individual.

1 + 1

A **Q. 7. List two advantages of growing grapes or banana plants through vegetative propagation.**
[O.D. Set II, 2013]

Ans. (i) Vegetative propagation is the only known method of multiplication of seedless plants, which gives a genetically uniform population.

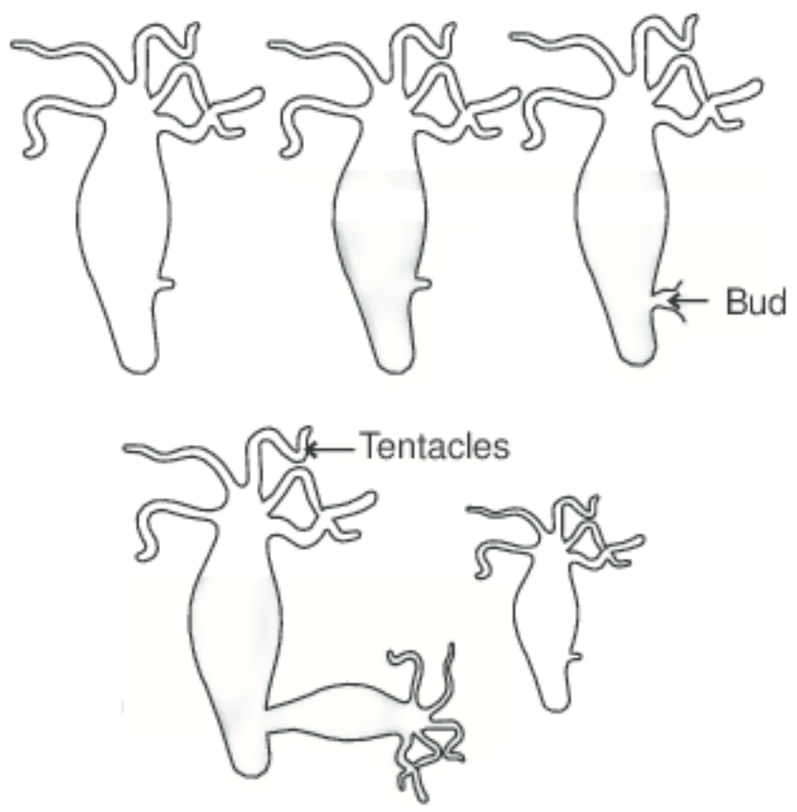
(ii) Seeds and fruits are of uniform quantity, size taste and aroma and have a good quality of variety. **1 + 1**

U **Q. 8. How is the process of binary fission different in *Amoeba* and *Leishmania* ?**
[Board Term II, Set-QNA4XWT, 2014]

Ans. *Amoeba* reproduces through simple binary fission. *Leishmania* reproduces asexually through binary fission that occurs along a definite orientation related to the whip like structure at one end of the cell. **[CBSE Marking Scheme, 2014] 1 + 1**

U **Q. 9. Draw a labelled diagram to illustrate budding in *Hydra*.** **[Board Term II, O.D. Set III, 2014 Foreign Set I, II, III, O.D. I, 2013]**

Ans.



2

U **Q. 10. Fallen leaves of *'Bryophyllum'* on the ground produce new plants whereas the leaves of rose do not ? Explain this difference between the two plants.** **[Board Term II, Set (2016) 2012]**

Ans. In *Bryophyllum*, vegetative propagation occur through leaves where buds occur. **1**
Rose leaves do not form buds. **1**
[CBSE Marking Scheme, 2012]

A **Q. 11. What is a clone ? Why do offsprings formed by asexual reproduction exhibit remarkable similarity.** **[NCERT Exemplar 2017]**

Ans. Clone is an organism which is genetically identically with its parent organism. Cloning is an artificial method of asexual reproduction.

Offsprings produced by asexual reproduction exhibit remarkable similarities as no new combination of genes takes place. The parental set of genes is distributed in the offspring. **1 + 1**

U **Q. 12. "The chromosomal number of the sexually producing parents and their offspring is the same." Justify this statement.**
[Board Term II, Outside Delhi Set I, 2014]

OR

Explain how offsprings and parents of organisms reproducing sexually have same number of chromosomes ? [NCERT Exemplar 2017]

Ans. The first step in sexual reproduction is gamete formation. In this step, the number of chromosomes gets halved. Thus, each gamete receives half the number of chromosomes to that of somatic cells. During fertilisation, the fusion of male and female gametes takes place, which results in the number of chromosomes in the zygote to be equal to that of somatic cells. Thus, the chromosomal number of the sexually producing parents and their offspring is the same. **2**

U **Q. 13. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread ?** **[NCERT Exemplar 2017]**

Ans. Moistened bread slice offers both moisture and nutrients to the bread mould, hence it grows profusely. Dry slice of bread offers nutrients but not moisture hence hyphae fail to grow. **2**

Short Answer Type Questions-II

(3 marks each)

U **Q. 1. What is vegetative propagation ? State two advantages and two disadvantages of this method.** **3**

Ans. Vegetative propagation is a mode of asexual reproduction in which new plants are formed from roots, stems, leaves and buds of the individual vegetative parts of the plants, example; eyes of potato. **1**

Advantages :

(i) Offsprings are genetically identical and therefore useful traits can be preserved. **½**

(ii) It is a rapid and economical method. **½**

Disadvantages :

(i) New characters cannot be introduced. **½**

(ii) The disease of the parent plant gets transferred to the offspring. **½**

OR

[Topper Answer, O.D. Set 1, 2017]

U **Q. 2. What is vegetative propagation ? When is it used ? List two uses.[Board Term II, 2015, 2012], [Board Foreign Set III, 2014]**

Ans. It is an asexual method of reproduction. In this process, vegetative part of a plant body such as stem, leaves, bulbs, tubers are used for growing new plants by cutting, grafting and layering which are identical to parents. 2

It is used to grow :

(i) Plants that have lost the capacity to produce seeds.

(ii) Plants which are genetically similar enough to the parent plants. ½+½

(iii) Superior quality of plants can be obtained.

(iv) It is cheaper, easier and more rapid method of propagation. **(Any two)**

[CBSE Marking Scheme, 2012]

U **Q. 3. Define reproduction. How does it help in providing stability to the population of species ?**

[NCERT] [Board Term II O.D. Set-I, 2016]

Ans. Reproduction : It is a (biological) process by which new individuals of the same species are produced by the existing organisms. 1

(i) Populations of organisms live in well defined places called niches in the ecosystem using their ability to reproduce. ½

(ii) Reproduction involves DNA copying which is the source of information for making proteins thereby controlling body design. ½

(iii) These body designs allow the organism to use a particular niche for the stability of the population of a species. ½

(iv) (Minor) variations may also lead to the stability of the species. **[CBSE Marking Scheme, 2016]** ½

OR

[Topper Answer, 2016]

U **Q. 4. What is regeneration ? Give one example of an organism that shows this process and one organism that does not. Why does regeneration not occur in the latter ? [Foreign 31/2/1, 2017]**

Ans. (i) Regeneration : Ability of organisms to give rise to new individual organisms from their body parts. **1**

(ii) Planaria/Hydra ½

(iii) Amoeba/Rhizopus/Banana/Sugarcane/any other ½

(iv) Regeneration is carried out by specialized cells which are not present in non regenerating organisms. **[CBSE Marking Scheme] 1**

U **Q. 5. In the context of reproduction of species state the main difference between fission and fragmentation. Also give one example of each. [Board Term-II O.D. Set II, 2016]**

Ans. Fission : It is the method of asexual reproduction in unicellular forms of life.

In this process the parent organism splits to form two or more daughter cells.

Example : *Amoeba / Plasmodium / Paramecium.*

(Or any other relevant example) 1, ½

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

Example : *Spirogyra.* **1½**

[CBSE Marking Scheme, 2016]

Detailed Answer :

Fission : It is defined as the splitting of a unicellular organism into two or more than two separate daughter cells. It is the most common and simplest method of asexual reproduction in unicellular organisms, such as bacteria and Protozoa. Generally it is of two types i.e. binary and multiple fission. In binary fission, parent organism divides into two identical daughter organism with definite orientation. In multiple fission, parent organism divides into many identical daughter organisms. The nucleus of the cell splits repeatedly to form many smaller nuclei called daughter nuclei surrounded by a little bit of cytoplasm and thin membrane around them. **1½**

Fragmentation : It is a form of asexual reproduction in which multicellular organisms like filamentous algae (*Spirogyra*) break up into two or more small fragments or pieces. On maturity, each of which subsequently grows to form a complete new organism. **1½**

R **Q. 6. What happens when :**

(a) Accidently, Planaria gets cut into many pieces ?

(b) Bryophyllum leaf falls on the wet soil ?

(c) On maturation sporangia of Rhizopus bursts ?

[Delhi Set 1, 2017]

Ans. (a) Each piece regenerates into new Planaria. **1**

(b) Bud, at its notches develop into new plants. **1**

(c) It releases spores which germinate into new mycelium in moist conditions. **1**

[Marking Scheme 2017]

Detailed Answer :

(i) When *Planaria* gets cut into many pieces, each piece regenerates into a new Planarian organism.

(ii) When *Bryophyllum* leaf falls on the wet soil, the buds that are produced in the notches along the leaf will develop into new plants by the process known as vegetative propagation.

(iii) When the sporangia of *Rhizopus* burst upon maturation, it releases spores which germinate into new mycelium in moist conditions. **3**

U **Q. 7. Explain the term "Regeneration" as used in relation to reproduction of organisms. Describe briefly how regeneration is carried out in multicellular organisms like *Hydra*. [O.D. Set I, 2016]**

Ans. Regeneration : It is the ability of an organism to give rise to a new organism/individual from their body parts. **1**

Regeneration in *Hydra* :

(i) The body of *Hydra* by any means is cut into number of pieces. ½

(ii) Each piece contains specialized cells. ½

(iii) These cells proliferate and make large number of cells. ½

(iv) From this mass of cells different cells undergo changes to become various cell types and tissues which finally develops into a new organism. **[CBSE Marking Scheme, 2016]** ½

OR

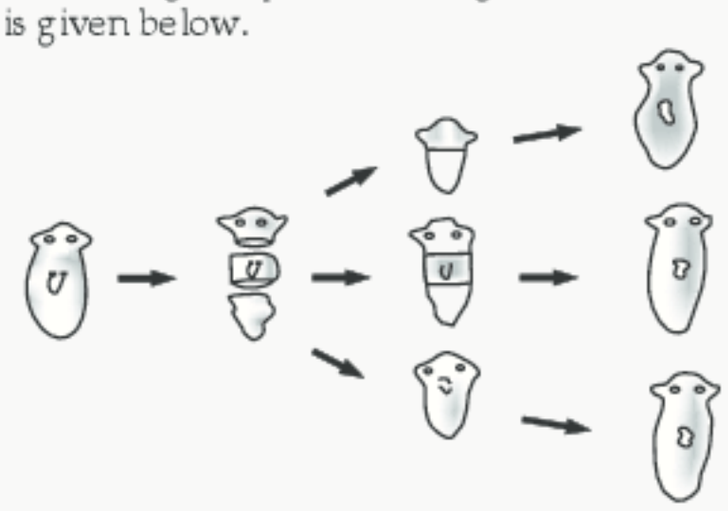
[Topper Answer, 2016]

U **Q. 8. What is multiple fission ? How does it occur in an organism ? Explain briefly. Name one organism which exhibits this type of reproduction.**
[Board Term-II, Delhi Set-II, 2016]

Ans. Multiple fission : The process of reproduction in which many individuals are formed or produced from the parent cell. 1
In this process, the nucleus divides repeatedly to produce large number of nuclei. Each nucleus gathers a bit of cytoplasm around itself, develops a membrane around each structure. Many daughter cells develop which on liberation grow into adult organism. 1½
Plasmodium exhibits this type of fission. ½
[CBSE Marking Scheme, 2016]

U **Q. 9. (i) With the help of a diagram demonstrate the process of regeneration as seen in *Planaria*.**
(ii) Which type of cells are used by such multi-cellular organisms to regenerate ?
[NCERT] [Board Term II, Set-GFUTB86, 2015]

Ans. (i) *Planaria* is a type of flatworm. It has the amazing capacity to regenerate its lost body part. When the flatworm is cut horizontally, separating the head from the tail, the tail will regenerate the lost head and the head will regenerate the lost tail. This process is known as regeneration. The diagram illustrating the process of regeneration in *Planaria* is given below.



Regeneration of *Planaria* 2
(ii) Specialized cells or Regenerative cells. 1
[CBSE Marking Scheme, 2015]

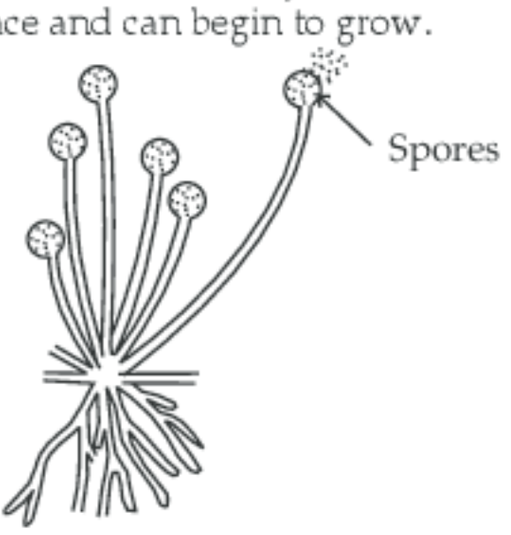
R **Q. 10. The process of spore formation takes place in many simple multicellular organisms which have certain reproductive parts that can be identified.**
(i) Name the organism using this process.
(ii) Name the reproductive and non-reproductive parts of such organisms.
[Board Term II Set GFUTB86, 2015]

Ans. (i) *Rhizopus*.
(ii) Reproductive part-Sporangia.
Non-reproductive part-Hyphae 1 + 1 + 1
[CBSE Marking Scheme, 2015]

U **Q. 11. Describe Reproduction by spores in *Rhizopus*.**
[O.D. 31/2 2017]

Ans. *Rhizopus* have sporangia which contain spores/ Diagram : ½, Labelling : ½ 1
When sporangia bursts the spores are liberated out. ½
They contain protective thick wall to tide over unfavourable conditions. ½
On return of the favourable conditions, spores germinate to grow into *Rhizopus*. 1
[Marking Scheme]

Detailed Answer :
Rhizopus reproduces by spore formation which is a type of asexual reproduction. It contains tiny blob-on-a stick like structures which are involved in reproduction. The blobs are sporangia which contain spores which are covered by thick walls that protects them until they come in contact with moist surface and can begin to grow. 2



Spore formation in *Rhizopus* 1

U **Q. 12. What is asexual reproduction ? Write the process of budding in *Hydra*.**
[Delhi Comptt. 31/1/1, 2017]

Ans. Asexual Reproduction : Mode of reproduction used by single organisms. 1
A bud develops as an outgrowth due to repeated cell division of reproductive cells at one specific site. These buds develop into tiny individuals, and when fully mature, detach from the parent body as new independent individuals. ½ × 4

Detailed Answer :
Asexual Reproduction is the process of producing new organisms from a single parent without the involvement of sex cells or gametes.

Budding in Hydra : Budding is the process of formation of an offspring from an outgrowth or bud of a parent. In Hydra it is usually formed in the lower half of the body. The buds separate from the parent soon after their formation or after some initial growth. A bud develops as an outgrowth due to repeated cell division at specific site which after developing into tiny individuals detach from the body of the parent to become new individuals. **1+2**

A **Q. 13. The picture given below depicts the process of asexual reproduction in *Plasmodium*.**

[Board Term II, Set-FF7NBE6, 2015]

(i) Name the process depicted above and define it.
(ii) What is meant by asexual reproduction ?

Ans. (i) Multiple Fission.

It is a division of single-celled organisms into many daughter cells simultaneously.

(ii) Creation of a new generation from a single individual or a single parent is involved. **1 + 1 + 1**

[CBSE Marking Scheme, 2015]

A **Q. 14. Colonies of yeast fail to multiply in water, but multiply in sugar, solution. Give reason why ?**

[NCERT Exemplar, 2017]

Ans. Yeast is a unicellular fungus hand fungi have saprophytic mode of nutrition. This means they cannot produce their own food but require an external source of carbon and energy. Therefore, it cannot grow in water as water does not have any carbon or energy source required for their growth, while it can grow in sugar solution, where it ferments sugar to produce energy and will have a carbon source for growth. Hence, colonies of yeast can be observed in sugar solution but cannot be observed in water.

A **Q. 15. Why is DNA copying an essential part of the process of reproduction ? What are the advantages of sexual reproduction over asexual reproduction ?**

[Board Term II, Foreign Set-II, 2015]

OR

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

Ans. DNA copying is essential because it makes possible the transmission of characters from parents to the next generation. **1**

Advantages of sexual reproduction over asexual reproduction-Sexual reproduction gives rise to variations; which are essential for evolution as well as survival of species under unfavourable conditions. **1 + 1**

[CBSE Marking Scheme, 2015]

R **Q. 16. Can you consider cell division as a type of reproduction in unicellular organism ? Give one reason.** **[NCERT Exemplar, 2017]**

Ans. Yes, because it results in the formation of two daughter cells, that is, it results in the production of more individuals of the organism. **2**

U **Q. 17. What is reproduction ? Explain two advantages of sexual reproduction over asexual reproduction.**

[Delhi Comptt. 31/1/3, 2017]

Ans. Reproduction : It is a (biological) process by which new individuals of the same species are produced by the existing organisms. **1**

Advantages of sexual reproduction :

(i) Leads to stability of population of species. **1**

(ii) Results in variations useful for the survival of species over time. **[Marking Scheme] 1**

U **Q. 18. List any two modes of asexual reproduction in animals. Under which mode of reproduction is vegetative propagation placed and why ? List two advantages of vegetative propagation.**

[Board Term II, Outside Delhi Set II, 2014]

Ans. The two modes of asexual reproduction in animals are :

(i) Binary fission, **(ii)** Budding.

Vegetative propagation is a form of asexual reproduction. It is the ability of plants to produce new plants from the vegetative parts, such as leaves, stems and roots, under favourable conditions. **1**

Advantages of vegetative propagation :

(i) Only one parent is required for reproduction; this eliminates the need of special mechanisms (pollination).

(ii) Many plants are able to tide over unfavourable conditions because of the presence of vegetative reproductive parts like tubers, corms and bulbs.

(iii) Plants that do not produce seeds are propagated by this method, *e.g.*, sugarcane and potato.

(iv) Vegetative propagation is a cheaper, easier and rapid method of propagation in plants than growing plants from their seeds. For example, lilies grow very slowly and take four to seven years to develop flowers when their seeds are grown, but flowers are produced only after a year or two when grown vegetatively.

(v) The trait (character) of the parent plant is preserved and the offspring are genetically identical.

(Any two) 2

U **Q. 19. Write one main difference between asexual and sexual mode of reproduction. Which species is likely to have comparatively better chances of survival-the one reproducing asexually or the one reproducing sexually ? Justify your answer.**

[Board Term-II, Foreign Set-I, 2015]

Ans. ➢ Asexual reproduction does not involve genetic fusion while sexual reproduction involves fusion of male and female gametes to form a zygote. **1**

(i) Species reproducing sexually have better chances of survival. **1**

(ii) Reason-Sexual reproduction gives rise to more variations which are essential for evolution as well as survival of species under unfavourable conditions. **[CBSE Marking Scheme, 2015] 1**

U **Q. 20. What is Vegetative Propagation ? List its any four advantages. [Delhi Comptt. 31/1/2, 2017]**

Ans. Vegetative Propagation : Process where plant parts–roots, stems and leaves are used to develop new plants. 1

Four advantages :

(i) Plants can bear flowers and fruits earlier than those produced from seeds

(ii) Plants that have lost the capacity to produce viable seeds can be grown.

(iii) Plants grown are genetically similar/clones of the parent plant

(iv) Economical, quick and easy method. ½ × 4 = 2

[Marking Scheme]

U **Q. 21. Explain the process of regeneration in *Planaria*. How is this process different from reproduction ?**

[Board Term-II, Delhi Set I 2015, OD 2014]

Ans. When *Planaria* is cut into many pieces, each piece grows into a complete organism; this regeneration process is carried out by specialized cell; which proliferate; develop and differentiate into various cell types and tissues. ½ × 4 = 2

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

[CBSE Marking Scheme, 2015] 1

R **Q. 22. Define the following processes of asexual reproduction :**

(i) Spore formation, (ii) Regeneration, (iii) Multiple fission.

[Board Term II, Set-8XSVHLC, 2014]

Ans. (i) Spore formation is a common method of asexual reproduction in many lower forms of life, like bacteria, fungi etc. It occurs mostly during unfavourable conditions such as extreme heat, dryness etc. The spores are asexual reproducing bodies enclosed in a thick walled structure called sporangium. On return of favourable conditions the sporangium wall bursts and the spores are released.

(ii) Regeneration means renewal, restoration, and growth. The process of getting back a full organism from its body parts is called regeneration. Some organism like *Hydra, Planaria* have the capability to develop a whole new organism from its cut body parts. Regeneration of an organism occurs by the process of growth and development. Regeneration occurs in those organisms which have relatively simple body organization consisting of few specialized cells.

(iii) In multiple fission, the nucleus divides several times simultaneously or successively into a number of daughter nuclei and then the cytoplasm divides into as many cells as there are nuclei, each cell containing a nucleus. It is the common form of asexual reproduction in certain acellular organisms. 1 + 1 + 1

[CBSE Marking Scheme, 2014]

U **Q. 23. (a) Name any two plants that reproduce by grafting.**

(b) List any two benefits to an organism that reproduces through spores ?

[Board Term II, Set (2044), 2012]

Ans. (a) Rose / Sugarcane, Grapes. 1

(b) (i) Many organisms can be produced at the same time. 1

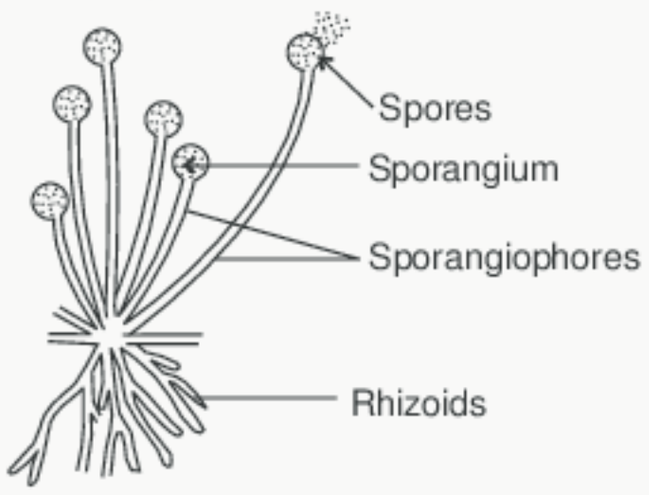
(ii) Organisms are able to tide over unfavourable conditions. 1

U **Q. 24. (i) With the help of a diagram, show asexual reproduction in *Rhizopus* ?**

(ii) How this method is advantageous for *Rhizopus* ?

[Board Term II, 2014]

Ans. (i) Spore formation takes place in *Rhizopus*. *Rhizopus* consists of fine thread like projection called hyphae. It has a knob like structure which is involved in reproduction called sporangia, containing spores, that develop into new *Rhizopus*. 2



(ii) More number of spores are produced which can easily help the *Rhizopus* to spread. 1

[CBSE Marking Scheme, 2014]

A **Q. 25. How do organisms, whether reproduced asexually or sexually maintain a constant chromosome number through several generations ? Explain with the help of suitable example. [Board Term-II, Delhi Set-I, 2016]**

Ans. (i) When organisms reproduce asexually, only mitotic divisions are involved and the chromosome number remains the same.

(ii) During asexual reproduction, the DNA (in the chromosomes) or the cells involved are copied and then equally divided among the two daughter cells. Thus, chromosome number remains unchanged. ½

(iii) In sexual reproduction, organisms produce gametes through a special type of division, meiosis–reductional division, in which the original number of chromosomes becomes half. These two gametes combine to form the zygote and the original number of chromosomes is restored.

(iv) In sexual reproduction specialized cells / germ cells with only half the number of chromosomes are formed. When these germ cells from two individuals combine to form a new individual, the original chromosome number is restored. ½ + ½

(v) Example : In humans, the parents father and mother each have 46 or 23 pairs of chromosomes. In the gametes–the sperm has half the number of chromosomes *i.e.*, 23 and the egg also has 23 chromosomes. When the sperm and the egg fuse, the zygote has 46 or 23 pairs of chromosomes. Thus, the chromosome number remains constant. 1½

[CBSE Marking Scheme, 2016]

A **Q. 26. What is the effect of DNA copying, which is not perfectly accurate, on the reproduction process ? How does the amount of DNA remain constant though each new generation is a combination of DNA copies of two individuals ?**

[Board Term II, O.D. Set-III, 2014]

Ans. Reproduction results in the production of offspring similar to parents in body design and form. The exact blue prints of body design is inherited in the offspring due to DNA replication/DNA copying. The imperfect DNA copying results in genetic variations that can be both useful or harmful for the offspring. The useful variations gets selected in nature and helps organism to survive in the changing environment while harmful variation gets eliminated.

If each new generation is to be the combination of the DNA copies from two pre-existing individuals, then each new generation will end up having twice the amount of DNA that the previous generation had. In sexual reproduction, the gametes usually contain half number of chromosomes and same numbers present in the body cells. These haploid gametes when fuse produce a new cell with double number of chromosomes than the gametes and same as the body cells. In this way organisms restrict doubling of DNA and maintain the chromosome number. 1½ + 1½

U **Q. 27. (i) Differentiate between binary and multiple fission. Name an organism that reproduces by multiple fission.**

[Board Term II, Foreign Set II 2014]

(ii) Vegetative propagation is beneficial to plants that are propagated asexually. Give two advantages.

[Board Term II, (2045), 2012]

Ans. (i) In binary fission, two daughter cells are formed and in multiple fission, many daughter cells are formed simultaneously. 1

Plasmodium which is a malarial parasite reproduces by multiple fission. 1

(ii) (a) Plants bear flowers and fruits earlier. ½

(b) Desirable traits can be propagated due to genetic similarity. ½

[CBSE Marking Scheme, 2014]

U **Q. 28. List three distinguishing features between sexual and asexual type of reproduction, in tabular form. [Board Term-II, O.D. Set II, 2015]**

Ans. Difference between Sexual and Asexual reproduction :

S. No.	Sexual Reproduction	Asexual Reproduction
(i)	It involves two parents.	It involves only one parent.
(ii)	Gametes are produced.	Gametes are not produced.
(iii)	Genetic variation occurs in the offspring.	Offsprings are identical.

[CBSE Marking Scheme, 2015] 1 + 1 + 1

R **Q. 29. (a) Name the following :**

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

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

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

[Board Term II Delhi Set III, 2015]

Ans. (a) (i) Hyphae **(ii)** Sporangia. ½ + ½

(b) Each sporangium contains hundreds of black-spots and these spores are dispersed into air to germinate on suitable substrate.

Spores have an outer thick wall that protects them in adverse conditions until they come in contact with another moist surface and begin to grow. 1

Functions : They germinate into new individuals under favourable conditions. 1

[CBSE Marking Scheme, 2015]

A **Q. 30. (i) Identify the process depicted in the diagram given below.**

[Board Term II, Set 6TM6KWC, 2015]

(ii) The part labelled as spores has a covering of thick walls around it. What is its advantage ?

(iii) What are hyphae ?

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

(ii) The thick walls protect the spores until they come in contact with soil.

(iii) The thread like projections are called hyphae. 1 + 1 + 1

A **Q. 31. What happens when**

(i) *Planaria* gets cut into two pieces ?

(ii) A mature *Spirogyra* filament attains considerable length ?

(iii) On maturation sporangia burst ?

[Board Term II, Foreign Set I 2016]

Ans.(i) Each piece regenerates into a new planaria. 1

(ii) Its filaments breaks into smaller pieces/fragments and each fragment gives rise to a new filament. 1

(iii) It releases spores which germinate into new mycelium in moist conditions. 1

[CBSE Marking Scheme, 2016]

Long Answer Type Questions (5 marks each)

U **Q. 1. What is vegetative propagation ? List with brief explanation three advantages of practising this process for growing same types of plants. Select two plants from the following which are grown by this process :**

Banana, Wheat, Mustard, Jasmine, Gram.

[Board Term-II, Foreign I, 2016]

Ans. (a) Vegetative propagation is the development of a new plant from the vegetative parts / roots, stem and leaves of a plant. 1

(b) Advantages : (i) Such plants can bear flowers and fruits earlier than those produced from seeds

(ii) Allows propagation of plants (banana, orange etc) that have lost capacity to produce seeds.

(iii) All plants produced are genetically similar to the parent plant and hence have all its characters.

3×1 = 3

➢ Jasmine, banana. ½ + ½

[CBSE Marking Scheme, 2016]

R **Q. 2. Name the following : [KVS-2014]**

An organism which reproduces by :

(i) Binary fission

(ii) Multiple fission

(iii) Budding

(iv) Fragmentation

(v) Spore formation

Ans. (i) *Amoeba*

(ii) *Plasmodium*

(iii) *Hydra*

(iv) *Spirogyra*

(v) *Rhizopus.* 1 × 5

R **Q. 3. (i) What are the different methods of asexual reproduction ? [ODE-2017]**

(ii) Explain budding and regeneration with diagrams.

[KVS-2014]

Ans. (a) (i) Fission, **(ii)** Budding, **(iii)** Fragmentation, **(iv)** Spore formation, **(v)** Vegetative propagation.

(b) Regeneration : See Ans. of Q. 7 (i). (S.A.T.Q-II) Topic 1.

Budding : In *Hydra,* a bud develops as an out-growth due to repeated cell divisions at one specific site. These buds develop into tiny individuals, when full mature they detach from the parent body and start independent existence. 2 + 3

(for diagram see Q. No. 9 (S.A.T.Q-I) Topic-I.)

A **Q. 4. Different organisms reproduce by different methods suitable to their body designs.**

(i) Justify the above statement using examples of three different organisms which reproduce by different methods of asexual reproduction.

(ii) Differentiate between sexual and asexual modes of reproduction. [Board Term II, Set-FF7NBE6, 2015]

Ans. (i) *Amoeba* : Binary fission

Plasmodium : Multiple fission

Hydra : Budding

Planaria : Regeneration **(Any three + Explain)**

(ii) Sexual-two parents; Asexual-single parent.

[CBSE Marking Scheme, 2015] 5

Detailed Answer :

(a) (i) Binary Fission in *Amoeba*—In this method, the nucleus first divides amitotically into two, followed by the division of the cytoplasm. The cell finally splits into two daughter cells. So, from one *Amoeba* parent, two daughter amoebae are formed.

(ii) Budding in *Hydra*—In Budding, a small part of the body of the parents grows out as a 'bud' which then detaches and becomes a new organism. *Hydra* reproduces by budding using the regenerative cells. A bud develops as an outgrowth in *hydra* due to repeated cell division at one specific site. When fully mature, the bud detaches itself from the parent body and develops into new independent individuals.

(iii) Regeneration in *Plauaria*—In this method, small cut or broken parts of the organisms body grow or regenerate into separate individuals. *Planaria* can be cut into any number of pieces and each piece grows into a complete organism.

(b) Difference between Sexual and Asexual Reproduction :

S No.	Sexual Reproduction	Asexual Reproduction
(i)	Two parents are required.	Only one parent is required.
(ii)	Offsprings are genetically dissimilar from parents.	Offsprings are identical to parents.

3 + 2

U **Q. 5. Differentiate between the following :**

(i) Pollen tube and style.

(ii) Fission in *Amoeba* and *Plasmodium*

(iii) Fragmentation and regeneration

(iv) Bud of *Hydra* and bud of *Bryophyllum*

(v) Vegetative propagation and Spore formation

[Board Term II, Set-8XSVHLC, 2014]

Ans. (i)

Pollen Tube	Style
Pollen tube is the part of the male gametophyte in plants. It is a long tube like structure that carries the male gamete from the stigma to the ovules.	It is a part of the female reproductive organ, carpel. It joins the stigma to the ovary. It is made up of soft tissues which allows the pollen tube to grow downwards towards the ovule.

(ii) Binary fission in *Amoeba* : A single cell divides itself into two daughter cell is known as binary fission, binary fission can also occur in particular axis. *e.g., Amoeba.*

Multiple fission in *Plasmodium* : It is also a mode of asexual reproduction in which a cell divides itself into many daughter cells simultaneously. It occur in definite orientation. *e.g.,* yeast, malarial parasites.

(iii) Regeneration is of two types, in the first type, a part of the body that gets broken off or cut is regenerated. For example, lizards cast off their tails to escape predators and then regenerate them. The other type of regeneration involve the capacity to give rise to an entire organism from a cut part. It is seen in small invertebrates such as *Planaria* and *Hydra.*

Fragmentation is also a mode of asexual reproduction. It is the unintentional cutting up of the body of an organism which each grows into different organism. It is most commonly seen in some algae.

(iv) In *Hydra,* the cells divide rapidly at a specific site and develop as an outgrowth called a bud. These buds, while attached to the parent plant, develop into small individuals. When this individual becomes large enough, it detaches itself from the parent body to exist as an independent individual.

In the *Bryophyllum* the leaves have small buds (as in potato). These buds later converts into small and very small plants which also have roots present on them. When these buds start growing further then the leaf becomes heavy and falls on the ground. Then the buds which are present on the leaf dumps into ground and forms a plant.

(v) Vegetative propagation : It is the ability of plants to reproduce by producing new plants from vegetative parts such as roots, stem, and leaves.

Spore formation : Spore formation is the mode of asexual reproduction in some organisms like fungi in which it gives rise to a globular structure known as sporangia, which contains spores. The sporangia burst to release spores and each of these spores germinates to produce a new individual. 1×5

[CBSE Marking Scheme, 2014]

U **Q. 6. (i) List three distinguishing features between sexual and asexual types of reproduction.**

(ii) Explain why variations are observed in the offspring of sexually reproducing organisms?

[Board Term II, Foreign Set I, II, III, 2014]

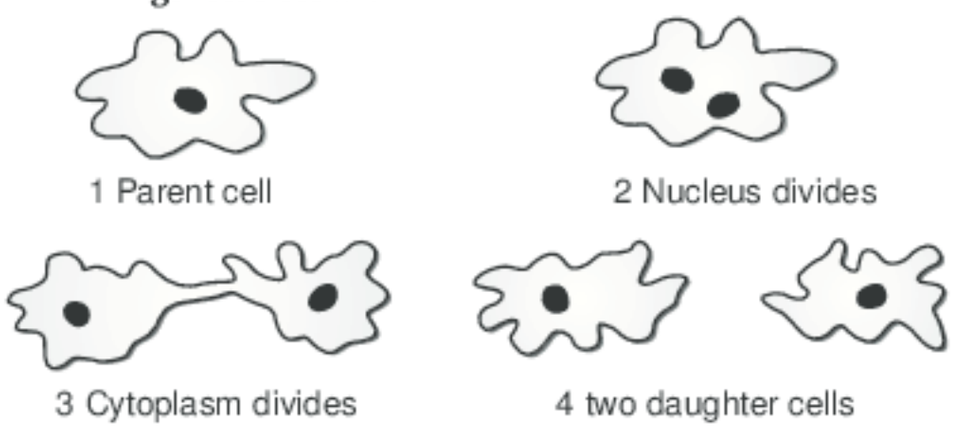
[Board Term-II Delhi I, 2013]

Ans. (i)

S. No.	Sexual Reproduction	Asexual Reproduction
1.	It produces new organism from two parents.	It produces new organism from a single parent.
2.	It involves sex cells or gametes.	It does not involve sex cells or gametes.
3.	Offsprings are not identical to the parents.	Offsprings are identical to the parents.

(ii) Sexual reproduction promotes diversity of characters in the offsprings. It result in new combinations of genes brought together in the gamete and this reshuffling increases genetic variation. It plays a prominent role in the origin of new species. The sexual mode of reproduction incorporates process of combining DNA from two different individuals during reproduction. 3 + 2

A **Q. 7. (i) Identify the process depicted in the picture given below :**



(a) Name the organism that divides by the above process.

(b) Compare the above process with multiple fission.

(c) State the type of reproduction in the above process and define it.

(ii) Differentiate between fission in *Amoeba* and *Leishmania*. [Board Term II, Set-UV6TFLN, 2015]

Ans. (i) (a) Binary fission—*Amoeba*

(b) Binary fission : Two daughter cells.
Multiple fission : Many daughter cells simultaneously

(c) Asexual reproduction, involvement of a single parent.

(ii) In *Amoeba,* splitting of two cells during division can take place in any plane.

In *Leishmania,* binary fission occurs in a definite orientation in relation to the whip like structure.

[CBSE Marking Scheme, 2015] 3 + 2

TOPIC-2
Sexual Reproduction in Plants

Very Short Answer Type Questions (1 mark each)

R Q.1. **What is the function of petals in a flower ?**
[Board Term II, Set-AIS, 2013]

Ans. The functions of petals is to attract insects for pollination and to protect the reproductive organs, which are at the centre of the flower. **1**

R Q.2. **What is the function of pollen grains in flowers ?**

Ans. Pollen grains fertilise the egg cell present in the embryo sac. **1**

R Q.3. **What is the function of micropyle ?**

Ans. The micropyle opening serves as a passage for the entry of the pollen tube into the ovule. **1**

R Q.4. **What is the technical term given to the stalk of the flower ?**

Ans. Pedicel. **1**

R Q.5. **Which group of plants show double fertilization?**

Ans. Angiosperms (flowering plants). **1**

R Q.6. **What is the other name of (i) Androecium, (ii) Gynoecium ?**

Ans. Androecium — Stamens
Gynoecium — Pistil / Carpel ½ + ½

R Q.7. **List two unisexual flowers.**
[Board Term-II, Foreign Set II, 2016]

Ans. Watermelon, papaya. ½ + ½
[CBSE Marking Scheme, 2016]

A Q.8. Name the parts of a bisexual flower that are not directly involved in reproduction.
[Board Term II, Foreign Set III, 2015]

Ans. Sepals/calyx
Petals/corolla
Thalamus **(Any two)** ½ + ½
[CBSE Marking Scheme, 2015]

R Q.9. **State the number of male gametes produced by each pollen grain.** **[Board Term II, 2013]**

Ans. Each pollen grain produced two male gametes. **1**

U Q.10. **What happens to the ovule and the ovary after fertilization ?**

Ans. After fertilisation, ovule changes to seed and ovary to fruit. **1**

R Q.11. **What is the end product of double fertilization ?**

Ans. Seeds and fruits. ½+½

R Q.12. **Give the terms for the pollination by winds and bats.**

Ans. Wind pollination — Anemophily
Bat pollination — Chiropterophily ½+½

A Q.13. **Why is fertilization not possible without pollination ?** **[Board Term-II, Foreign III, 2016]**

OR

Why cannot fertilisation take place in flowers if pollination does not occur ?
[NCERT Exemplar, 2017]

Ans. Pollination allows pollen grains that produce male germ cell to reach the carpel which contain the female germ cell, egg. Thus fertilization which involves fusion of male and female germ cells can only occur after pollination. **1**
[CBSE Marking Scheme, 2016]

Short Answer Type Questions-I (2 marks each)

U Q.1. **Mention any two functions of flowers ?**

Ans. Functions of a flower are :
(i) To attract pollinators and help in pollination.
(ii) To bear male and female sex organs. **1 + 1**

U Q.2. **What is the significance of pollination ?**

Ans. (i) It is necessary for seed formation and thus, perpetuation of species.
(ii) It stimulates the development of fruits.
(iii) Cross-pollination brings about genetic recombination. **(Any two) 1 + 1**

U Q.3. **What are the two possibilities of Self-pollination?**

Ans. (i) Self-pollination can be between the same flower.
(ii) It can take place between two different flowers of the same plant. **1 + 1**

U Q.4. **Explain giving one example of each, the unisexual and bisexual flowers.**
[Board Term II Delhi, 2011]

Ans. Unisexual is the plant whose flowers contain either stamens or carpels but not both.
Example : Papaya, watermelon.
Bisexual is the plant whose flowers contain both stamens and carpels.
Example : Hibiscus, Mustard. **1 + 1**
[CBSE Marking Scheme, 2011]

U Q.5. **(i) What is the fate of the ovules and the ovary in a flower after fertilization ?**
(ii) How is the process of pollination different from fertilization ? **[Board Term II, Set [2014] 2012]**

Ans. **(i)** After fertilization, ovules become seeds and ovary forms the fruit. ½+½

(ii) Pollination is the transfer of pollen grains from anther to the stigma of a flower. ½

Fertilization is the fusion of male and female gametes. **[CBSE Marking Scheme, 2012]** ½

U **Q. 6. Describe about the different parts of a stamen in male reproductive organ of a plant.**

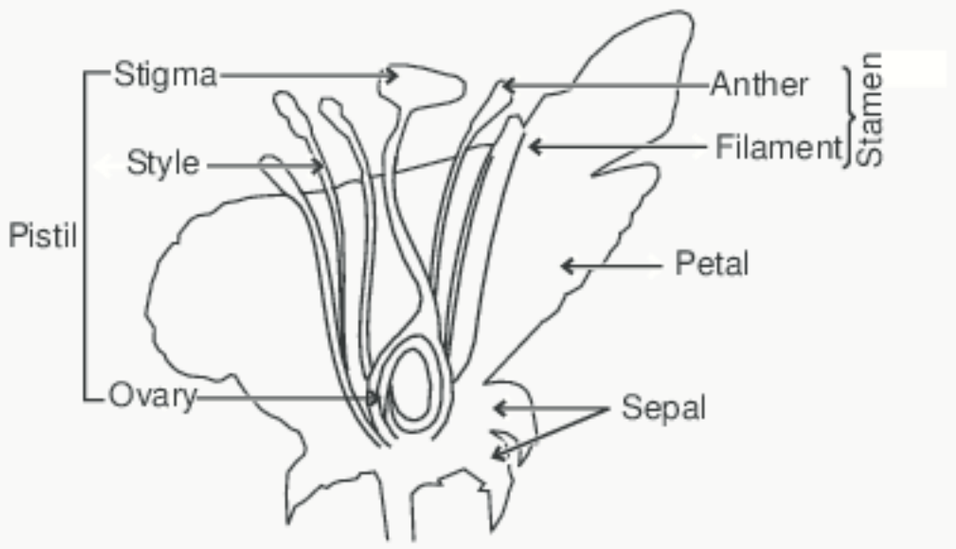
Ans. Stamen is the male reproductive organ of the plant. A flower usually has a number of stamens in it.

Each stamen is made up of two parts-a filament, the stalk of stamen and an anther, the swollen top of stamen. Anther is the upper bilobed part and each lobe contains two pollen sacs within which numerous pollen grains are produced. 2

U **Q. 7. Draw a labelled longitudinal structure of a flower showing its parts.**

[Board Term II, Set (2018), 2012, DDE 2017]

Ans.



Longitudinal section of a flower 2

[CBSE Marking Scheme, 2012]

Short Answer Type Questions-II

(3 marks each)

U **Q. 1. What is meant by pollination ? Name and differentiate between the two types of pollination.**

[Board Term-II Delhi Set III, Foreign Set I, 2016]

Ans. **(i) Pollination :** The transfer of pollen grains from the anther to the stigma is called pollination. 1

The two types of pollination :

(ii) Self pollination : When the pollen grains from the stamens of a flower fall on the stigma of the same flower, then self pollination occurs. ½ + ½

(iii) Cross pollination : When pollen grains from the stamens of a flower fall on the stigma of another flower, then cross pollination occurs. ½ + ½

[CBSE Marking Scheme, 2016]

R **Q. 2. Describe in brief the function of various parts of female reproductive part of bisexual flower.**

[Board Term II, Foreign Set I, II, 2014]

Ans. **(i) Sepals and petals :** Sepals in the calyx cup protect the flower in the bud stage. They persist in the fruit. Petals of insect pollinated flowers are brightly coloured and scented to attract bees and butterflies for pollination. They are colourless and inconspicuous in wind pollinated flowers.

(ii) Stamen : This is the male reproductive part of the flower. The anther produces pollen grains.

(iii) Carpel : It has a swollen bottom part called ovary, a middle elongated part called style and a sticky terminal part called stigma. The ovary contains ovules which contain the female gametes - the eggs. 1 + 1 + 1

U **Q. 3. Name three parts of carpel and give one function each.** **[Board Term II, Set AISI, 2013]**

Ans. The three parts of carpel are :

(i) Ovary : It contains the ovule.

(ii) Style : It exposes the stigma for pollination.

(iii) Stigma : It is sticky and receives the pollen grains during pollination. 1 + 1 + 1

U **Q. 4. (i) Why is vegetative propagation practised for growing some types of plants ?**

(ii) Name the different parts of a flower that has germ cells.

(iii) List any two agents of pollination.

[Board Term II, Set A1, 2011]

Ans. **(i)** Because they produce flowers and fruit early. 1

(ii) Stamen and pistil. 1

(iii) Wind, water, insects. **(Any two)**

U **Q. 5. (i) What is the difference between self-pollination and cross pollination ?**

(ii) What happens to the pollen which falls on a suitable stigma ? Explain.

[Board Term II, 2011, Set B1]

Ans. **(i) Self-pollination** is the transfer of pollen grains from the anther of one flower to the stigma of the same flower or another flower of the same plant. 1

Cross pollination is the transfer of pollen-grain from the anther of one flower to the stigma of another flower growing on another plant of the same species. 1

(ii) The pollen grain starts germinating and forms a pollen tube. The pollen tube grows in the style till reaches the ovule through micropyle where it fertilizes with female gamete. 1

R **Q. 6. Enumerate the method of fertilisation as seen in a flowering plant.**

Ans. In plants, pollination is followed by fertilisation. The pollen grains deposited on the stigma form tubes called pollen tubes. One pollen tube grows through the style and reaches the ovary, where ovules are located. Inside the ovule, the pollen tube releases two male gametes into the embryo sac. The embryo sac of the ovule contains the egg. One male gamete fuses with the egg. This fusion is called Syngamy. The other male gamete fuses with the polar nuclei. This process is called the triple fusion. This mechanism of two fusions occurring in an embryo sac is called double fertilisation. After

fertilisation, ovary develops into the fruit and ovule into the seeds. 3

R **Q. 7. What is a seed ? How does it help in reproduction in plants ?**

Ans. A seed is the reproductive unit of a plant which can be used to grow into a new plant. It contains a body plant or embryo and food for the baby plant. The baby plant present in a seed is in the dormant or inactive state. When the seeds get suitable conditions of water, warmth, air and light, then new plants grow out of these seeds. In this way, the parent plant reproduces more plants like itself by forming seeds through flowers. 3

R **Q. 8. Mention the important post-fertilisation changes in the flower.**

Ans. The important post-fertilisation changes in flower are :

(i) Sepals, petals, stigma, style and stamen degenerate.

(ii) The fertilised egg develops into embryo.

(iii) The ovary ripens into fruit.

(iv) The ovules ripens into seeds.

(v) The integument of ovule changes into seed coat and funicle changes into stalk of the seed.

½+½+½+½+½+½

R **Q. 9. What is sexual reproduction ? List its four Significance.[Board Term II, Foreign Set I 2016]**

Ans. Two major processes namely formation of gametes and fusion of gametes constitute sexual reproduction 1

Significance–(i) Incorporates the process of combining DNA from two different individuals during reproduction.

(ii) Increases genetic variation.

(iii) Promotes diversity in the offsprings.

(iv) Plays a role in the origin of new species. $4 \times ½ = 3$

[CBSE Marking Scheme, 2016]

U **Q. 10. Draw longitudinal section of a bisexual flower and label the following parts on it :**

(i) Anther, (ii) Ovary, (iii) Stigma, (iv) Style.

[Board Term-II, Foreign Set II, 2015]

Ans.

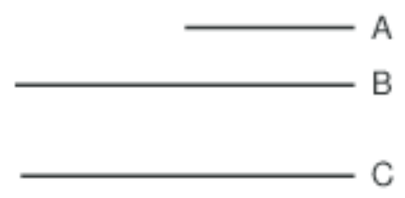
Drawing 1

4 correct labelling **(i)** Anther **(ii)** Ovary **(iii)** Stigma **(iv)** Style ½ × 4

[CBSE Marking Scheme, 2015]

U **Q. 11. Name the parts A, B and C shown in the following diagram and state one function of each.**

[Board Term- II, Delhi Set I, 2016]



Ans. A. Anther : It produces pollen grains. ½ + ½

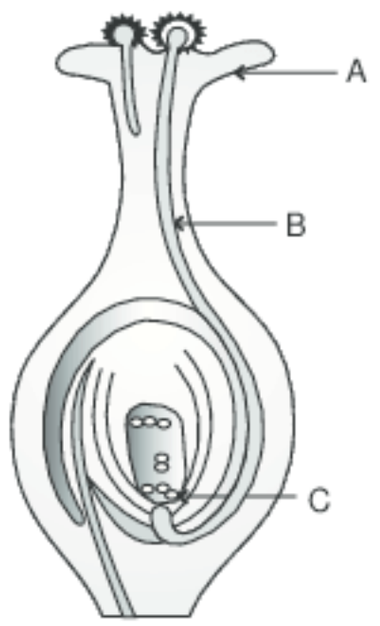
B. Style : It provides the path through which the pollen tube grows and reaches the ovary. ½ + ½

C. Ovary : It contains ovules and each ovule has an egg cell/female gamete. It develops into fruit after fertilization.

[CBSE Marking Scheme, 2016] ½ + ½

A **Q. 12. Name the parts A, B and C shown in the diagram and write their functions.**

[Board Term-II, Delhi III, 2015]



Ans. Part A is Stigma.

Function : It is the terminal part of carpel, which may be sticky and helps in receiving the pollen grains from the anther of stamen during pollination.

Part B is Pollen tube.

Function : The pollen tube grows out of the pollen grain through the style to reach the ovary.

Part C is Female Germ Cell.

Function : It is a female gametes which fuses with male gamete to form a diploid cell known as zygote.

½+½+½+½+½+½

R **Q. 13. In a germinating seed, which parts are known as future shoot and future root ? Mention the function of cotyledon.[Board Term II, SQP, 2016]**

Ans. Future shoot–Plumule

Future root–Radicle

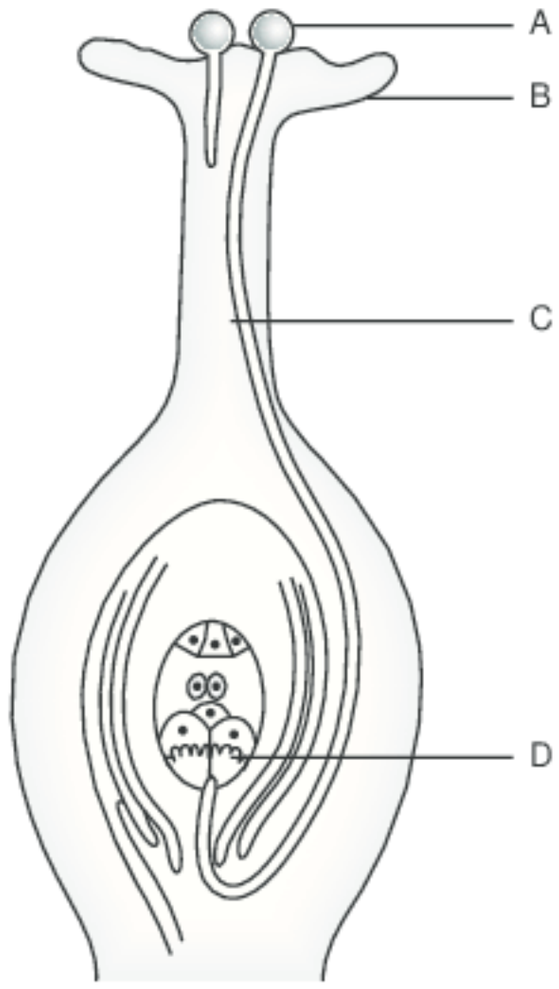
Function of Cotyledon–It store food for the future plant or embryo.

[CBSE Marking Scheme, 2016] 1+1+1=3

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

[Board Term II, OD Set I, 2016]

(b)



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

Ans. (a) (i) Involvement of two different individuals.

(ii) Creation of new combination of variants. ½ + ½

(b)(i) pollen/pollen grain.

(ii) by pollination/agents of pollination.

(iii) It (pollen tube) helps male gamete to reach egg (ovule).

(iv) Converts into embryo **[CBSE Marking Scheme, 2016]** 4 × ½ = 2

OR

[Topper Answer, 2016]

R **Q. 15. Name the reproductive parts of an angiosperm. Where are these parts located ? Explain in brief the structure of its female reproductive parts.**

[Board Term-I, Foreign Set II 2016]

Ans.(i) Stamen and Carpel. **1**

(ii) located in the flower. ½

(iii) Carpel is made up of three parts–the bottom swollen part is ovary, middle elongated part is the style, terminal sticky part is stigma.

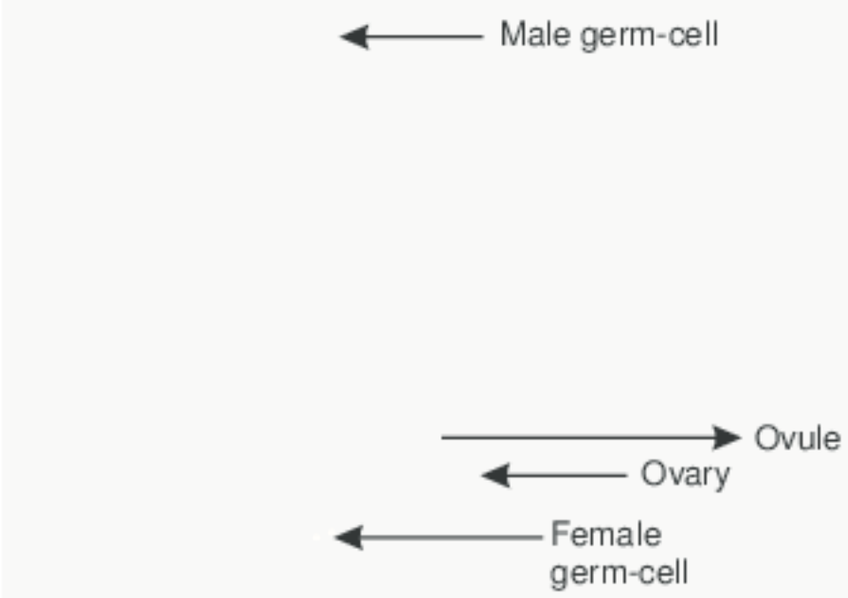
[CBSE Marking Scheme, 2016] ½ × 3 = 1½

U **Q. 16. Draw a diagram of the longitudinal section of a flower exhibiting germination of pollen on stigma and label**

(i) Ovary, (ii) Male germ-cell, (iii) Female-germ cell and (iv) ovule on it.

[Board Term-II, Foreign Set-III, 2015]

Ans.



Drawing 1

Four correct labelling, viz., ovary, male germ cell, female germ cell and ovule. ½ × 4

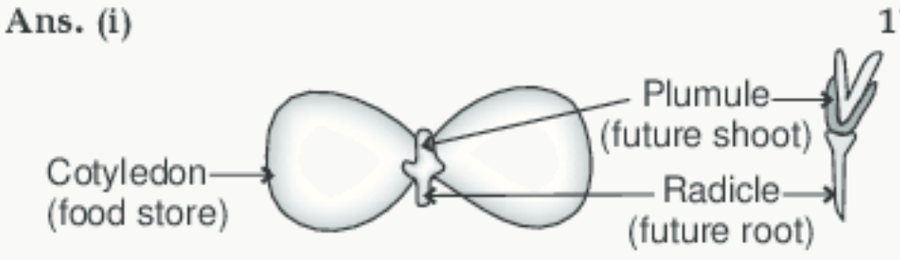
[CBSE Marking Scheme, 2015]

R **Q. 17. (i) Draw a neat labelled diagram of a germinated seed and label radicle, plumule and cotyledon.**

(ii) Mention function of each of these parts.

[Board Term II, Set (2045) 2012]

Ans. (i) **1½**

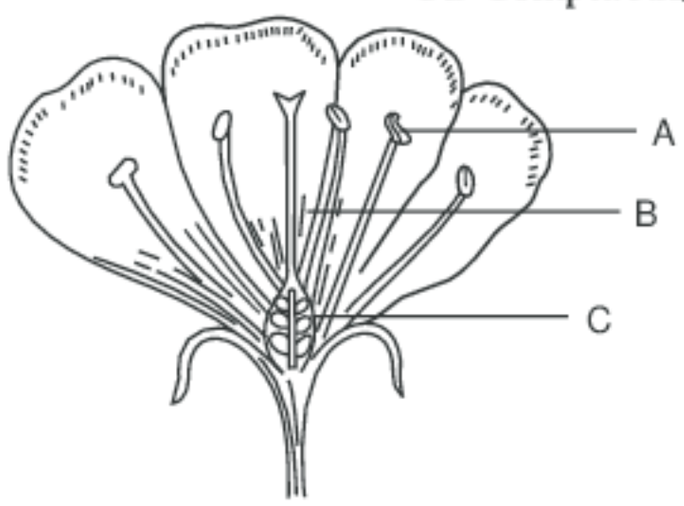


(ii) (a) Radicle : Future root, (b) Plumule : Future stem, (c) Cotyledon (food store). **1½**

[CBSE Marking Scheme, 2012]

A **Q. 18. Name the parts A, B and C shown in the given diagram and state one function of each part.**

[Board Term II, Set A1, 2011, OD Comptt. 321/1, 2017]



Ans. A—Anther (Produces pollen grains) ½+½

B—Style, (Passage of pollen tube) ½+½

C—Ovary, ovary contains ovules. Each ovule has an egg which on fertilization matures into seed. ½ + ½

Long Answer Type Questions

(5 marks each)

R **Q. 1. (a) What is pollination ? Give its two types.**

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

(i) Stigma;

(ii) Pollen tube with a male germ cell;

(iii) Female germ cell. [Delhi Comptt. 31/1/1, 2017]

Ans. (a) Pollination : Process of transfer of pollen grains from the anther to the stigma of the flower **1**

Two types : Self-pollination and Cross pollination ½, ½

(b)

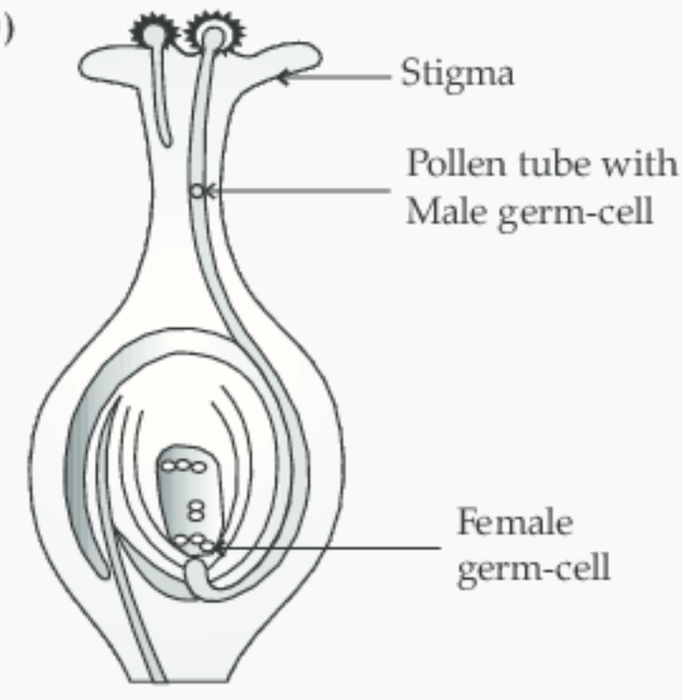


Diagram **1½**

Three labellings ½ × 3

[Marking Scheme, 2017]

U **Q. 2. Give one example each of unisexual and bisexual flowers. Differentiate between the two types of pollination that occur in flowers. What happens when a pollen lands on a suitable stigma ? Write about the events that occur till the seed formation in the ovary. [Foreign 31/2/1, 2017]**

Ans. Unisexual Flower : Papaya/Water-melon/ any other (any one) ½

Bisexual Flower : Hibiscus/Rose/ any other (any one) ½

Self pollination : The pollen grains are transferred from the anther to the stigma of the same flower or to the flower of the same plant **1**

Cross pollination : The pollen grains are transferred from the anther to the stigma of a flower of a different plant. **1**

- After pollen lands on a suitable stigma, a pollen tube grows out of pollen grain and travels through the style to reach the ovary ½
- The male germ cell fuses with the female germ cell to form a zygote. ½
- Zygote divides several times to form an embryo within the ovule ½
- The ovule develops tough coat and gradually gets converted into a seed ½

(Marking Scheme)

U **Q. 3. (i) Define the terms pollination and fertilisation.**
(ii) Distinguish between self pollination and cross pollination.

Ans. (i) Pollination : It is the transfer of pollen grains from the anther of a stamen to the stigma of a carpel.

Fertilisation : It is defined as the fusion of a male gamete with a female gamete to form a zygote during sexual reproduction.

(ii) Difference between self pollination and cross pollination :

S. No.	Self Pollination	Cross Pollination
(i)	Self-pollination occurs within a flower or between two flowers of the same plants.	Cross-pollination occurs between two flowers borne on different plants of the same species.
(ii)	Flowers do not depend on other agencies for pollination.	Agents such as insects, water and wind are required for pollination.
(iii)	Flowers are not attractive nor do they produce nectar.	Flowers attract insects by various means like coloured petals, scent and nectar.

2 + 3

U **Q. 4. (i) Give one example each of a unisexual and a bisexual flower.**
(ii) Mention the changes a flower undergoes after fertilisation.
(iii) How does the amount of DNA remain constant though each new generation in a combination of DNA copies of two individuals ?
[Board Term II, Delhi Set I, II, III, 2014]

Ans. (i) Unisexual flowers : Cucumber, pumpkin, water melon, papaya, etc.

Bisexual flowers : Hibiscus, rose, lily, etc. (Any one example)

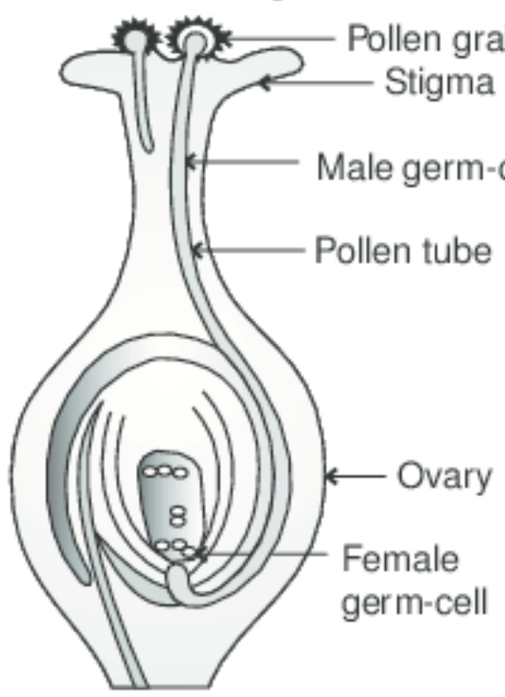
(ii) Changes in a flower after fertilisation : The outer layers of the ovule become impervious and hard and function as a seed coat. An ovule with an embryo inside is called a seed.

The ovary enlarges and ripens to become a fruit. Other floral parts such as sepals, petals, stamens, styles and stigma may fall off. However, in some cases, they remain persistent in the fruit.

(iii) Deoxyribonucleic acid (DNA) copying is an essential part of reproduction, as it passes genetic information from parents to offspring. The reproducing cells produce a copy of their DNA through some chemical reactions and result in two copies of DNA. The copying of DNA always takes place along with the creation of additional cellular structure. This process is then followed by the division of a cell into two cells. In this way, the amount of DNA remains constant through each new generation. **1 + 2 + 2**

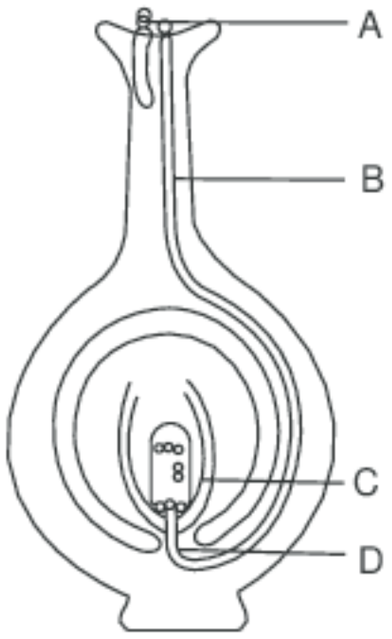
U **Q. 5. (i) Draw a diagram showing germination of pollen on stigma of a flower.**
(ii) Label pollen grain, male germ cells, pollen tube and female germ cell in the above diagram.
(iii) Define fertilization in plants. [KVS-2014]

Ans.



The fusion of male and female gametes of all sexually-reproducing organisms is called fertilization. **2 + 2 + 1**

A **Q. 6. (a) Name the parts labelled as A, B, C and D in the diagram given below :**



(b) What is pollination ? State its significance.

(c) How does fertilisation occur in flowers ?
Name the parts of the flower that develop into (i) seed, and (ii) fruit after fertilization.

[Board Term II, Outside Delhi Set I, II, III, 2014]

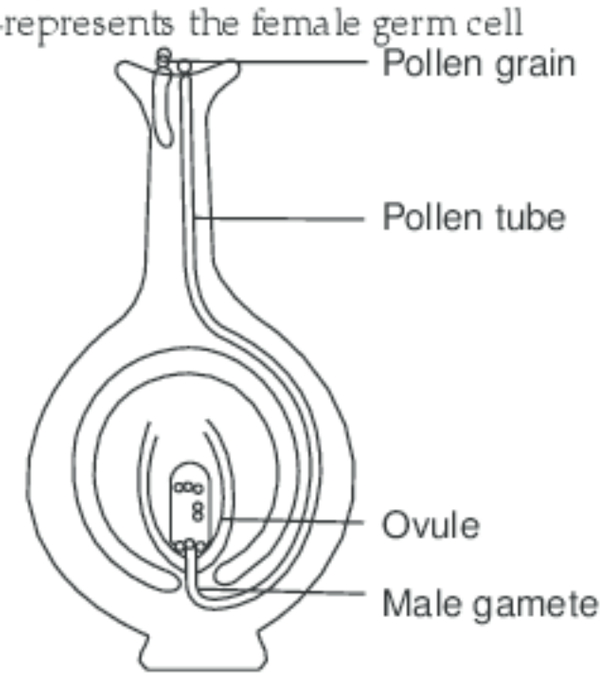
Ans. (a) In the given figure, **1**

A—represents the pollen grain

B—represents the pollen tube

C—represents the ovary

D—represents the female germ cell



(b) The transfer of pollen grains from the anther to the stigma of a flower is known as pollination. **1**

Significance of pollination :

(i) It is a significant event because it precedes fertilization.

(ii) It brings the male and female gametes closer for the process of fertilization.

(iii) Cross-pollination introduces variations in plants because of the mixing of different genes. These variations further increase the adaptability of plants towards the environment or surroundings. **1**

(c) Double fertilization is a characteristic feature of flowering plants. In this process, out of the two sperm nuclei, one sperm nucleus fuses with the egg nucleus to form an embryo (process is called syngamy) and another fuses with the polar nucleus to form an endosperm (process is called triple fusion). Because two kinds of fusion—syngamy and triple fusion—take place, the process is known as double fertilisation. After fertilisation,

(i) the ovule develops into a seed

(ii) the ovary develops into a fruit **2**

A Q. 7. A. Draw a longitudinal section of a flower and label the following parts :

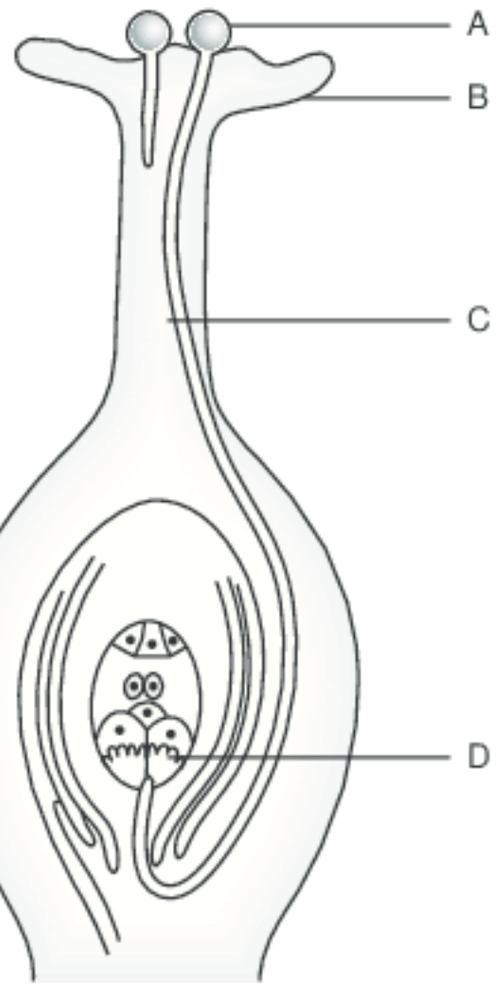
(i) Part that develops into a fruit

(ii) Part that produces pollen grain

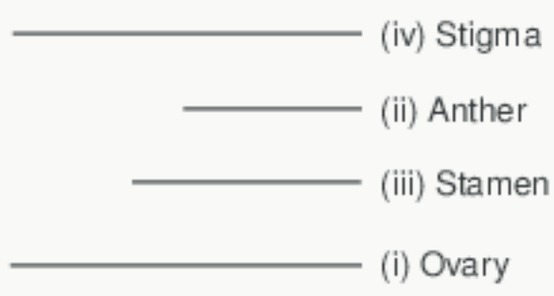
(iii) Part that transfers male gametes

(iv) Part that is sticky to trap

B. Name the parts labelled A, B, C, D in the diagram given below : [Board Term-II, SQP, 2016]



Ans. A.



2½

B. A–Pollen grain
B–Pollen tube
C–Ovary 2½
D–Female gamete

[CBSE Marking Scheme, 2016]

A Q. 8. (a) Identify A, B, and D in the given diagram and write their names.

(b) What is pollination ? Explain its significance.

(c) Explain the process of fertilization in flowers. Name the parts of the flower that develop after fertilization into

(i) seed,

(ii) fruit. [Board Term-II, Foreign Set I 2015]

Ans. (a) A—Stigma

B—Pollen tube

C—Ovary

D—Female germ cell/Egg cell ½×4 = 2

(b) Pollination—Transfer of pollen grains from anther to the stigma of a flower. ½

Significance of pollination—Process of pollination leads to fertilization as it brings the male and female gametes together for fusion. ½

(c) After a pollen falls on a suitable stigma, the pollen tube grows out of the pollen grain and travels through the style to reach the ovule in the ovary. Here the male germ cell (carried by the pollen tube) fuses with the female germ cell to form a zygote. **1**

(i) Ovule ½

(ii) Ovary **[CBSE Marking Scheme, 2015]** ½

U **Q. 9. What is pollination ? How does it occur in plants? How does pollination lead to fertilization? Explain. [Board Term II, O.D. Set-III, 2013]**

Ans. The transfer of pollens from anther to the stigma of a flower is called pollination.

The transfer is accomplished by an external agency such as wind (anemophily), water (hydrophily), insects (entomophily), birds (ornithophily), bats (chiropterophily), etc. Both wind and water are abiotic agencies while insects, birds, bats etc. are biotic agencies of pollination.

After falling on stigma, the pollen grain absorbs water and nutrients. It produces a tube called pollen tube. Pollen tube grows through style and reaches the ovary. Its tip contains a tube nucleus and two male gametes or sperm cells. The advancing pollen tube enters an ovule, generally through micropyle and reaches the interior of the embryo sac. Here the tube bursts to release its two male gametes. One male gamete fuses with egg to form zygote and the second male gamete fuses with binucleate central cells which forms endosperm. 1 + 1½ + 2½

TOPIC-3
Reproduction in Human Beings

Very Short Answer Type Questions (1 mark each)

R **Q. 1. What is fertilisation ? Where does it occur in a human female ? [Foreign 31/2/3, 2017]**

Ans. Fission of male and female gamete is known as fertilization. It occurs in fallopian tube. ½ + ½

R **Q. 2. What is gestation period ?**

Ans. The time period from the development of foetus inside the uterus till birth is called gestation period. **1**

A **Q. 3. What happens when egg is not fertilized ?**

[NCERT]

Ans. The lining of the uterus becomes spongy and thick to nourish the embryo but when the egg is not fertilized, the lining breaks down and comes out through vagina in the form of blood and mucus. **1**

R **Q. 4. In the human female reproductive system where does fertilization occur ?**

[Board Term II, Set-GFUTB86, 2015]

Ans. Oviduct or Fallopian tube. **1**

[CBSE Marking Scheme, 2015]

R **Q. 5. List two functions of ovary of human female reproductive system. [Board Term-II, O.D. Set III 2016]**

Ans. Two functions of Ovary :

(i) To Produce female gamete / ovum.

(ii) To secrete female hormones / estrogen and progesterone. **[CBSE Marking Scheme, 2016]** ½ + ½

OR

[Topper Answer, 2016]

R Q. 6. **Name the organs producing sperms and ova respectively in humans.**

[Foreign 31/2/3, 2017]

Ans. Testis : Sperms, **Ovary :** Ova. ½ + ½

R Q. 7. **Give the function of prostate gland and seminal vesicles.**

OR

What is the role of seminal vesicles and the prostate gland ?

Ans. Prostate glands provides secretion which contains chemical for motility of sperm. Seminal vesicles contain fructose, protein and other chemicals that are necessary for nourishing and stimulating sperms. 1

R Q. 8. **Write the role of testes in male reproductive system.** **[Board Term II, Set-FF7NBE6, 2015]**

Ans. Formation of sperms and to secrete hormone.

[CBSE Marking Scheme, 2015] ½ + ½

R Q. 9. **Name the parts where sperms are formed in a male's body and eggs are formed in female's body.** **[Board Term II Set-8XSVHLC, 2014]**

Ans. Sperms are produced in testes and eggs are produced in ovary. ½ + ½

[CBSE Marking Scheme, 2014]

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

Ans. No, because copper T, will not prevent contact of body fluids. Thus, it will not protect her from sexually transmitted diseases. 1

R Q. 11. **Write the full form of IUCD and HIV.**

Ans. IUCD : Intra-Uterine Contraceptive Devices. ½

HIV : Human Immunodeficiency Virus. ½

A Q. 12. **Give reason for the statement–Since the ovary releases one egg every month, the uterus also prepares itself every month by making its lining thick and spongy.** **[Board Term-II, SQP, 2016]**

Ans. It is required for nourishing the embryo if fertilization takes place and reaches the uterus.

[CBSE Marking Scheme, 2016] 1

A Q. 13. **No two individuals are absolutely alike in a population. Why ?**

[Board Term-II, O.D. Set-I, 2013]

Ans. Because hundreds of biochemical reactions occur during preparation of DNA copies. Few of them are liable to run and form a different product and hence they are not identical to the original. Thus, this gives rise to variations. 1

Short Answer Type Questions-I

(2 marks each)

U Q. 1. **What is the main difference between sperms and eggs of humans ? Write the importance of this difference.**

[Board Term II, Outside Delhi Set I, 2014]

Ans. Difference between sperms and eggs of humans :

The major genetic differences lies in the difference in sex chromosome of sperm (male gamete) and egg (female gamete). Sperm has Y chromosome as sex chromosome, while egg has X chromosome as sex chromosome.

Importance of the difference :

The difference in the sperm and egg cells maintains the continuity of the species generation after generation by the process of reproduction. 1 + 1

U Q. 2. **List two preparations shown every month by the uterus in anticipation of pregnancy in humans.**

[Board Term II, Foreign Set III, 2014]

Ans. Uterus by undergoing cyclic changes prepares itself for receiving the zygote and supporting its further growth into foetus every month in anticipation of pregnancy. The inner layer of uterus called endometrium becomes thickened to support the growth of foetus. 1 + 1

R Q. 3. **Mention the two functions of human testes.**

[Board Term-II, Delhi Set II, 2013]

OR

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

Ans. (i) Testes produce sperm.

(ii) Testes produce male sex hormone called testosterone. 1 + 1

R Q. 4. **What is the role of seminal vesicles and prostate gland in Human male reproductive system?**

[KVS-2014]

Ans. Seminal vesicles are a pair of thin walled muscular sac which secretes fluid for nourishment of Sperms. Prostate gland provides nourishment and transportation of sperm. 1 + 1

U **Q. 5. State the importance of chromosomal difference between sperms and eggs of human.**

[Board Term-II, O.D. Set III, 2013]

Ans. Sperms contain two types of chromosomes *i.e.,* X—chromosomes and Y—chromosomes.

Egg contains one type of chromosomes only *i.e.,* X—chromosome. **1 + 1**

A **Q. 6. Identify among the following organism which is reproduced by sexual and which by asexual method.**

***Amoeba*, human beings, whale, *Hydra*, dog, *Spirogyra*.** **[Board Term II, Set AIS I, 2013]**

Ans. Sexual reproduction—Dog, whale, human.

Asexual reproduction—*Amoeba, Hydra, Spirogyra.* 2

R **Q. 7. Write two functions of each**

(i) Testis, **(ii)** Ovaries.

[Board Term II, Set-92024), 2012]

Ans. Two functions are :

(i) Testis : It produces sperms and secretes male sex hormones called testosterone. **1**

(ii) Ovary : It produces ovum and secretes female sex hormones called estrogen and progesterone. **1**

[CBSE Marking Scheme, 2012]

U **Q. 8. (i) Trace the path of sperms from where they are produced in human body to the exterior.**

[NCERT Exemplar, 2017]

(ii) Write the functions of secretions of prostate gland and seminal vesicles in humans.

[Board Term-II, Delhi Set III, 2013]

Ans. (i) Testes—epididymis—vas deferens—ejaculatory duct—urinogenital duct—penis.

(ii) Seminal vesicles are a pair of lobulated glands that produce 60-70% of semen plasma which consist of fructose, proteins and other chemicals for nourishing and stimulating sperms.

Secretion of prostate gland is thick, milky and alkaline. It contains chemicals essential for motility of sperms. **1 + ½+½**

U **Q. 9. What changes are observed in the uterus if fertilisation does not occur ?**

[NCERT Exemplar, 2017]

Ans. When an egg is released by ovary the walls of the uterus thickens so as to give the fertilised egg a smooth covering but as fertilisation doesn't occur the walls come back to their original position by breaking down and thus the blood in it starts flowing out through urethra. 2

U **Q. 10. Explain why does menstruation occur in human females ?**

[NCERT] [Board Term II, Set (2015), 2012]

Ans. Every month uterus prepares itself to receive fertilized egg. Its lining become thick to provide nutrition to embryo, if fertilization of egg takes place. If fertilization of egg does not take place then lining is no longer needed and it gets detached and comes out through the vagina along with blood and mucus. **[CBSE Marking Scheme, 2012]** 2

U **Q. 11. What changes are observed in the uterus subsequent to implantation of young embryo ?**

[NCERT Exemplar, 2017]

Ans. The uterine wall thickens that is richly supplied with blood. A special tissue called placenta develops which connects embryo to the uterine wall that provides nutrients and oxygen to it. 2

R **Q. 12. Mention the functions of (a) placenta, (b) fallopian tube in the human female reproductive system.** **[Board Term II, Set [2019], 2012]**

Ans. (a) Placenta : (i) Helps in the transportation atom of glucose and oxygen from the mother to the embryo. ½

(ii) Waste generated by the embryo is removed by transferring it to the mother's blood. ½

(b) Fallopian tube : (i) Egg is carried from the ovary to the uterus. ½

(ii) Fertilization occurs here. ½

[CBSE Marking Scheme, 2012]

R **Q. 13. How does the embryo get nourishment inside the mother's body ?**

[Board Term II, Set-FF7NBE6, 2015, 2014, Foreign Set I, II, III; Set (2017) 2012]

Ans. The embryo gets nourishment from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are the blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. 2

[CBSE Marking Scheme, 2012]

R **Q. 14. List any two contraceptive methods practised only by women. Mention how these methods work ?** **[Board Term II, Set [2019] 2012]**

Ans. (i) Oral pills : Change hormonal balance so eggs are not released. **1**

(ii) Loop / Copper-T : Placed in the uterus. Prevent pregnancy by checking the entry of sperms through the vagina. **1**

[CBSE Marking Scheme, 2012]

U **Q. 15. What are the benefits of using mechanical barriers during sexual act ?**

[NCERT Exemplar, 2017]

Ans. Mechanical barriers like condom prevents the sperms from reaching the egg. Thus it is an effective method to avoid pregnancy. It also prevents transmission of infections during sexual act. 2

Short Answer Type Questions-II (3 marks each)

A **Q. 1. State the basic requirement for sexual reproduction ? Write the importance of such reproductions in nature. [Delhi 31/1/1, 2017]**

Ans. Formation of male and female gametes, fusion of gametes/syngamy ½ + ½

Importance : Combination of DNA from two different individuals lead to increase in genetic variation in the organism. 1

This leads to diversity in the population which helps in natural selection.

[Marking Scheme, 2017] 1

Detailed Answer :

The basic requirements for sexual reproduction to take place are involvement of two parents and fusion of haploid gametes.

Importance of sexual reproduction :

Fusion of gametes results in genetic variations in the offsprings. This promotes diversity of characters in offsprings. These genetic variations, thus, lead to evolution of species as well as allow the organisms to become better adapted in the changing environment. 3

U **Q. 2. Mention the total number of chromosomes along with the sex chromosomes that are present in a human female and a human male. Explain how in sexually producing organisms the number of chromosomes in the progeny remains the same as that of the parents. [Delhi 31/1/2, 2017]**

Ans. Total number of chromosomes is 46. In humans, two sex chromosomes present are X and Y, while in human female, both sex chromosomes are X.

During sexual reproduction, a female gamete or egg cell fuses with a male gamete or sperm cell which are haploid to form zygote. Zygote is diploid which contains 23 chromosomes from mother and 23 from father. In this way, an equal genetic contribution of male and female parents is ensured in the progeny. 2 + 1

U **Q. 3. List six specific characteristics of sexual reproduction.**

Ans. Specific characteristics of sexual reproduction are :

(i) Sexual reproduction involves the fusion of male and female gametes coming from both the parents.

(ii) In this, offsprings receive some genes from mother and some from the father.

(iii) The offsprings have genetic variation.

(iv) It leads to the continuous evolution of various species.

(v) It plays a prominent role in the origin of new species.

(vi) The sexual mode of reproduction incorporates process of combining DNA from two different individuals during reproduction.

½+½+½+½+½+½

U **Q. 4. List any four steps involved in sexual reproduction and write its two advantages. [Delhi 31/1/2, 2017]**

Ans. Steps involved in sexual reproduction are :

(i) Formation of gametes through meiosis.

(ii) Transfer of male gametes into the female body.

(iii) Fusion of male and female gametes. Process is fertilisation.

(iv) Formation of offspring from a single celled zygote-Post fertilisation changes.

Advantages of sexual reproduction :

(i) It is a source of genetic variations among individuals of a population.

(ii) It gives rise to individuals that are most adapted to the environment. 2 + 1

A **Q. 5. Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement.** 3

Ans.

[Toppers Answer, OD Set 1, 2017]

Detailed Answer :

Reproduction is one of the most important characteristics of living beings as it enables them to form offspring and continue their population.

Through reproduction, they transfer their genetic information to the next generation. Reproduction ensures their continuity of existence on Earth. **3**

U **Q. 6. What are the functions of testis in the human male reproductive system ? Why are these located outside the abdominal cavity ? Who is responsible for bringing about changes in appearance seen in boys at the time of puberty? [Board Term-II, Delhi Set II 2016]**

Ans. Functions of testis—

(i) Produce sperms. ½

(ii) Produces male hormone/ testosterone. ½

(a) These are located outside the human body, as sperms need lower temperature than the normal body temperature to mature. **1**

(b) Testosterone. **[CBSE Marking Scheme, 2016] 1**

R **Q. 7. What is placenta ? Write any two major functions of placenta. [Board Term-II, SQP, 2016]**

Ans. A disc shaped organ or special tissue in the uterus of pregnant mammal, nourishing and maintaining the foetus through the umbilical cord.

Functions of Placenta :

(i) Provides large surface area for glucose and oxygen to pass from mother to the embryo.

(ii) Removal of waste generated in the developing embryo into the mother's blood. **1 + 1 + 1**

[CBSE Marking Scheme, 2016]

U **Q. 8. State the changes that take place in the uterus when :**

(i) Implantation of embryo has occurred.

(ii) Female gamete/egg is not fertilised.

[Delhi 31/1/1, 2017]

Ans. (a) When implantation of embryo has occurred, the uterine wall thickens and is richly supplied with blood to nourish the growing embryo. **1½**

(b) The thick and spongy lining of the uterus slowly breaks and comes out through the vagina as blood and mucus. **1½**

[Marking Scheme]

Detailed Answers :

(i) When implantation has occurred in uterus of mother, the inner lining of the uterus thickens and is richly supplied with the blood vessels to provide nourishment to the growing embryo.

(ii) If the egg is not fertilised, it lives for one day. Since, the thickened uterus lining is no more required; it slowly breaks down and comes out of the vagina as blood and mucous known as menstruation which lasts for about two to eight days. **3**

U **Q. 9. (a) Mention the role of the following organs of human male reproductive system :**

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

(b) What are the two roles of testosterone ?

[Board Term-II, Foreign Set III 2016]

Ans. (a) (i) Testis—To produce male gametes // sperm or male hormone / testosterone.

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

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

(iv) Prostrate glands—To secrete the fluid which provides nutrition and medium for transport of sperms. **4 × ½**

(b) (i) Regulates formation of sperms, **(ii)** brings about the changes in boys during adolescence ½ + ½

[CBSE Marking Scheme, 2016]

U **Q. 10. Write the functions of the following parts of human female reproductive system :**

(i) Ovary, (ii) Fallopian, (iii) Uterus.

[Delhi Comptt. 31/1/2, 2017]

Ans. (i) Ovary : Produces egg or female gamete, female sex hormone/ estrogen ½, ½

(ii) Fallopian tube : Transfer of ovum to the uterus, Site for fertilization ½, ½

(iii) Uterus : Site of implantation of zygote, development of embryo. ½, ½

Detailed Answers :

(i) Ovary : It produces eggs (ova) and female sex hormone estrogen and progesterone.

(ii) Fallopian Tube : The fallopian tube provides passage for the eggs (ova) to pass into the uterus by ciliary action. It is the site for fertilisation.

(iii) Uterus : It receive the fallopian tubes on either side and is capable of undergoing great enlargement. Uterus is the site of implantation of zygote and site of development of embryo. **3**

U **Q. 11. What is Placenta ? Explain its functions in humans. [Foreign Set I, 2015]**

OR

What is placenta ? State its function in human female. [Board Term II, OD Set I, 2014]

Ans. Placenta is a specialized tissue embedded in the uterine wall. It contains villi on the embryo's side and blood spaces on the mother's side.

Function—Helps in exchange of nutrients, gases and wastes materials between the mother and embryo/foetus. **[CBSE Marking Scheme, 2015] 3**

U **Q. 12. What is placenta ? Explain its role in the development of human embryo.**

[Board Term II, Set (67002), 2012]

Ans. Placenta is a disc-shaped structure between mother and embryo. **1**

Functions :

(i) Provides large surface area for glucose and O_2 to pass from mother to embryo. **1**

(ii) Removal of wastes from embryo. **1**

[CBSE Marking Scheme, 2012]

U **Q. 13. (a) Write the functions of the following parts of human male reproductive system :**

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

(b) List any two common pubertal changes that appear in human males. [Delhi Comptt. 31/1/1, 2017]

Ans. (a) (i) Testis—Formation of sperm / germ cells // secretion of testosterone

(ii) Vas deferens—Delivery of sperms from testis to urethra.

(iii) Urethra—Ejaculation of sperms.

(iv) Prostrate—Its secretions nourishes the sperms.

4 × ½

(b) Thick hair growth on the face, voice begins to crack, hair growth in armpits. (or any other) ½+½

[Marking Scheme]

U **Q. 14. State briefly the changes that take place in a fertilized egg till birth of the child in the human female reproductive system. What happens to the egg when it is not fertilized ?**

[Delhi Comptt. 31/1/3, 2017]

Ans. Changes in fertilized egg :

- Zygote/fertilized egg starts dividing.
- Implantation of zygote in the inner uterine wall.
- Embryo starts growing with the help of the placenta which results in the development of the child.
- Birth of a child as a result of rhythmic contraction of the muscles in the uterus. ½ × 4
- When egg is not fertilized, the inner lining of the uterus slowly breaks and comes out through the vagina as blood and mucous (Menstruation) **1**

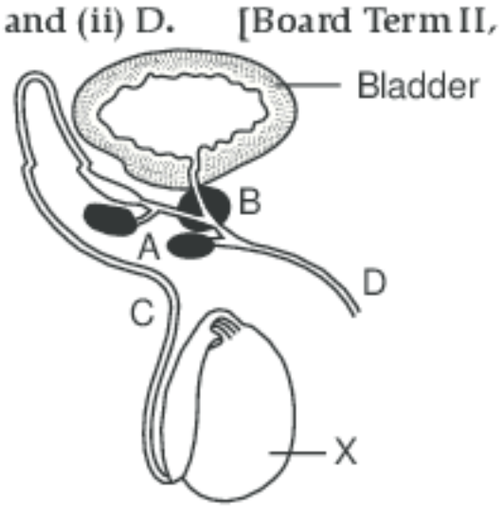
A **Q. 15. In the diagram of human male reproductive system given below :**

(i) Label the parts A and B.

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

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

(i) C and (ii) D. [Board Term II, Set A1, 2011]



Ans. (i) A-Seminal vesicle B-Prostate gland. ½+½

(ii) Testosterone; controls gamete formation and develops secondary sex organs. **1**

(iii) (a) C-Sperms, **(b)** D-Sperms/semen and urine. ½+½

R **Q. 16. (i) How many eggs are produced every month by either of the ovaries in a human female ? Where does fertilization takes place in the female reproductive system ?**

(ii) What happens in case the eggs released by the ovary is not fertilized ?

[Board Term II, Set B1, 2011]

Ans. (i) One egg is produced every month by one of the ovaries. ½

Fertilization takes place in the fallopian tubes. ½

(ii) In case the egg released by the ovaries is not fertilized, it lives for about one day. But since the uterus prepares itself every month to receive a fertilized egg, its lining become thick and spongy. When the egg does not fertilize this lining slowly breaks and come out through the vagina as blood and mucus and is known as menstruation. 2

U **Q. 17. Is copy of DNA formed during reproduction identical to the original cell ? Give reason for the support of your answer and explain how DNA copying is beneficial for the species ?**

[Board Term II, Set AIS 2013]

Ans. No, it cannot be identical to the original cell.

It has variation.

It becomes the basis for organic evolution. **1 + 1 + 1**

U **Q. 18. Write one difference between sexual and asexual mode of reproduction. Which species is likely to have better chances of survival – the one reproducing asexually or the one reproducing sexually ? Justify your answer.**

[Board Term II, Outside Delhi Set III, 2014]

Ans. Sexual reproduction involves the fusion of the male and the female gamete. This fusion allows the formation of new variants by the combination of the DNA from two (usually) different members of the species. The variations allow the individuals to adapt under varied environmental conditions for better chances of survival. **1**

However, it is not always necessary that the offspring produced due to sexual reproduction has better chances of survival. Under some circumstances, asexual reproduction is more advantageous for certain organisms. For example, some individuals who do not move from one place to another and are well settled in their environment. Also, asexual reproduction is a fast and a quick mode of reproduction which does not consume much time and energy as compared to sexual reproduction. 2

A **Q. 19. DNA content has the tendency to double itself during sexual reproduction due to combining of the genetic materials from two parents. How can the problem of DNA doubling be solved to maintain the consistency of the genetic material throughout the species ?**

[Board Term II, Set-GFUTB86, 2015]

Ans. (i) Germ-cells from two individuals combine.
(ii) Chromosome number and DNA content is halved in special linkage cells in specialized organs.
(iii) Takes place in reproductive cells maintaining the DNA content. **1 + 1 + 1**

[CBSE Marking Scheme, 2015]

A **Q. 20. List four points of significance of reproductive health in a society. Name any two areas related to reproductive health which have improved over the past 50 years in our country.**

[Board Term-II, O.D. Set II, 2015]

Ans. Four points of significance of reproductive health are :
(i) It helps the person to lead a normal life.
(ii) Its helps in the awareness of sexually transmitted diseases.
(iii) It helps in improving the reproductive life
(iv) It also help in controlling population. **2 + 1**

OR

Significance - prevent STDS, Advantage of small family, less mortality among newborns, Reduces the cases of maternal mortality. **3**

R **Q. 21. (i) Mention two secondary sexual characters in human male.**
(ii) Why testis in male body are extra-abdominal ?
(iii) Write the dual purpose served by urethra in males ? **[Board Term II, Set (2024) 2012]**

Ans. (i) Hair growth on face, chest, armpit and genital area / body becomes muscular / voice becomes deep and coarse / penis occasionally begins to become enlarged and erect. **1**
(ii) Formation of sperms needs lower temperature than the normal body temperature. Hence, testis lie outside the body cavity in the scrotum. **1**
(iii) Urethra is a common duct for the passage of both urine and semen. **(Any two)**

[CBSE Marking Scheme, 2012] 1

K **Q. 22. (i) State any two changes seen in boys at the time of puberty.**
(ii) Define implantation and fertilization.

[Board Term II, Set-B1, 2011]

Ans. (i) Boys begin to have thick hair growth on the face. Their voice begins to crack. **½ + ½**
(ii) Implantation is the process of fixing of zygote to the uterine wall. **1**
Fertilization is the union of male and female gamete to form a zygote. **1**

A **Q. 23. Explain the following :**
(i) Testes and Ovaries are considered as the primary sex organs.
(ii) Advantage of seed production in plant.
(iii) Vas deferens is long in human male.

[Board Term II, Set (2036), 2012]

Ans. (i) Both produces gametes and sex hormones. **1**
(ii) Contains body plant (embryo) which maintains the species of a particular plant. **1**
(iii) To carry sperm from testes, which enter penis for their release. **[CBSE Marking Scheme, 2012] 1**

R **Q. 24. Write two example each of sexually transmitted diseases caused by (i) virus, (ii) bacteria. Explain how the transmission of such diseases be prevented ?**

Ans. Disease caused by virus—AIDS, Genital Warts.
Disease caused by bacteria—Gonorrhea, Syphilis. **1**
Prevention of Diseases :
(i) By use of devices made of plastic, metal or a combination of the two which is inserted into uterus.
(ii) By using contraceptive devices
(iii) By educating people and maintaining hygiene
(iv) By avoiding multiple sexes. **2**

A **Q. 25. List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males ? How does the use of these techniques have a direct impact on the health and prosperity of a family ?** **3**

Ans.

[Toppers Answer, OD Set 1, 2017]

OR

Three techniques that have been developed to prevent pregnancy are :

(i) Barrier method : Physical methods such as condom, diaphragm and cervical caps are used to prevent entry of sperms in females.

(ii) Chemical methods : Drugs such as oral pills and vaginal pills are used by females.

(iii) Surgical methods such as vasectomy in males and tubectomy in females.

Chemical techniques are not meant for males.

The use of these techniques helps in controlling population explosion thus providing better living conditions.

It helps in keeping proper gap between siblings thus gives better health to mother as well as children. 1+1+1

U **Q. 26. What is contraception ? Name any two methods. How does the use of these methods have a direct effect on the health and prosperity of a family ? State any three points.** **[Foreign 31/2/1, 2017]**

Ans.

- Contraception : Any method which prevents conception/ pregnancy is called contraception. ½
- Barrier Method, Chemical Method, Surgical Method (any two) ½ + ½
- Health of women (mother) is maintained, Parents can give more attention to their children/ family, More resources may be made available for improvement of standard of living (or any other relevant point) (any three) ½ × 3

[CBSE Marking Scheme, 2017]

U **Q. 27. Name the two types of mammalian gametes. How are these different from each other ? Name the type of reproduction they are involved in. Write the advantage of this type of reproduction.** **[Foreign 31/2/3, 2017]**

Ans. Male gamete : sperm ½

Female gamete : ovum/egg ½

Sperms are motile and produced by male individual ova/eggs are non-motile and produced by female individual **1**

Sexual reproduction ½

Advantage : Generates more variations ½

[CBSE Marking Scheme, 2017]

U **Q. 28. Suggest three contraceptive methods to control the size of human population which is essential for the health and prosperity of a country. State the basic principle involved in each.**

[Delhi Comptt. 31/1/2]

[Board Term-II, Delhi Set I, 2016, DDE 2017]

Ans. Three methods of contraception—

(i) Barrier method or mechanical method/ Condom/ Diaphragm, to prevent the meeting of sperms and ova.

(ii) Chemical method/ Oral pills—Changes the hormonal balance of the female partner so that the eggs are not released.

(iii) Surgical method–to block the vas deferens in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilization takes place.

(iv) IUCDs/ Loop or the copper-T placed in the uterus, to prevent pregnancy. **(Any three)**

[CBSE Marking Scheme, 2016] 3 × ½ + ½ = 3

U **Q. 29. List any four methods of contraceptions used by humans. How does their use have a direct effect on the health and prosperity of a family.**

[Board Term-II, Delhi Set I, 2015]

Ans. (a) Four methods

(i) Mechanical or barrier method Or Male or female condoms.

(ii) Use of hormonal preparations Or Oral Pills/i-pill/Saheli.

(iii) Use of loop or copper T Or IUCD.

(iv) Surgical method Or tubectomy/vasectomy ½ × 4

- **Effect on health and prosperity :**

(i) Health of women is maintained.

(ii) Parents can give more attention to children.

(iii) More resources can be made available.

(Any two) ½ × 2

[CBSE Marking Scheme, 2015]

Detailed Answer :

The four methods of contraceptions used by humans are :

(i) Mechanical barrier method.

(ii) Chemical methods

(iii) Oral Pills

(iv) Surgical methods

Sexual act always has the potential to pregnancy. Pregnancy makes major demand on the body and mind of woman and if she is not ready, her health will be adversely affected. Contraceptive methods help in avoiding pregnancy and also help in keeping gaps between two children so that women's body recovers. These methods help in limiting number of children one or two. 2 + 1

U **Q. 30. List four methods of contraception used by humans.**

Justify the following statement : "The use of contraceptive methods has a direct effect on the health and prosperity of a family."

[Board Term II, 2014, Outside Delhi Set 2]

OR

List any four methods of contraception used by humans. How does their use have a direct effect on the health and prosperity of a family ?

[Board Term II, Delhi Set I, II, III, 2014]

OR

What are the different methods of contraception?

[NCERT]

Ans. Following are the four methods of contraception used by humans :

(i) Natural method

(ii) Barrier method

(iii) Oral contraceptives

(iv) Implants and surgical methods

Effects of contraception on the health and prosperity of a family :

(i) It helps in preventing unwanted pregnancies.

(ii) It prevents the chances of frequent pregnancies, which otherwise affect the health of females.

(iii) It helps in family planning by controlling the number of children in a family, thus reducing the chances of poverty.

(iv) It also reduces the chances of transmission of sexually transmitted diseases such as AIDS. In this way, birth control methods play an important role in the health and prosperity of a family. **1 + 2**

R **Q. 3. State one function of each of the following parts of human male reproductive system.**

(i) Vas deferens, (ii) Testes, (iii) Prostate gland.

[Board Term II, Set B1, 2011]

Ans. (i) Vas Deferens : It helps in the passage of sperms. **1**

(ii) Testes : It produces sperms and male sex hormone—testosterone. **1**

(iii) Prostate gland : It secretes alkaline fluid which is discharged into the urethra. It protects sperms from acidity of male urethra. **1**

Long Answer Type Questions

(5 marks each)

U **Q. 1. (a) Write the functions of each of the following parts in a human female reproductive system : (i) Ovary, (ii) Uterus, (iii) Fallopian tube.**

(b) Write the structure and functions of placenta in a human female.

Ans. (a)

[Topper Answer, OD Set 1, 2017]

U **Q. 2. (a) Write the functions of the following parts in human female reproductive system :**

(i) Ovary, (ii) Oviduct, (iii) Uterus

(b) Describe the structure and function of placenta.

[Board Term-II, Delhi Set I 2016]

Ans.(a) (i) Ovary— (i) Production of female hormone ½
(ii) Production of female gamete ½

(ii) Oviduct (i) Transfer of female gamete from the ovary ½
(ii) Site of fertilization ½

(iii) Uterus— (i) Implantation of the zygote. ½
(ii) Nourishment of the developing embryo/placenta formation. ½

(b) Structure of Placenta : It is a disc like structure embedded in the uterine wall connected to the embryo. It has villi on the embryo's side of the tissue and on the mother side, it has blood spaces, which surround the villi. ½ + ½

Function of Placenta : It provides a large surface area for nutrients/glucose and oxygen to pass from the mother's side to the embryo and waste substances from the embryo's side to mother's blood. **[CBSE Marking Scheme, 2016]** ½ + ½

R **Q. 3. (a) Name the organ that produces sperms as well as secretes a hormone in human males. Name the hormone it secretes and write its functions.**

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

[Delhi 31/1/1, 2017]

(c) Explain how the embryo gets nourishment inside the mother's body.

Ans. (a) ➢ Testes ½
➢ Testosterone ½
➢ Functions of Testosterone
(i) Formation of sperms
(ii) Development of secondary sexual characters ½ × 2

(b) Fallopian Tubes/Oviduct ½

(c) Placenta, a special disc-like tissue embedded in the mother's uterine wall and connected to the foetus/ embryo ½ + **1**
Placenta provides a large surface area for glucose and oxygen/ nutrient to pass from the mother's blood to the developing embryo/ foetus. **1**

[CBSE Marking Scheme, 2017]

Detailed Answer :

(i) The organ that produces sperms as well as secretes male hormone is testis. The hormone secreted by it is testosterone.

Functions of testosterone are :

(a) It stimulates sperm production.

(b) It stimulates the development of secondary sexual characters in males.

(c) It is involved in development, maturation and functioning of accessory sex organs like vas deferens and seminal vesicles.

(ii) Fallopian tubes

(iii) The embryo gets nourishment from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are the blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. 5

R **Q. 4. (a) Name the human male reproductive organ that produces sperms and also secretes a hormone. Write the functions of the secreted hormone.**

(b) Name the parts of the human female reproductive system where—

(i) Fertilisation takes place

(ii) Implantation of the fertilised egg occurs.

(c) Explain how the embryo gets nourishment inside the mother's body.

[Board Term-II, O.D. Set I, 2015]

Ans. (a) Testes are the oval-shaped primary reproductive organs in man. Its function is to produce sperm and male sex hormone called testosterone.
Testosterone hormone initiates the development of secondary sexual characters in male 2

(b) (i) Oviduct ½
(ii) Uterus. ½

(c) Same as Q. 4. Long Answer Type Questions. 2

[CBSE Marking Scheme, 2015]

R **Q. 5. (a) Write the functions of the following in human female reproductive system :**

Ovary, oviduct, uterus.

(b) How does the embryo get nourishment inside the mother's body ? Explain in brief.

[Board Term-II, Delhi Set-I, 2015]

Ans. (a) Functions :

(i) Ovary : Ovary perform dual functions of production of female gamete or ovum and the secretion of female sex hormones, estrogen and progesterone.

(ii) Oviduct : It carry ova or eggs from the ovary to the uterus.

(iii) Uterus : It is a hollow pear-shaped organ within which the embryo develops.

(b) The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta.
This is a disc which is embedded in the uterine wall and transfer glucose and oxygen from the mother to the embryo. 3 + 2

[CBSE Marking Scheme, 2015]

U **Q. 6. What is Placenta ? Describe its structure. State its functions in case of a pregnant human female.**
[Board Term-II, O.D. Set I, 2016]

OR

What is Placenta ? Mention its role during pregnancy. **[NCERT Exemplar]**

Ans. Placenta : A special tissue that helps human embryo in obtaining nutrition from mother's blood. **1**

Structure : This is a disc which is embedded in the uterine wall which contains villi on the embryo side of the tissue, and on the mother's side are blood spaces which surround the villi. **1 + 1**

Function : This provides a large surface area for glucose and oxygen to pass from the mother to the embryo, and the developing embryo will also generate waste substances which can be removed by transferring them into the Mother's blood through the placenta. **[CBSE Marking Scheme, 2016]1 + 1**

OR

[Topper Answer, 2016]

U **Q. 7.(a)** State in brief the functions of the following organs in the human female reproductive system:
Ovary, Fallopian tube, Uterus

(b) What is menstruation ? Why does it occur ?
[Board Term-II, Foreign Set-III, 2016]

OR

Why does menstruation occur ? **[NCERT]**

Ans. Functions :

Ovary– (i) Production of female gamete
(ii) Production of female hormone **1**

Fallopian tube– (i) Site of fertilization
(ii) Transfer of female gamete from ovary. **1**

Uterus– (i) Implantation of zygote/ fertilise egg/embryo.
(ii) Nourishment to the developing embryo. **1**

Menstruation–(i) It is the periodic breakdown of uterine lining and its removal along with blood and mucous in (post pubertal stage of a) human female. **1**

(ii) Uterine lining is required to nourish the embryo that is formed if fertilization takes place. In absence of fertilization, the lining is not required and hence is shed in the form of menstruation. **1**
[CBSE Marking Scheme, 2016]

A **Q. 8. (a) Name the respective part of human female reproductive system :**
(i) that produces eggs,
(ii) where fusion of eggs and sperm takes place, and
(iii) where zygote gets implanted.
(b) Describe in brief what happens to the zygote after it gets implanted. **[Board Term II, Delhi Set I, II, Foreign Set I, II, III 2014]**

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

(b) The zygote formed after fertilisation in the fallopian tube is implanted in the uterus. It divides repeatedly to form a mass of cells known as embryo. This embryo gets attached to the inner layer of the uterine cavity, *i.e.*, endometrium. It thickens every month and is supplied with blood to nourish the embryo. Soon it gets covered by rapidly dividing uterine cells. This leads to pregnancy.
Within a span of some months, the embryo starts developing limbs and begins to resemble a miniature human being. When all body parts of

the embryo can be recognised, it becomes a foetus. When this foetus is fully developed, the mother gives birth to the baby. 3 + 2

U **Q. 9. (a) Write the name of the male reproductive organ that produces sperms and secrete a hormone. Name the hormone secreted and state its function.**

(b) Write the site of fertilization and the part where the zygote gets implanted in the human female.

(c) State, in brief, how an embryo gets its nourishment inside the mother's body. [Board Term II, Delhi Set III, Foreign Set-I, II, III 2014]

Ans. (a) A testosterone is the hormone produced in the testes that stimulates the development of secondary sexual characters in males.

Its important functions are :

(i) Development, maturation and functioning of the male accessory sex organs like vas deferens and seminal vesicles.

(ii) Stimulate muscular growth, growth of facial hair, low pitch voice, etc., sperm production. All these activities are hindered in the absence of testosterone.

(b) Fertilization takes place in ampulla region of fallopian tube and zygote gets implanted in the uterus.

(c) Embryo is present in the womb of a mother where it is connected with the uterine wall of mother by placenta. The foetus receives oxygen, nourishment and other life supporting things from mother through this placenta. (½ + ½ +1) + 1 + 2

U **Q. 10. (a) Draw a sectional view of human female reproductive system and label the part where**

(i) eggs develop.

(ii) fertilization take place.

(iii) fertilized egg gets implanted.

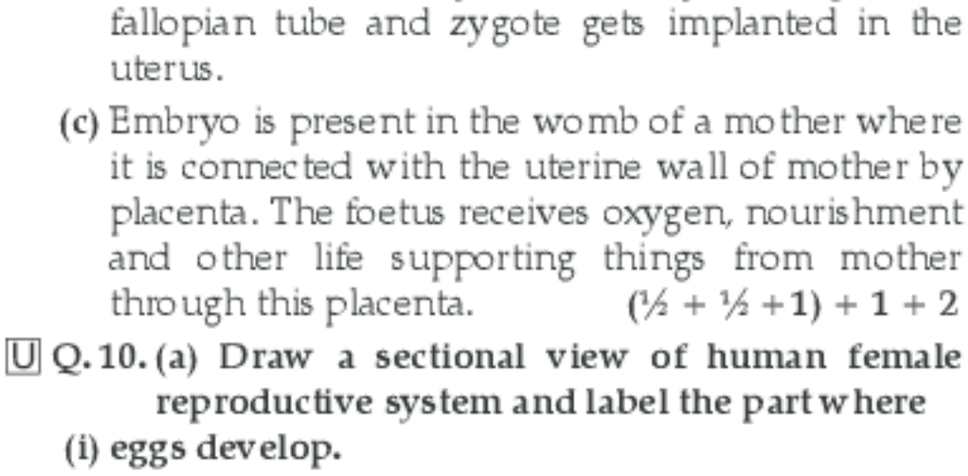
(b) Describe, in brief, the changes the uterus undergoes.

(i) to receive the zygote.

(ii) if zygote is not formed.

[Board Term II, Outside Delhi Set I, II, III; KVS-2014, Set-QNA4XWT ; Delhi III, 2013]

Ans. (a) The human female reproductive system consists of a pair of ovaries, a pair of oviducts, the uterus and the vagina.



(i) The development of egg occurs in the ovary. 1

(ii) Fertilisation takes place in the fallopian tubes. 1

(iii) The fertilised egg gets implanted in the uterus. 1

(b) (i) The uterus prepares itself every month to receive a fertilized egg/zygote. The inner uterus lining (endometrium) becomes thick and is supplied with blood to nourish the embryo. 1

(ii) If the egg is not fertilised, then the uterus lining is not required. Hence, it breaks down and gets released in the form of blood and mucous through the vagina. This process lasts for 2–8 days. This cycle occurs every month and is known as menstruation. 1

U **Q. 11. (a) Name two sexually transmitted disease.**

(b) Why prenatal sex determination is prohibited by law.

(c) What are the different methods of contraception ?

Ans. (a) AIDS, Syphilis.

(b) Surgery can be used to prevent frequent or unwanted pregnancies. However, this method can be used by people for gender-selective abortion as happens in illegal female foeticides. As a result of prenatal gender determination, the child-gender ratio is declining at an alarming rate in many of our societies.

Therefore, prenatal gender-determination has been prohibited by law.

(c) (i) Creating a mechanical barrier so that the sperms do not reach the egg. This is done with a condom which is worn around the penis or a similar device that is placed in the vagina.

(ii) Changing the hormonal balance of the body so that fertilization cannot occur. This is done with the help of oral contraceptive pills.

(iii) Contraceptive devices like loop or copper-T are placed in the uterus to prevent pregnancy.

(iv) Surgical methods like vasectomy in males and tubectomy in females. 1 + 2 + 2

U **Q. 12. (a) List two advantages of sexual reproduction over asexual reproduction.**

(b) Name the type of asexual reproduction seen in :

(i) *Plasmodium*, **(ii)** *Planaria*.

(c) How will an organism be benefitted if it reproduces through spores ?

(d) List two contraceptive methods and state two benefits of adopting these methods.

[Board Term II, Set (2024), 2012]

Ans. (a) Sexual reproduction promotes diversity of characters in the offsprings. ½+½

It results in new combination of genes.

(b) (i) Multiple fission, **(ii)** Regeneration. ½+½

(c) It is a simpler and faster mode of reproduction. Spores being small and light get easily dispersed through wind, water and animals. 1

(d) Two contraceptive methods :

(i) Creating mechanical barrier. ½

(ii) Using contraceptive pills. ½

Two benefits of these methods are :

(i) Protection from sexually transmitted diseases.

(ii) Sufficient gap between successive births. ½+½

[CBSE Marking Scheme, 2012]

A **Q. 13. (i) Name a sexually transmitted disease and a method to avoid it.**

(ii) Draw a neat diagram of human male reproductive system and label the parts performing the following functions :

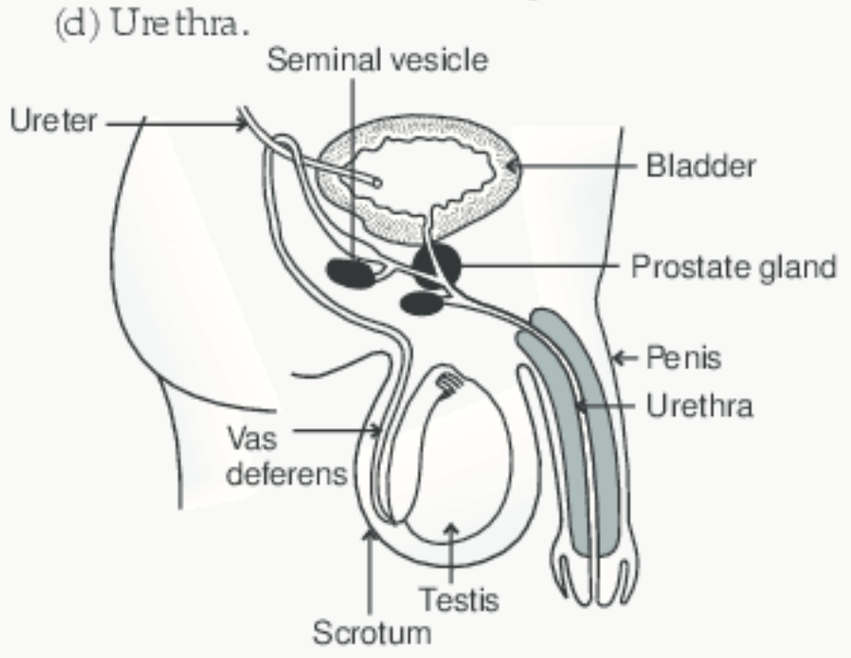
(a) Production of sperms, (b) Gland which provide fluid, (c) Provides low temperature for the formation of sperms. (d) Common passage for sperm and urine.

[Board Term II, Set B1 (2022) 2012, 2011]

Ans. (i) Viral infection such as warts or HIV-AIDS. 1

By using condoms during sexual intercourse. 1

(ii) (a) Testis, (b) Prostate gland, (c) Scrotum, (d) Urethra. 3



Human Male Reproductive System

[CBSE Marking Scheme, 2012]

High Order Thinking Skills (HOTS) Questions

Q. 1. Why is variation beneficial to the species, but not necessarily for the individual ? 3

Ans. Variation is beneficial to the species but not necessarily for the individuals because variations present in some populations would enable them to survive. In case of changing environment such as global warming, it is useful for the survival of species. 3

Q. 2. How will an organism be benefitted if it reproduces through spores ? 3

Ans. An organism will be benefitted if it reproduces through spores in the following ways :

(i) Spores are formed in large number

(ii) Spores have an outer thick wall that protects them in adverse conditions until they come in contact with another moist surface and begin to grow. 3

Q. 3. In a bisexual flower in spite of the young stamens being removed artificially, the flower produces fruit. Provide a suitable explanation for the above situation. [NCERT Exemplar] 3

Ans. Removal of stamens of a bisexual flower will not affect pollination of its intact pistil and formation of fruit. Cross-pollination has occurred leading to fertilisation. 3

Q. 4. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete ? What is the number of chromosomes in the zygote ?

[NCERT Exemplar] 3

Ans. The number of chromosomes in the female gamete is 24. The number of chromosomes in the Zygote is 48. 3

Q. 5. Write the full forms of IUCD, AIDS, HIV, OC 3

Ans. Full form of :

(i) IUCD : Intrauterine contraceptive Devices.

(ii) AIDS : Acquired Immunodeficiency Syndrome

(iii) HIV : Human Immunodeficiency Virus.

(iv) OC : Oral Contraceptive. 3

Q. 6. What causes joining up of stock and scion in grafting ? Name one positive trait that the plant contributing scion should have and one positive trait that the plant contributing the stock should have. 5

Ans. The stock and scion join up due to cambium activity. Stock is the portion on which grafting is done and it provides the roots. Scion is the portion of the plant, which is grafted on to the other plant and it contributes the stem.

The plant contributing stock should have an efficient absorbing system. The plant contributing scion should have good quality of fruit or flower. 3 + 2

Q. 7. Define grafting. Suggest any two advantages and disadvantages of grafting. 5

Ans. Grafting is a method of reproduction in which two plants of closely related varieties are joined together so that they live as one plant. 1

Two advantages of grafting :

(i) A young scion can be made to flower when it is grafted on a nature tree. 1

(ii) Different varieties can be grafted on the same stock. 1

Two disadvantages of grafting :

(i) Sexual reproduction is a necessity for evolution. 1

(ii) Plants produce very few seeds. 1

Q. 8. Differentiate between gestation and parturition. 3

Ans. Gestation : The development of foetus inside the uterus till birth is called gestation.

Parturition : On completion of gestation, the birth of the fully – developed foetus is called parturition.

1½ + 1½

Value Based Questions

Q. 1. Vegetative propagation is the term given to any asexual means of obtaining new plants. New plants are obtained from the parts of old plants such as stems, roots and leaves, without the help, of any reproductive organ. Some plants growers have developed artificial methods of vegetative propagation such as cutting, layering and grafting which are used in agriculture and horticulture.

(i) Name the method of vegetative propagation in rose and jasmine plant. 1

(ii) "Vegetative propagation produces better plants with higher yield in ornamental crops." To justify the statement give four reasons. 2

Ans. (i) Grafting in rose & Layering in Jasmine. ½+½

(ii) (a) It is cheaper, easier and more rapid method of propagation. ½

(b) Better quality of plants can be maintained. ½

(c) Produce seeds with prolonged period of dormancy. ½

(d) Traits or characters of the parent plant are preserved. ½

Q. 2. Due to heavy rise in demands for tea in international market and simultaneous incentive given by Government on tea plantation, a tea company wants to go for a large scale expansion of its tea plantation in Assam. To implement the project, the company need a large numbers of saplings and a huge motivated work force. The problem of saplings was overcome by the company by introducing tissue culture.

(a) What are the minimum facilities that the company should provide to its workers ? 1

(b) What additional step can the company take to motivate the workers to put extra effort for successful expansion of the plantation ? 1

(c) How can the company arrange fund to implement the project ? 1

Ans. (a) The company must pay the minimum wages prescribed by the Government to its workers. In addition, the company must arrange for housing, good sanitation and safe drinking water for its workers. 1

(b) The company can establish a school in the township for the children of the workers and a hospital for medical facility to the workers and their families. The company can also share a percentage of its profit with the workers to motivate them to give their best for the project. 1

(c) The company can arrange fund by any of the following ways :

(i) Contribution from the owners.

(ii) Loan from the banks.

(iii) Raising fund from public.

(iv) A combination of the above three methods. 1

Q. 3. The teacher explained in the class that reproduction is the process by which organisms increase their population. Manoj wanted to know more about the reproductive-health. Therefore, the teacher also explained in the class about the diseases that can be transmitted, if proper care is not taken.

(i) Why is the increasing human population a cause of concern for all of us ?

(ii) Name two diseases that can be sexually transmitted.

(iii) State one value each displayed by Manoj and his teacher. (O.D. Comptt. 31/1, 2017

Ans. (i) Because natural resources are limited, and it would be difficult to sustain a large population on limited resources **1**

(ii) HIV- AIDS, Syphilis, Gonorrhoea, Warts (any two) ½ + ½

(iii) Manoj- Inquisitive, understands the need for healthy living (any one) ½

Teacher—concerned, dutiful (any one) ½

Q. 4. A pregnant woman, who is a mother of one daughter, requests the doctor of an ultrasound clinic to test and determine the sex of the baby in her womb.

The doctor, very politely, refused and explained the legal and ethical point of view of the situation. On the basis of arguments and counselling, the doctor prepared the woman to happily accept the baby.

(a) Why is pre-natal sex determination ethically wrong ?

(b) Had you been in place of the doctor, what argument you would have placed to counsel the mother ?

(c) State the values exhibited by the doctor.

Ans. (a) Pre-natal sex determination is ethically wrong so as to maintain a balanced sex ratio and to stop the practice of killing a female child inside the womb.

(b) To educate mother about giving birth to girl child.

(c) Patience, intelligence and caring. 1+1+1

Q. 5. Reproductive health covers in all those aspects of general health which help a person to lead a normal, safe and satisfying reproductive life. But the overall burden of reproductive ill health is very high and many women die every year due to the complications of pregnancy and child birth. Most maternal deaths occur due to haemorrhage, septic, obstructed labour and unsafe abortions. Male participation in the family welfare programme is very poor and acceptance of vasectomy is particularly low. Research related to reproductive health encompasses safe motherhood, prevention and management of complication of abortions, reproductive tract infection and sexually transmitted diseases.

(i) What is STD ? Name two STDs which can be transmitted from mother to child during pregnancy. 1

(ii) Reproductive health is of prior importance to reduce maternal mortality. Suggest some measures which can save mother from unnecessary pregnancy and from STDs. 2

Ans. (i) STDs are sexually transmitted diseases.
Two STDs are — AIDS, Gonorrhea. 1

(ii) Some measures to prevent pregnancy :
(a) Use of intrauterine contraceptive devices.
(b) Use of oral pills.
(c) Use of cervical caps.
(d) Surgical method Tubectomy
(e) Use of vaginal pills.
(f) Use of condoms. 2

Q. 6. From the time of conception, the girl child was discriminated against all her life because daughters are perceived as an economic and social burden and also of the obsession for a male child in our patriarchal society.

Sunita got married in a very rich family and was living a very happy life. Soon she became pregnant and gave the news to all her family members. To her surprise, her husband and in-law, forced her for the prenatal sex determination of the sex of the foetus and got her aborted when they found that it was a girl child.

(a) Do you think it was correct to go for the prenatal sex determination ? According to you is there any difference in between the female and the male child ?

(b) Why do you think that Sunita should not be blamed for giving birth to a girl child ? 3

[Board Term II, Set AIS 2013]

Ans. (a) No, it was incorrect.
No, there is no difference between a girl and a boy.
The sex determination is a matter of chance.

(b) It is the father, who is responsible for the male or female child. The sperm of the male partner contains 50% X chromosome and 50% Y chromosomes while the mother has only X chromosome to contribute. 3

Q. 7. Population explosion is not a far, a number of reasons are behind in the enhancement of people living in a country. Though all the countries are facing this problem, but the problem is very alarming in India. It is threatening the development of the country. Organisms increase their population with the help of reproduction. The rates of birth and death in a given population determines it size. The increase in a population occurs when the birth rate is higher than the death rate. The government find itself unable to manage facilities for increased number of population. The Government of India is taking many preventive measures. Family planning is being stressed by the government.

(i) Mention any three methods of contraception ? 1½

(ii) Suggest four ways which you will take to make rural area people aware about the vitality of family planning. 1½

Ans. (i) Three methods of contraception are :
(a) Mechanical Barrier Methods.
(b) Chemical Methods.
(c) Surgical Methods. 1½

(ii) (a) Discussion of benefits of family planning by people.
(b) Organising seminar.
(c) Making poster.
(d) Observing the problems due to enhanced population. 1½

Q. 8. Sexual reproduction is a type of reproduction in which the two sexes, namely, male and female are involved. The male sexual unit is known as male gamete or sperm in humans while female sexual unit is termed as female gamete or ova. Thus, the two major processes, *i.e.*, formation of gametes and fusion of gametes constitute sexual reproduction.

(i) What is fertilisation ? 1

(ii) "Sexual reproduction is considered to be superior to a sexual reproduction in terms of variation in species." Comment any four points in respect of this statement. 2

Ans. (i) Fusion of a male gamete with a female gamete is known as fertilisation. 1

(ii) (a) It promotes diversity of characters in the offsprings. ½
(b) It results in new combination of genes brought together in gamete. ½
(c) It increases genetic variation. ½
(d) It plays a prominent role in the origin of new species. ½

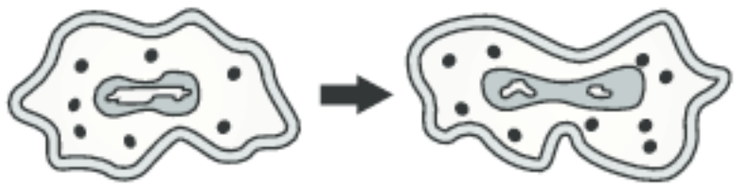
Practical Based Questions

Experiment 1 :	**To Study :** **(i)** binary fission in *Amoeba*, and **(ii)** budding in *Yeast* with the help of prepared slides.
Experiment 2 :	To identify the difference parts of an embryo of a dicot seed

Q. 1. Name the type of asexual reproduction in which two individuals are formed from a single parent and the parental identity is lost.

Write the first step from where such a type of reproduction begins. Draw first two stages of this reproduction.

Ans. Binary fission ½
Elongation of cell and its nucleus ½

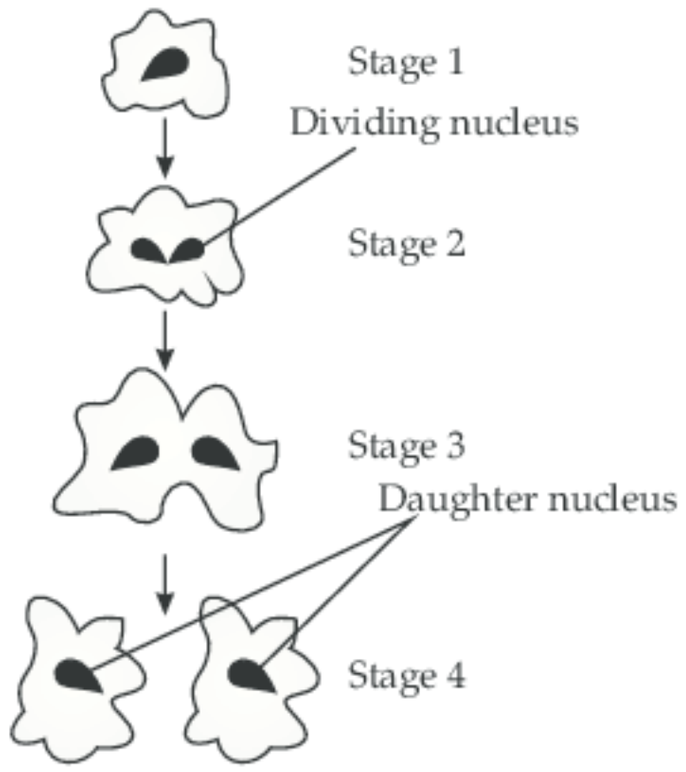


Correct diagram showing progressive elongation of the nucleus and cytoplasm. 1

Q. 2. Draw in sequence (showing the four stages) the process of binary fission in *Amoeba*.

[O.D Set 31/1, 2017]

Ans. Binary Fission in *Amoeba*



½ + 4

Q. 3. What is the significance of asexual reproduction?

Ans. Significance of asexual reproduction :

(i) Requirement of one parent to produce offspring so no need to migrate to other place to reproduce.

(ii) Numerous offspring can be produced in a short span of time.

(iii) Minimize the use of energy and time. 1 + 1

Q. 4. A student observed the slide of binary fission of *Amoeba* under a microscope. What should be the observations reported by him.

[Board Term II, Set-FF7NBE6, 2015]

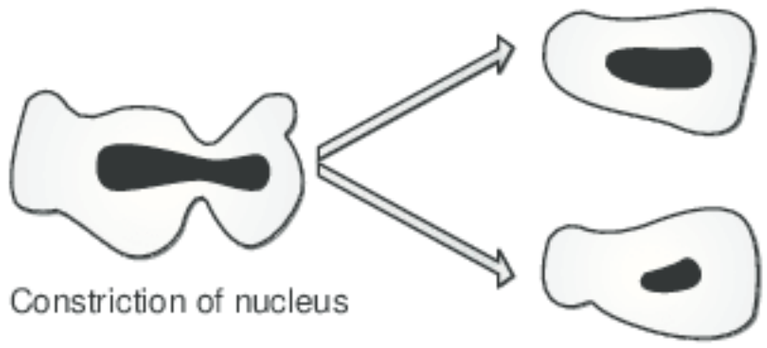
Ans. (i) Division of the nucleus.
(ii) Division of cytoplasm. 1 + 1

[CBSE Marking Scheme, 2015]

Q. 5. Name the type of asexual reproduction in which two individuals are formed from a single parent and the parental identity is lost. Draw the initial and final stages of this type of reproduction.

[Board Term II, Delhi Set I, 2015]

Ans. Type of asexual reproduction in Binary fission.

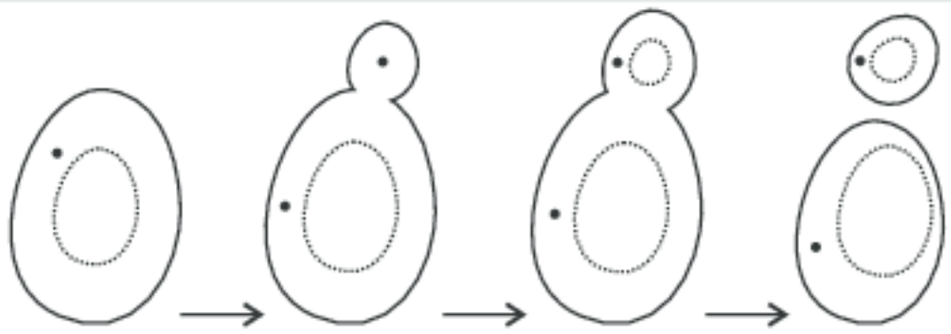


1 + 1

Q. 6. A student is observing a permanent slide showing sequentially the different stages of asexual reproduction taking place in yeast. Name this process and draw diagrams, of what he observes, in a proper sequence.

[Board Term II, O.D. Set-I, 2016]

Ans.



2

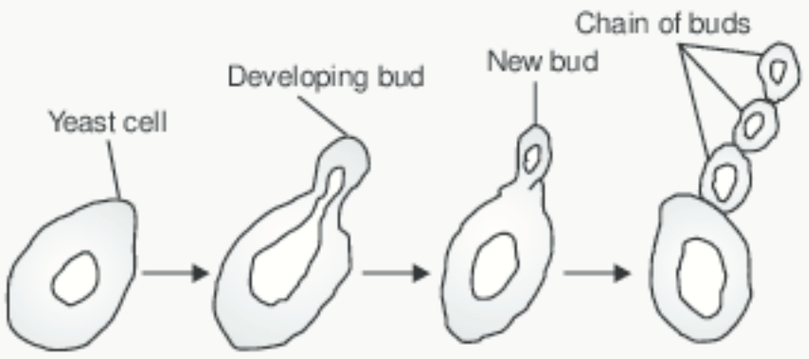
OR

[Topper Answer, 2016]

Q. 7. A student is observing a permanent slide showing sequentially the different stages of asexual reproduction taking place in yeast. Name this process and draw diagrams, of what he observes, in a proper sequence.

[Board Term II, O.D. Set I, 2016]

Ans.



(Three/four diagrams in proper sequence) **1 + 1 = 2**

[CBSE Marking Scheme, 2016]

Q. 8. Draw a labelled diagram to show that particular stage of binary fission in *Amoeba* in which its nucleus elongates and divide into two and a constriction appears in its cell membrane.

[Board Term II, Delhi Set I, 2016]

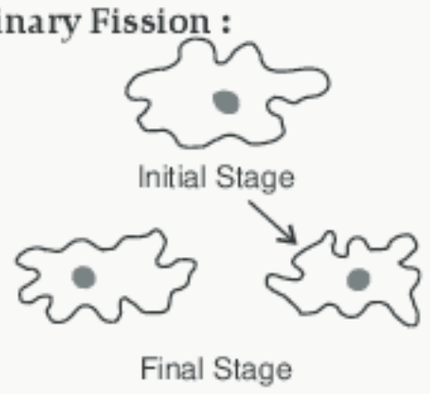
Ans.

1 + 1

[CBSE Marking Scheme, 2016]

Q. 9. In which asexual reproduction two individuals are formed from a single parent and the parental identity is lost ? Draw the initial and the final stages of this type of reproduction to justify your answer. Write the event with which this process starts. **[Board Term II, Foreign Set I, 2016]**

Ans. Binary Fission :



1 + 1

Process starts with elongation of nucleus.

[CBSE Marking Scheme, 2016]

Q. 10. A student confirms binary fission process in a unicellular organism after observing a slide under microscope. What he might have observed in that slide to reach to this condition ?

[Board Term II, Set-GFUTB86, 2015]

Ans. (i) An organism having elongated and constricted nucleus.

(ii) An organism having two nuclei with constriction in between. **[CBSE Marking Scheme, 2015] 1 + 1**

Q. 11. Are binary fission and budding faster processes of reproduction when compared to sexual reproduction. Justify.

Ans. Yes. Binary fission and budding do not involve any variations, also these involve single parent. **1 + 1**

Q. 12. Draw a diagram showing different parts of an embryo of gram seed and label them.

[Delhi Comptt. 31/1/1, 2017]

Ans.

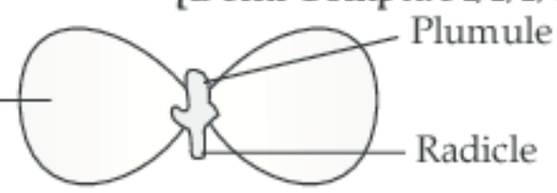


Diagram ½

Three labellings ½ + 3

Q. 13. You have to perform the experiment, "To identify the different parts of an embryo of a gram seed". Describe the procedure that you would follow.

[Foreign 31/2/1, 2017]

Ans. (i) Soak a few seeds of gram/Bengal gram/chana/ kidney beans/ etc and leave them overnight.

(ii) Drain the excess water.

(iii) Cover the seeds with a wet cloth and leave them for a day.

(iv) Cut open the seed carefully and observe the different parts. ½ + 4

Q. 14. Write the procedure for seed germination.

Ans. (i) Take a petri dish. Place damp cotton on it.

(ii) Put the dicot seeds on the petri dish. Allow it to germinate.

(iii) Place the germinated seed on the watch glass.

(iv) Open the two cotyledons with a forceps and needle.

(v) Observe the structure of seed.

(iv) Also observe the embryonal axis with a magnifying glass and label its parts. 2

Q. 15. Distinguish between albuminous seed and ex-albuminous seed.

Ans. Albuminous seed : Seeds having copious amount of endosperm. *e.g.,* Wheat

Ex-albuminous seed : Seeds in which endosperm is used up. *e.g.,* Grass **1 + 1**

Q. 16. Write two precautions to be taken while identifying different parts of an embryo of a dicot seed.

Ans. (i) Conditions for the seed germination should be optimum *i.e.* warmth, moisture and air.

(ii) Care should be taken to separate two cotyledons so that the embryonal axis is intact. **1 + 1**

Q. 17. The students of a class were asked by the teacher to study the different parts of an embryo of an angiosperm. Write down the correct steps for the experiment ?

Ans. First of all, take some dry gram seeds in a Petri dish. Now, soak the seeds in plain water and keep them overnight. Drain the excess water. After that, cover the soaked seeds with a wet cotton cloth and leave them for a day. Finally, cut open a soaked seed and observe its different parts.

Q. 18. Write down the name of materials required in the experiment, germination of seeds?

Ans. For showing germination, seeds of gram, water, bowl and wet clothes are required.

Q. 19. A student was asked to observe and identify the various parts of an embryo of a red kidney bean seed. He identified the parts and listed them as under:

(i) Tegmen

(ii) Testa

(iii) Cotyledon

(iv) Radicle

(v) Plumule

Write down the correctly identified parts among these?

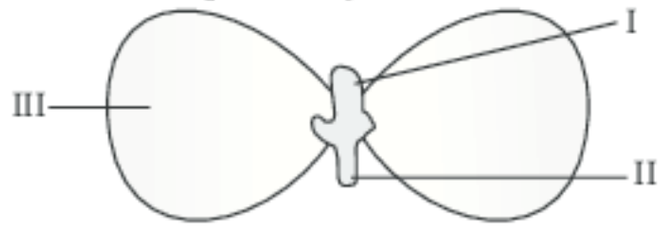
Ans. Testa, Radical and Plumule are various parts of an embryo of a red kidney bean.

Q. 20. A student has to perform the experiment "To identify the different parts of an embryo of a dicot seed." Name three dicot seeds? Seeds on germination give rise to _____ and _____.

Ans. Three dicot seeds are: Red kidney bean, Pea and gram.

Seeds on germination give rise to radicle and plumule

Q. 21. In the following diagram showing the structure of embryo of a dicot seed, what are the parts marked I, II and III sequentially?



Ans. In the given figure, I represent the plumule, II represents the radicle and III represents the cotyledon.

Q. 22. (a) Name the structure which stores food in the seeds?

(b) What is the importance of seed coat in a dicotyledonous seed?

Ans. (a) Cotyledons store food.

(b) Seed coat is for protection

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