Reproduction

Improve your learning

Q. 1. Why do fish and frog produce a huge number of eggs each year? (AS1)

Answer : a) Aquatic animals such as fishes and frogs reproduce through sexual reproduction by external fertilization i.e. the fertilization occurs outside the female's body.

b) In external fertilization, since the chances of fertilization, or the development and survival of the zygote are totally dependent on nature, large number of eggs and sperms are produced and released every cycle.

c) Most of the times, the unfertilized or the fertilized eggs are lost to predators, water currents, and other environmental factors, so in order to compensate for the loss, a huge number of eggs are produced.

Q. 2. Give examples and explain what is meant by external fertilization? (AS1)

Answer : a) External fertilization can be defined as the fertilization that takes place outside the female's body.

b) External fertilization is mostly common in aquatic organisms such as fishes and amphibians.

c) During the time of mating, the female lays a large number of eggs in the water and male releases millions of sperms on them in water. The zygote thus formed after the fusion of gametes is protected in a jelly-like structure where it grows and develops.

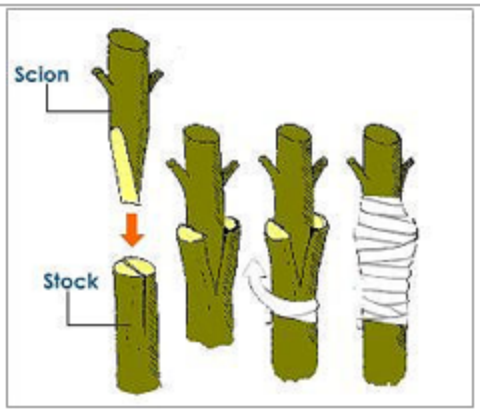
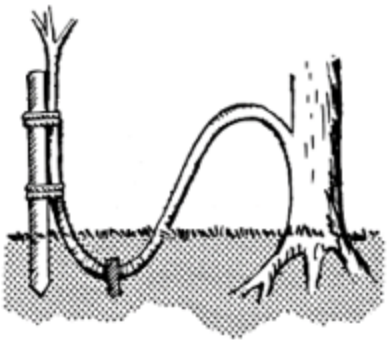
d) Since the chances of fertilization or the development and survival of the zygote are totally dependent on nature, a large number of eggs and sperms are produced and released every cycle.

e) For example: Fishes, frogs and other amphibians.

Q. 3 A. Write differences between (AS1)

Grafting – layering

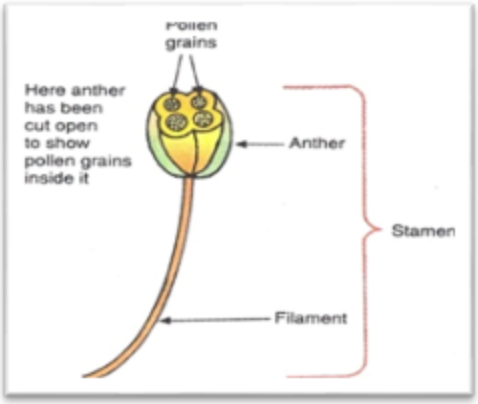
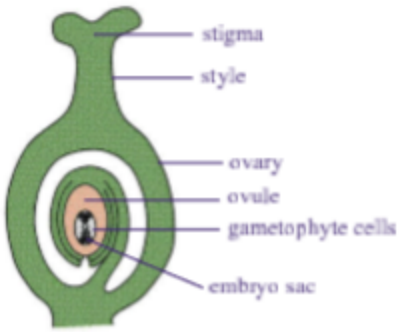
Answer : Grafting – layering

S.No.	Grafting	Layering
1	In this method, two plants are joined together in such a way that the two stems join and grow as a single plant.	In this method, a branch of a plant having at least one node is bent such that the node touches the soil. The node is covered with moist soil and after a few days it develops its own roots and starts growing as a new plant.
2		
3	This technique is used to produce plants with desirable characteristics and is helpful for propagating improved varieties of various flowers and fruits.	This technique is used for producing a large number of copies/ clones on the same plant in much lesser time.
4	For example Mango, rose	For example Nerium

Q. 3 B. Write differences between (AS1)

Stamen – carpel

Answer : Stamen – carpel

S.no.	Stamen	Carpel
1	Stamens are the male reproductive organs where male gametes are produced.	The carpel is the female reproductive organ where female gamete or ovule is produced.
2	It is also called androecium.	It is also called gynoecium
3	It consists of 2 parts- the lobe-like structures that contain pollen grains caller anther and stalk called filament.	It consists of 3 parts- the uppermost portion which receives the pollen called stigma, the stalk called style and ovary which contains ovules.
4		

Q. 4. Explain the process of fertilization in plants. (AS1)

Answer : a) The pollen grain reaches the stigma of the flower called pollination.

b) The pollen tube starts germinating, the pollen contains 2 cells- generative cell and a vegetative cell.

c) Both the cells travel through the pollen tube which leads them to the embryo sac.

d) The embryo sac is a 7 celled 8 nuclei structure.

e) One of the male gametes fuses with the female egg- called syngamy, while the other fuses with the 2 polar nuclei forming a triploid- called triple fusion.

f) Since 2 kinds of fertilization take place in a plant, it is also called double fertilization.

g) After fertilization, the triploid central cell develops into endosperm while the zygote develops into an embryo.

Q. 5 A. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Fission:

Answer : The different modes of asexual reproduction are as follows:

Fission: The splitting of unicellular organisms into daughter cells is called fission. If the parent cell splits into two daughter cells, it is called binary fission whereas splitting of parent cells into more than 2 cells is called multiple fission. For example binary fission in Amoeba and multiple fission in Plasmodium.

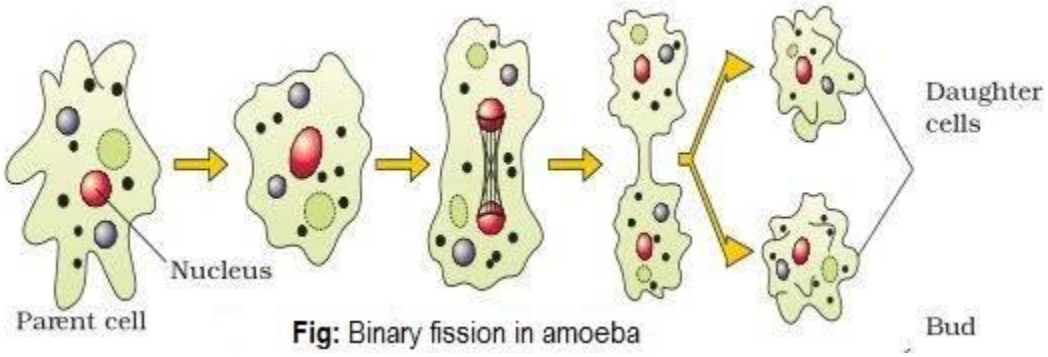


Fig: Binary fission in amoeba

Q. 5 B. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Budding:

Answer : Budding: An outgrowth called bud starts forming on the body of the parent organisms. When the bud is fully grown, it detaches itself from the parent body and starts acting as an individual. For example Yeast.

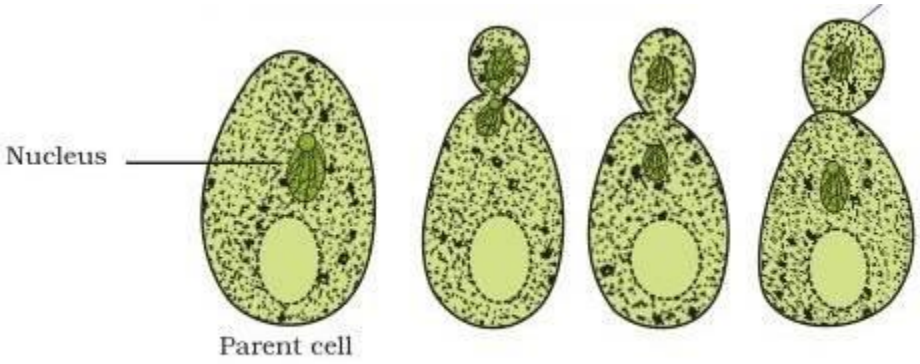
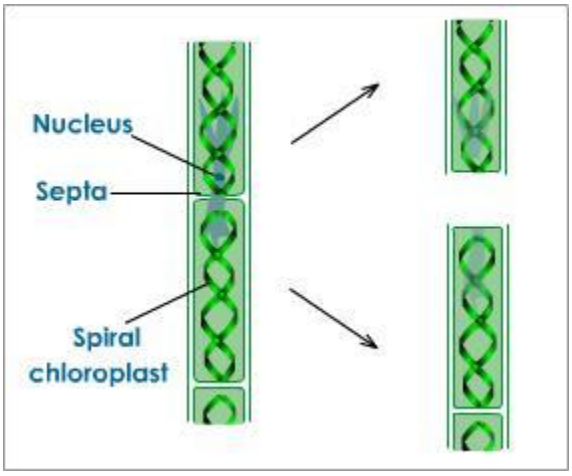


Fig: Budding in yeast

Q. 5 C. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Fragmentation:

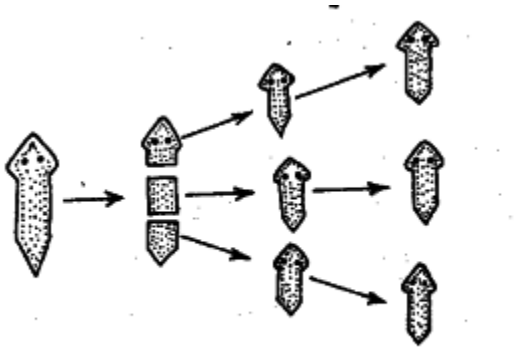
Answer : Fragmentation: Fragmentation is a mode of reproduction in which an organism divides into 2 or more fragments and each fragment acts as a new individual. It is more common in simpler organisms such as algae, fungi, and flatworms.



Q. 5 D. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Regeneration:

Answer : Regeneration: The ability of an organism to grow from a part is called regeneration and is useful in case the organism gets cut up into pieces. For example Planaria.


Regeneration in *Planaria.*

Q. 5 E. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Parthenogenesis:

Answer : Parthenogenesis: The process of reproduction where there is a shift from sexual to asexual mode of reproduction due to various environmental changes. It can be both natural such as in bees, wasps or induced such as in various seedless fruits.

Q. 5 F. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Vegetative propagation:

Answer : Vegetative propagation: The mode of reproduction in which vegetative propagules rather than seeds are used to grow plants. It is useful to grow seedless plants, the plant who have lost the ability to produce seeds or to grow a number of plants in a short duration. It can be both natural such as in Bryophyllum, strawberries, or artificial such as grafting, layering etc.

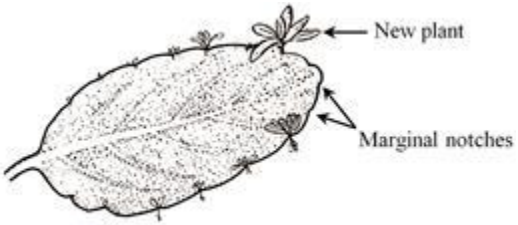
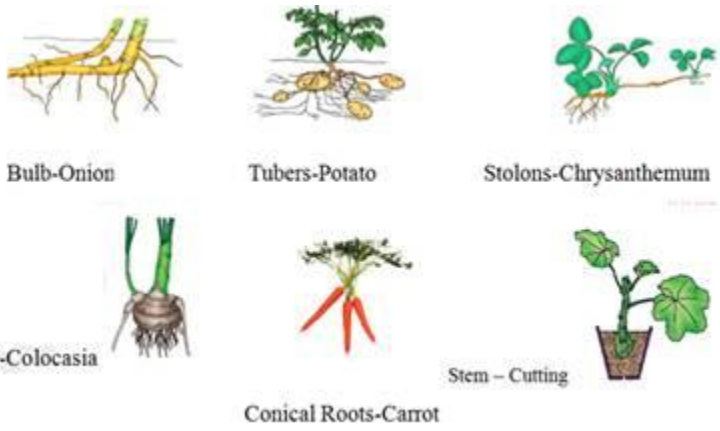


Fig. 9 Vegetative propagation by leaves in Bryophyllum



Q. 5 G. What are the different modes of asexual reproduction? Cite them with examples. (AS1)

Spore formation:

Answer : Spore formation: Spores are microscopic unicellular structures produced inside sporangium in various fungi, bacteria and non-flowering plants. These spores are produced in very large number.

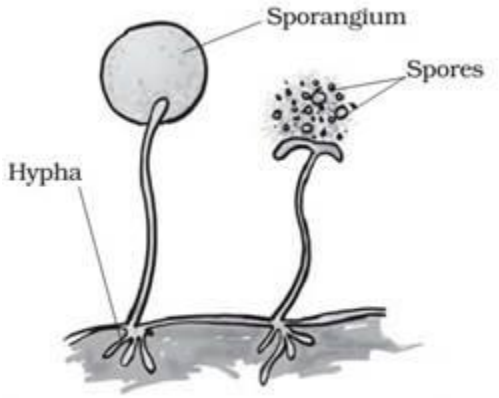


Fig. 12.7 *Reproduction through spore formation in fungus*

Q. 6. In what ways does sexual reproduction differs from asexual one? State at least three reasons. (AS1)

Answer :

S.no.	Characteristics	Asexual reproduction	Sexual reproduction
1.	Parents	It involves a single parent.	It involves both the parents.
2.	Time	It takes place in a very short period of time.	It takes a considerable amount of time.
3.	Number of offspring's	Usually larger number of offspring's are produced.	A lesser number of offspring's produced.
4.	Complexity	More common in simpler organisms.	Most of the complex organisms reproduce through sexual modes of reproduction.
5.	Variation	The daughter organisms are identical to the parent.	The offspring consists of characteristics of both the parents and hence has a number of variations.
6.	Type of cell division	Only mitosis	Meiosis followed by mitosis
7.	Examples	Amoeba, yeast.	Complex plants and animals.

Q. 7. How are sperm cells adapted for their function? (AS1)

Answer :a) The major function of the sperm is to travel to the egg cell so as to fertilize it.

b) For this, sperm has to travel a large distance in short amount of time. The sperm cell consists of a long tail that helps in its movement.

c) Also, in order to introduce its nucleus into the female cell for fusion, the sperm has to break through the various layers enveloping the egg. For this, acrosome is present on the head of the sperm which releases enzymes that help in dissolving the layers around the egg.

Q. 8. The menstrual cycle prepares the uterus for a fertilized egg. How long is an average menstrual cycle from start to finish? (AS1)

Answer : a) An average menstrual cycle extends between a period of 28-30 days from the onset of puberty in girls.

b) It starts with the end of the previous menstruation.

c) One of the ovaries develop an egg and release it on the 14^{th} day. This process is called ovulation.

d) The uterus prepares itself for receiving a zygote if fertilization takes place.

e) The walls of the uterus get thick and richly supplied with blood vessels. The uterus also increases in its size.

f) If the egg is not fertilized between the 14^{th}-18^{th} day, the egg is shed off the body.

g) As there is no use of the uterine lining, it too comes off the vagina around 28^{th} day in the form of menstrual flow.

Q. 9. When the fetus is growing inside the uterus it needs nutrients. What provides these nutrients? (AS1)

Answer : a) While the fetus is growing inside the uterus, it receives nutrition from the body of the mother itself through the placenta.

b) The placenta is a tissue formed by the cells of both the mother and the embryo around the 12th week of pregnancy.

Q. 10. Which type of substances are absorbed by fetus from the mother? (AS1)

Answer : The foetus absorbs substances such as oxygen and various other nutrients from the mother through the placenta. The blood travels through the membranes surrounding the placenta and the nutrients along with oxygen and other things are diffused in the foetus.

Q. 11. What is the job of the amniotic sac? (AS1)

Answer : a) Amniotic sac develops from an embryonic membrane called amnion.

b) The amnion grows around the embryo covering it entirely into a cavity.

c) This cavity is filled with a fluid called the amniotic fluid in which the embryo develops.

d) The amniotic fluid along with amniotic cavity helps in keeping the embryo moist and safe from minor mechanical injuries.

e) The amniotic sac provides cushioning whereas the fluid-filled cavity acts as shock absorber.

Q. 12. What are the advantages of sexual reproduction? (AS1)

Answer : Advantages of sexual reproduction:

a) Sexual reproduction involves the combining of gametes of both the parents to form a zygote. Hence, this zygote consists of the combination of characteristics of both the parents.

b) Every time a new zygote is formed, new combinations take place giving rise to various variations.

c) Accumulation of such variations helps the organisms to adapt and survive better in the environmental conditions and also helps in bringing new characteristics.

Q. 13. How does reproduction help in providing stability to the population of species? (AS1)

Answer : a) Every organism in a population has a certain life span. In that particular time period, it takes birth, grows, develops and after fulfilling its life expectancy dies.

b) Reproduction ensures that the population of a particular species keeps on surviving by the production of new offspring’s of the same kind.

c) If reproduction does not take place, no new organisms will be produced while the old ones keep on perishing. A time will come when all the organisms are dead and the population of particular species will cease to exist.

d) Hence, reproduction is important for providing stability to a population.

Q. 14. Write the differences between mitosis and meiosis. (AS1)

Answer :

S.no.	Characteristics	Mitosis	Meiosis
1.	Type of parent cells	Occurs in all the somatic cells.	Occurs only in reproductive cells to form gametes.
2.	Ploidy	The daughter cells have the same number of chromosomes as the parent cell i.e. ploidy remains same.	The daughter cells have half the number of chromosomes than the parent cells and hence are called haploids.
3.	Number of daughter cells	1 Mitotic division gives rise to 2 daughter cells	1 meiotic division gives rise to 4 daughter cells.
4.	Phases	It consists of only one phase that has 4 stages- prophase, metaphase, anaphase, and telophase.	It consists of two phases- meiosis1 and meiosis II.
5.	Type of daughter cells	The daughter cells formed are identical to the parent cells.	The daughter cells formed have changed due to the crossing over that takes place between homologous chromosomes.
6.	Type of division	Since the number of chromosomes in daughter cells is equal to the parent, it is also called equational division.	Since the number of chromosomes is reduced to half in daughter cells, this type of division is also called reduction division.

Q. 15. What happens to the wall of the uterus during menstruation? (AS1)

Answer : a) If the fertilization does no take place, the egg or ova is shed out of the body. The thick uterine lining that developed to receive the embryo also gets wasted.

b) During menstruation, this thick uterine lining/wall is shed out of the body and comes out of the vagina in the form of blood and mucus.

Q. 16. "All unicellular organisms undergo only mitotic cell division during favorable conditions" – Do you support this statement? Why? (AS2)

Answer : Yes, all unicellular organisms undergo mitotic cell division during favorable conditions in order to increase their population. Whether it be through fission, budding, etc., they reproduce to form daughter cells.

Q. 17. Vicky's father wants to grow a single plant having two desirable characters colourful flowers and big fruits. What method will you suggest him and why? (AS3)

Answer : I will suggest the method of either grafting or cross-pollination.

Grafting method:

•In this method, two plants are joined together in such a way that the two stems join and grow as a single plant.

•This technique is used to produce plants with desirable characteristics and is helpful for propagating improved varieties of various flowers and fruits.

•In this technique, the plant attached to the soil is called stock whereas the team attached to it is called Scion.

•Using this technique, we can attach the two plants with desirable characteristics of colourful flowers and big fruits together to get the single plant.

Cross-pollination method:

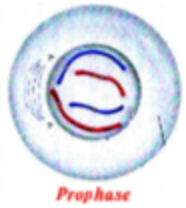
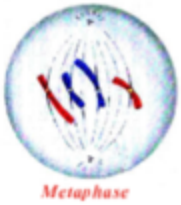
•In this method, 2 plants of the same species but different characteristics can be cross-pollinated.

•The pollen from one plant having the characteristic of colourful flower can be used to pollinate another plant that bears big fruits.

•The resulting zygote will have the characteristics of both the pants.

Q. 18. Uproot an onion plant and take a thin section of its root tip. Stain it and observe under the microscope. Draw as you see and identify the stages of the cell division. (AS3)

Answer : Onion root tip consists of meristematic tissues which consist of cells that are continuously dividing. Hence, by observing those cells we can see the various stages of mitosis.

S.no.	Stage	Diagram	Characteristic features
1.	Prophase		• Condensation of chromatin material into chromosomes starts taking place • Nuclear membrane starts disappearing. • Nucleolus disappears.
2.	Metaphase		• The completely condensed chromosomes align themselves on the equatorial plane. • Centromere splits, spindle fibers get attached to each chromatid
3.	anaphase		• Spindle fibers start contracting, pulling the chromatids towards the opposite poles.
4.	telophase		• Chromosomes convert back to chromatin • Nuclear membrane starts appearing around the separated chromatin. • Nucleolus starts reappearing. • Cytokinesis starts taking place.

Q. 19. Visit a nearby village and collect information how farmers grow sugarcane, flowering plants like chrysanthemum, primrose and vegetables like stem tubers, plump gourd (dondakaya) etc. Make a report and present in class. (AS4)

Answer :

S.no.	Name of plant	Method of growing
1.	Sugarcane	Cutting
2.	Chrysanthemum	Cutting
3.	Rose	Stem cutting, layering
4.	Stem tubers	Planting tubers
5.	Plump gourd	Stem cutting

Q. 20. Collect information from the school library or using internet what vegetative methods are followed in your district as well as in your state to propagate various plants of economic importance. Represent it in a graph. (AS5)

Answer :

i. Through leaves- *Bryophyllum*

ii. Through stems-

•Stolon's- Jasmine, strawberry

•Bulbs- onion

•Tuber- potato

iii. Through roots- carrot, radish

iv. Through corms- ginger

Q. 21. Make a flow chart to show the cell cycle and explain cell division describing different stages of mitosis. (AS5)

Answer :

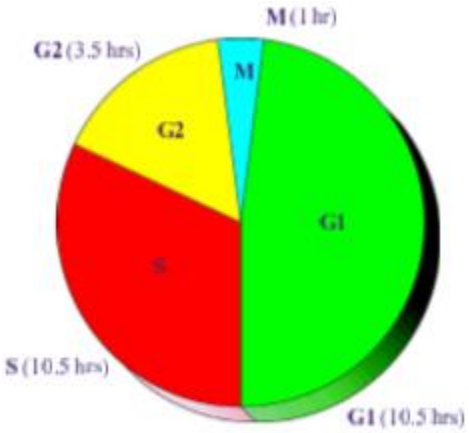


fig-28: Interphase

Cell cycle:

Cell cycle consists of two stages- interphase and mitotic phase

a) Interphase: it is the period between two cell divisions. This is a period where genetic material makes its copy such that it is equally divided among the two daughter cells formed during cell division. It consists of three stages-

•G1 phase: this is the linking period between completion of mitosis and the beginning of DNA replication (Gap1 phase). The cell size increases during this period.

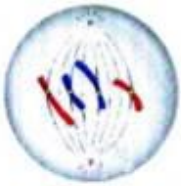
•**S-phase:** this is the period of DNA synthesis (synthesis phase) leading to duplication of chromosomes.

•**G2 phase:** this is the time between the end of DNA replication and beginning of mitosis (Gap2 phase). Cell organelles divide and the cell prepares for mitosis.

b) M-phase: It is the phase of cell division or mitosis and consists of 2 stages- karyokinesis (nuclear division) and cytokinesis (cytoplasmic division). Karyokinesis is further divided into 4 stages namely- prophase, metaphase, anaphase, and telophase.

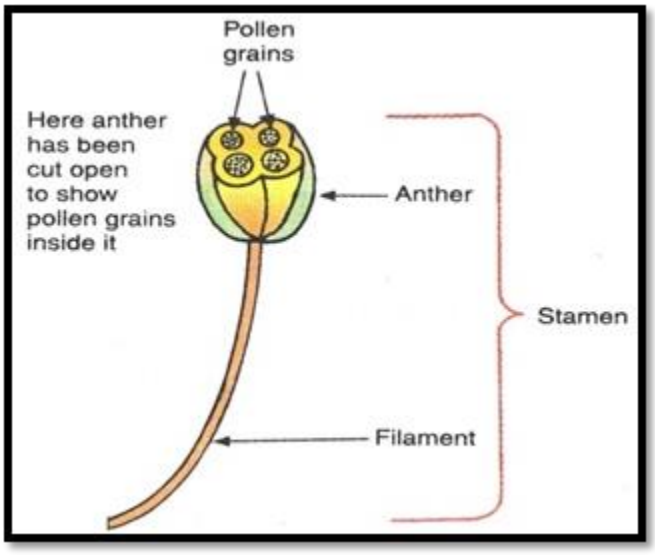
Mitosis:

It consists of karyokinesis (nuclear division) and cytokinesis (cytoplasmic division). Karyokinesis is further divided into four stages:

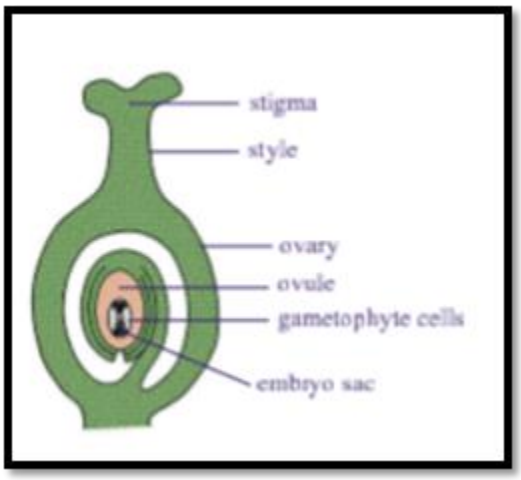
S.no.	Stage	Diagram	Characteristic features
1.	Prophase	 Prophase	• Condensation of chromatin material into chromosomes starts taking place • Nuclear membrane starts disappearing. • Nucleolus disappears.
2.	Metaphase	 Metaphase	• The completely condensed chromosomes align themselves on the equatorial plane. • Centromere splits, spindle fibres get attached to each chromatid
3.	anaphase	 Anaphase	• Spindle fibers start contracting, pulling the chromatids towards the opposite poles.
4.	telophase	 Telophase	• Chromosomes convert back to chromatin • Nuclear membrane starts appearing around the separated chromatin. • Nucleolus starts reappearing. • Cytokinesis starts taking place.

Q. 22. Draw neatly labeled diagrams of male and female reproductive system of the plant. (AS5)

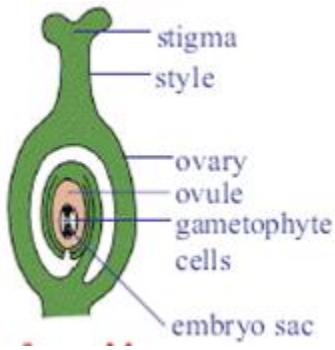
Answer : Male reproductive part:



Female reproductive part:



Q. 23. Observe the following part of a flowering plant prepare a note. (AS5)



Answer : a. This is the structure of the female reproductive part of the flower known as pistil or carpel.

b. It consists of 3 main parts- stigma, style, and ovary.

c. Stigma is the flattened structure on the top that is sticky or hairy to receive and trap the pollen grains.

d. The style is the long stalk that connects the stigma to the ovary.

e. Ovary consists of the female gamete or egg. The ovaries consist of one or more ovules which further develop to form a 7-celled, 8-nucleated embryo sac that contains the egg cell or female gamete.

Q. 24. Prepare a flow chart to explain the process of sexual reproduction in plants. (AS5)

Answer : The male reproductive system of the flower consists of the stamen that produces the male gametophyte- pollen grains

The female reproductive system consists of carpel which consists of stigma, style, and ovary. Ovary consists of the female game in the ovules.

Pollination is the process in which the pollen grains are transferred from the anther of the stamen to the stigma of the carpel.

The germination of pollen produces pollen tube which travels down the stigma towards the ovary.

The ovary consists of 1 or more ovules. The ovule develops into embryo sac which is a 7-celled, 8-nucleated structure.

The pollen consists of 2 male gametes- generative cell and vegetative cell which travel down to the embryo sac.

One of the cells fuses with the female gamete to form zygote while the other fuses with the polar nuclei to form a triploid. This is called double fertilization.

After fertilization the embryo sac gets converted into seed coat, polar nuclei form endosperm, ovary forms the fruit and zygote forms embryo.

Q. 25. Draw a neatly lablled diagram to explain plant fertilization. Write few points on pollen grain. (AS5)

Answer :

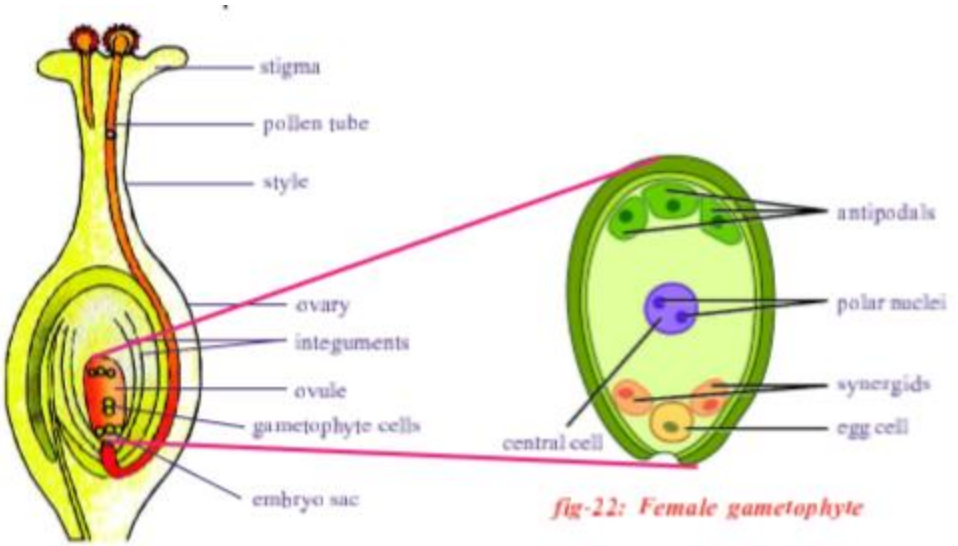


fig-21: Fertilisation

fig-22: Female gametophyte

h) The pollen grain reaches the stigma of the flower called pollination.

i) The pollen tube starts germinating, the pollen contains 2 cells- generative cell and a vegetative cell.

j) Both the cells travel through the pollen tube which leads them to the embryo sac.

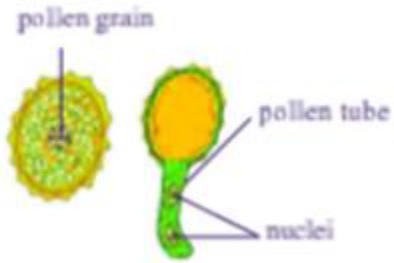
k) The embryo sac is a 7 celled 8 nuclei structure.

l) One of the male gametes fuses with the female egg- called syngamy, while the other fuses with the 2 polar nuclei forming a triploid- called triple fusion.

m) Since 2 kinds of fertilization take place in a plant, it is also called double fertilization.

n) After fertilization, the triploid central cell develops into endosperm while the zygote develops into an embryo.

Pollen grain:



a) Pollen grains are the structures or male gametophytes produced in the anthers of the flower which contain the mail gametes.

b) They are coarse powdery grain-like structure.

c) They have double walls with pores. The outer wall is made up of sporopollenin which is one of the hardest substance known.

d) Pollen grain travels from the anthers of the stamen to the stigma of the pistil through various agents to deliver the male gamete by the process called pollination.

Q. 26. What would be the consequences if there is no meiosis in organisms that reproduce sexually? (AS2)

Answer : a) Organisms reproducing sexually undergo reduction division to form gametes which are haploid i.e., they contain half the number of chromosomes than their parents.

b) This is to ensure that when the 2 gametes fuse to form a zygote, the original chromosome number is restored in the organism and the species remains constant.

c) If meiosis does not take place, the ploidy will double with every other fertilization leading to disruption or imbalance in the number of chromosomes causing many harmful changes, some of which can be fatal for the growing zygote.

Q. 27. How will you appreciate cell division that helps in the perpetuation of life? (AS6)

Answer : a) Cell division is an important step for the succession of life.

b) According to the improvised Cell Theory- All new cells arise from the pre-existing cells.

c) These new cells arise due to cell division whether it be mitotic or meiotic. The new cells or daughter cells inherit the information and characteristics from their parent cells.

d) Mitotic cell division helps in increasing the number of cells and hence making sure that the population of the species remains stable.

e) Whereas meiotic division helps in keeping the number of chromosomes constant during sexual reproduction, thus maintaining the accuracy of species and enriching them with variations.

f) Hence, we can say that cell division is very useful for the perpetuation of life.

Q. 28. What precautions will you take to keep away from various sexually transmitted diseases? (AS7)

Answer : Precautions to avoid sexually transmitted diseases:

a) Avoid multiple/unknown sexual partners.

b) Avoid unsafe sexual practices.

c) Usage of mechanical barriers such as condoms or diaphragms during any sexual activity.

d) Get a regular checkup from qualified doctors for any sexually transmitted diseases.

e) Avoid sharing of undergarments, towels etc.

Q. 29. Conduct a seminar on child marriages and foeticide. (AS7)

Answer : Child marriage-

•Child marriage is very common in most parts of rural India.

•Children especially girls below 18 years of age are married to elder men on confines of bonds between their parents.

•This leads to one of the major problems i.e. teenage pregnancy. It is extremely harmful to the girl as well as the baby as the young girl's body is not prepared to bear a child.

•It causes severe deficiencies to the mother as well as the baby and the child birth can be extremely complex. The children born out of these young pregnancies are weak, undernourished, and sometimes mentally retarded as well.

Female foeticide:

•The girl child is still deemed to be a burden in India and many of the times, these fetuses are aborted in the womb itself.

•This has led to drastic decline in the male-female sex ratio.

•To combat this, prenatal sex determination has been banned in India and any trained individual practicing it is punishable by law.

Choose the correct Answer

Q. 1. The part of the female reproductive system that produces the eggs? ( )

A. Ovary
B. Epididymis
C. Cervix
D. Fallopian tube

Answer : A pair of ovaries are present in the lower abdomen of females which produce mature eggs each month. The ovaries are also responsible for secreting female hormones and promoting the growth of secondary sexual characteristics.

Q. 2. The term that we use to describe a sperm cell fusing with an egg cell? ( )

A. Fragmentation
B. Fermentation
C. Fertilization
D. Fusion

Answer : Fertilization is the process in which male and female gametes fuse together to form a zygote.

Q. 3. Which part of the male reproductive system produces (human) the sperm cells? ( )

A. Vasdiference
B. Epididymis
C. Seminiferous tubules
D. Scrotum

Answer : Seminiferous tubules are highly coiled tubules present in the lobules of testis which consists of cells that undergo meiosis to form spermatozoa.

Q. 4. How does the sperm break through the egg cell membrane? Choose the option you think is right. ( )

A. Tears a hole in the membrane
B. Dissolves the membrane with chemicals
C. Bites through the membrane with teeth
D. Squeezes through gaps in the membrane

Answer : The head of the sperm consists of acrosome that releases chemicals on reaction that dissolve the layers surrounding the egg cell so that the sperm can fertilize it.

Q. 5. Why are egg cells larger than sperm cells? Choose the option you think is right. ( )

A. Egg cells have more cells in them
B. Have food store to help growth after fertilisation
C. Have thicker cell membranes
D. Have larger nuclei

Answer : Egg cells are larger in size as they store food to nourish the zygote till it gets implanted into the mother's body through placenta.

Q. 6. Which of these things will affect the way a foetus grows? Choose the option you think is right. ( )

A. Chemicals in cigarette smoke
B. Alcohol
C. Drugs
D. All of the above

Answer : All of these- cigarettes, alcohol and drug abuse can cause physical, mental damage to the growing foetus and is extremely harmful for the health of both, mother and baby.

Q. 7. Which of the following is the correct sequence of steps in the human life cycle? Choose the right option.

A. Babyhood, childhood, adolescence, adulthood
B. Childhood, babyhood, adulthood, adolescence
C. Adolescence, babyhood, adulthood, childhood
D. None of these

Answer : The baby grows into a child and then reaches its adolescence and finally grows into an adult.