Reproduction in Organisms

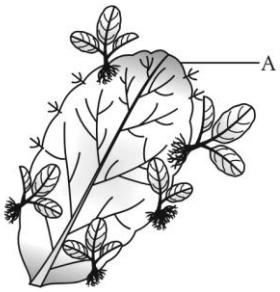
TOPIC - 1

Asexual Reproduction

Very Short Answer Type Questions **(1 mark each)**

Q. 1. Identify 'A' in the given diagram and state its function.

[Delhi Set-I, Comptt. 2016]



Ans. 'A'—Adventitious buds

Function — Vegetative propagation

[CBSE Marking Scheme, 2016]

Q. 2. Identify 'A' in the given diagram and state its function.

[Delhi Set-II, Comptt. 2016]

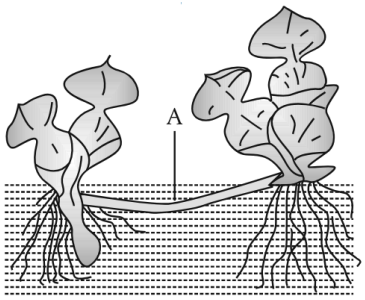
Ans. 'A'—Nodes

Function — Vegetative propagation

[CBSE Marking Scheme, 2016]

Q. 3. Identify 'A' in the diagram and mention its function.

[Delhi Set-III, Comptt. 2016]



Ans. 'A'—Offset

Function — Vegetative propagation

[CBSE Marking Scheme, 2016]

Q. 4. Name an alga that reproduces asexually through zoospores. Why are these reproductive units so called ?
[CBSE, All India, 2013]

Ans. Asexual reproduction by zoospore formation takes place in Chlamydomonas. These reproductive units are called as zoospores because they are motile.

Q. 5. Give an example each of a fungus which reproduces by :

(i) budding

(ii) conidia.

[Outside Delhi, Comptt. 2014]

Ans. Budding : Yeast (Saccharomyces)

Conidia : Penicillium

Q. 6. Name the units of vegetative propagation in grasses and water hyacinth.

[Outside Delhi Set-III, Comptt. 2012]

Ans. Grasses : Runner.

Water hyacinth : Offset.

Q. 7. Name the vegetative propagules in the following :

(i) Agave (ii) Bryophyllu

[Outside Delhi Set-III, 2014]

Ans. (i) Agave : Bulbil

(ii) Bryophyllum : Leaf buds/adventitious buds

[CBSE Marking Scheme, 2014]

Q. 8. Write the name of the organism that is referred to as the 'Terror of Bengal'. **[Delhi Set-I, 2014]**

Ans. Eichhornia crassipes put "water hyacinth under bracket remove slash. (water hyacinth).

[CBSE Marking Scheme, 2014]

Q. 9. Which of the following statements is true for Yeast ?

(i) The cell divides by binary fission. One of them develops into a bud.

(ii) The cell divides unequally. The smaller cell develops into a bud.

(iii) The cell produces conidia, which develop into a bud.

[Delhi Set-I, Comptt. 2013]

Ans. (ii) The cell divides unequally. The smaller cell develops into a bud.

Q. 10. Which of the following statements is true for Bryophyllum ?

(i) Germinating bud appears from the eye of the stem tuber.

(ii) Germinating bud appears from the node of the rhizome.

(iii) Germinating bud appears from the notch of the leaf margin.

[Delhi Set-II, Comptt. 2013]

Ans. (iii) Germinating bud appears from the notch of the leaf margin.

Q. 11. Which of the following statements is true for Hydra ?

(i) It produces asexual gemmules.

(ii) It produces unicellular bud.

(iii) It produces multicellular bud.

[Outside Delhi Set-II, Comptt. 2013]

Ans. (iii) It produces multicellular bud.

Q. 12. Why are living plant cells said to be totipotent ?

[Outside Delhi Set-I, Comptt. 2013]

Ans. The living plant cells are said to be totipotent because the whole plant can be regenerated from a single cell.

Q. 13. Which of the following statements is true for ginger ?

(i) Germinating bud appears from the eye of the stem tuber.

(ii) Germinating bud appears from the node of the rhizome.

(iii) Germinating bud appears from the notch of the leaf margin.

[Outside Delhi Set-II, Comptt. 2013]

Ans. (ii) Germinating bud appears from the node of the rhizome.

Q. 14. Name the mode of reproduction that helps in producing genetically identical offsprings.

[Delhi Set-I, Comptt. 2012]

Ans. Asexual reproduction.

Q. 15. Name an organism where cell division in itself is a mode of reproduction.

[Outside Delhi Set-I, II, Comptt. 2013]

Ans. Amoeba, a unicellular organism which reproduces asexually by binary fission.

Q. 16. Which of the following organisms exhibit binary fission ?

Bacillus, Penicillium, Yeast, Amoeba.

[Outside Delhi Set-I, Comptt. 2012]

Ans. Bacillus, Yeast and Amoeba.

Q. 17. Name the respective asexual reproductive structures of yeast and sponge.

[Outside Delhi Set-II, Comptt. 2012]

Ans. Yeast : Bud (outgrowth of yeast cell)

Sponge : Gemmule.

Q. 18. How does Penicillium reproduce asexually ?

[Delhi Set-I, II, III, 2011]

Ans. Penicillium reproduces asexually through conidia formation.

Q. 19. Offsprings derived by asexual reproduction are called clones. Justify giving two reasons.

[Outside Delhi Set-II, 2010]

Ans. As they are morphologically (structurally) similar, and genetically identical (exact replica of parental DNA).
[CBSE Marking Scheme, 2010]

Q. 20. Name the vegetative propagules in (i) Potato, and (ii) Pistia.
[Foreign set-I, II, III, 2017]

Ans. (i) Auxillary buds/Eye buds (ii) Offset

Q. 21. Name the type of asexual reproduction where the parent cell ceases to exist.

[Delhi Set-I Comptt. 2017]

Ans. Fission / Binary fission / Longitudinal fission / multiple fission.

[CBSE Marking scheme-2017]

Q. 22. Write one difference between binary fission and budding.

[Delhi Set-I, III Comptt. 2017]

Ans. Differences between binary fission and budding :

Binary Fission	Budding
Cell divides into two equal halves.	The division is unequal.
Each of the two equal halves rapidly grows into an adult.	The smaller part (bud) remains attached initially to the parent cell which eventually gets separated and matures into a new organism.
Parent cell loses its identity.	The parent cell maintains its identity and forms a separate bud.

Q. 23. Banana produces fruits but is propagated only by vegetative means. Why does is it so ?

[CBSE Foreign, 2012]

Ans. Seeds are not produced in banana. So, they are propagated only by vegetative methods.

Short Answer Type Questions - I **(2 marks each)**

Q. 1. Why is banana considered a good example of parthenocarpy?

[Delhi & Outside Delhi Set-I, 2012]

Or

Why is banana referred to as a parthenocarpic fruit?

[Outside Delhi, Set-I, Comptt. 2013]

Ans. Parthenocarpy can be induced through the application of growth hormones and such fruits are seedless. Since, banana produces fruit without fertilisation, it is considered a good example of parthenocarpy.

Q. 2. Banana fruit is said to be parthenocarpic whereas turkey is said to be parthenogenetic. Why?

[Delhi Set-I, 2015]

Ans. Banana : The fruit develops without fertilization from an unfertilized ovary.

Turkey : The ovum/female gamete develop into a new chick without fertilization.

[CBSE Marking Scheme, 2015]

Q. 3. Identify the picture and mention the vegetative part that helps it to propagate.

[Outside Delhi Set-I, 2015]

Ans. Rhizome of ginger are modified underground stem, axillary bud grows from the node.

[CBSE Marking Scheme, 2015]

Detailed Answer : The given picture is of Ginger. In ginger, vegetative propagation occurs through the underground stem called rhizome. A rhizome is a modified underground horizontal stem.

Q. 4. Which statement is true for Hydra ?

(i) It produces asexual gemmules.

(ii) It produces unicellular bud.

(iii) It produces multicellular bud.

[CBSE All India Comptt. 2013]

Ans. Statement (iii) is correct. Hydra is a multicellular organism. It reproduces asexually by budding.

Q. 5. Name the units of vegetative propagation in water hyacinth. Explain giving reasons why it has become the most invasive aquatic weed ?
[Foreign, 2013; Delhi Set-I Comptt. 2013]

Ans. Water hyacinth reproduces vegetatively by offsets. It propagate, at an enormous and alarming rate. Therefore, it spreads all over the water body and fully covers it within a short period of time. Thus, it has become the most invasive aquatic weed.

Short Answer Type Questions-II **(3 marks each)**

Q. 1. Banana crop is cultivated by farmers without sowing of seeds. Explain how the plant is propagated ?
[Delhi Set-I, Comptt. 2014]

Ans. In banana, the seeds are not produced because the fruits are parthenocarpic. Therefore, these plants are propagated vegetatively with the help of horizontally growing underground rhizome which is a modified underground stem. The axillary buds present at the nodes of the rhizome gives rise to new plants of banana.

Q. 2. Plants like potato, sugarcane do not require seeds for producing new plants. How do they produce new plants? Give two other examples where new plants are produced in the same way.

[Outside Delhi Set-I Comptt. 2017]

Ans. New plants arise from nodes present in the modified stems of these plants, through vegetative propagation. When the nodes come in contact with damp soil or water, they produce roots and new plants e.g., Banana, Ginger, Dahlia, Bryophyllum.

[CBSE Marking Scheme 2017]

TOPIC - 2

Sexual Reproduction

Very Short Answer Type Questions **(1 mark each)**

Q. 1. Write the two pre-fertilization events from the list given below :

Syngamy, gametogenesis, embryogenesis, pollination.

[Delhi Set-I Comptt. 2014]

Ans. Gametogenesis and pollination.

Q. 2. In which two of the following organisms is the fertilization external ?

Bony fishes, ferns, frog, birds.

[Delhi Set-III, Comptt. 2014]

Ans. Bony fishes and frogs.

Q. 3. Mention any two conditions that enhance the chances of syngamy in organisms exhibiting external fertilization.
[Outside Delhi Set-I, Comptt. 2017]

Ans. Organisms exhibiting external fertilisation show great synchrony between the sexes, release a large number of gametes into the surrounding medium.
[CBSE Marking Scheme 2017]

Q. 4. Which of the following statements is true for date palm.

(i) It is monoecious producing both staminate and pistillate flowers in the same plant.

(ii) It is monoecious producing staminate flowers in one and pistillate flowers in another tree.

(iii) It is dioecious producing staminate flowers in one tree and pistillate flowers in another tree.

[Outside Delhi Set-III Comptt. 2014]

Ans. Statement (iii) is true. Date palm is a dioecious plant.

Q. 5. Name the common phenomenon with reference to reproduction in rotifers, honey bees and turkey.

[Delhi Set-I, Comptt. 2013]

Ans. The common phenomenon with reference to reproduction in rotifers, honey bees and turkey is parthenogenesis. It is the process in which the female gamete undergoes development to form new organism without fertilization.

Q. 6. Name the mode of reproduction that ensures the creation of new variants.

[Delhi Set-I, Comptt. 2012]

Ans. Sexual reproduction : It is a kind of reproduction where male and female gametes fuse together to form the diploid zygote. Zygote germinates and gives rise to new individual showing some variations.

Q. 7. Cucurbits and papaya plants bear staminate and pistillate flowers. Mention the categories they are put under separately on the basis of type of flowers they bear.

[Delhi Set-II, 2012]

Ans. Cucurbits are monoecious plants because they bear both staminate and pistillate flowers on the same plant.

Papaya plants are dioecious because staminate and pistillate flowers are borne on different plants.

Q. 8. Mention the unique flowering phenomenon exhibited by Strobilanthes kunthianus (Neelakurinji)

[Outside Delhi Set-II, 2012]

Ans. Strobilanthes kunthianus is a monocarpic plant. It flowers once in a life span of 12 years after which it dies.

Q. 9. Name the type of cell division that takes place in the zygote of an organism exhibiting haplontic life cycle.

[Delhi Set-I, II, III, 2011]

Ans. Meiotic division.

Q. 10. Name the phase all organisms have to pass through before they can reproduce sexually.

[Outside Delhi Set-I, II, III, 2011]

Ans. Juvenile phase. In plants it is called as vegetative phase. Infact, it is the pre-reproductive period in the life cycle of an individual.

Q. 11. Which of the following statements is true for cucurbits ?

(i) It is monoecious producing both staminate and pistillate flowers in the same plant.

(ii) It is monoecious producing staminate and pistillate flowers in two different plants.

(iii) It is dioecious producing staminate flowers in one plant and pistillate flowers in another.

[Delhi, Set-I, Comptt. 2013]

Ans. (i) Statement (i) is correct. i.e., The plants are monoecious because both male and female flowers are borne on the same plants.

Q. 12. Name two animals that exhibit oestrous cycle.

[Foreign Set-I, 2016, Outside Delhi Set-I, Comptt. 2014]

Ans. Cow, sheep, rat, deer, dog, tiger, etc.

[CBSE Marking Scheme, 2016]

Short Answer Type Questions-I **(2 marks each)**

Q. 1. (a) Why do organisms like algae and fungi shift from asexual mode of reproduction to sexual mode ? (b) What is a juvenile phase in organisms ?

[Comptt, Set-1,2,3, 2018]

Ans. (a) To tide over adverse conditions.

(b) A phase of growth and maturity, before organisms can reproduce sexually.

[CBSE Marking Scheme, 2018]

Q. 2. Explain the significance of meiocytes in a diploid organism.

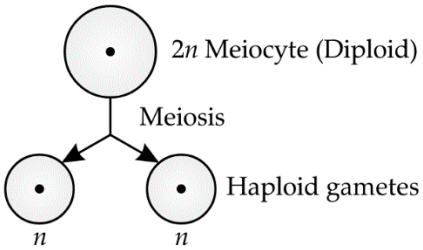
[Delhi Set-I, 2016]

Ans. Undergo meiosis/undergo gametogenesis/form haploid gametes, help to restore 2n (diploidy) through zygote formation or syngamy/help to restore chromosome number.

[CBSE Marking Scheme, 2016]

Detailed Answer : Meiocytes or gamete mother cells are diploid cell which undergoes meiotic division to produce (2n) male and female gametes that carry only one set of chromosomes thus making the gametes haploid (n).

Gamete mother cell :



Q. 3. Explain the importance of syngamy and meiosis in sexual life cycle of an organism.

[Delhi Set-II, 2016]

Ans. Syngamy : Restoration of (2n) chromosome number/diploidy/zygote formation/variations (due to syngamy).

Meiosis : Gamete formation/reduction of (n) chromosome number/haploidy/variation (due to crossing over)

[CBSE Marking Scheme, 2016]

Detailed Answer :

Meiosis and syngamy maintain the fixed chromosome number of the species. In a sexual life cycle of an organism, meiosis leads to formation of gametes which are haploid.

Syngamy is the process that leads to fusion of haploid gametes and formation of diploid zygote.

Q. 4. Why do moss plants produce very large number of male gametes ? Provide one reason. What are these gametes called ?

[Outside Delhi Set-I, 2015]

Ans. In moss plants, water is the medium through which male gametes reach the female gamete. Hence, a large number of male gametes fail to reach the female gamete. This results in a great loss of male gametes. Therefore, to compensate for this loss the male gametes in moss plants are produced in very large number.

The male gametes in moss plant are called as the antherozoids.

Q. 5. Why do algae and fungi shift to sexual mode of reproductions just before the onset of adverse conditions ?

[Delhi Set, I, 2014]

Ans. Most of the algae and fungi are unable to survive under adverse environmental conditions. Therefore, in order to tide over these unfavourable conditions, these organisms shift to the sexual mode of reproduction during which they produce male/female gametes that fuse to form the zygote. The zygote secretes a thick wall around itself and undergoes a period of rest for passing the unfavourable conditions. Gradually, on the approach of favourable conditions, the zygote germinates to produce the new thalli of algae and mycelium of fungi.

Q. 6. Coconut plant is monoecious, while date palm is dioecious. Why are they called so ?

[Delhi Set-I, 2014]

Ans. In coconut plant, both male and female flowers are present on the same plant whereas in date palm, both male and female flowers are present on the separate plants species.

Q. 7. (i) Why is a whiptail lizard referred to as parthenogenetic ?

(ii) State the difference between meiocyte and gamete with respect to chromosome number.

[Delhi Set-I 2012]

Ans. (i) Whiptail lizards are referred to as parthenogenetic because they develop from unfertilized egg i.e, the egg produces the new individual without fertilization.

(ii) Meiocytes have diploid number (2n) of chromosomes whereas gametes contain haploid number (n) of chromosomes.

Q. 8. Angiosperms bearing unisexual flowers are said to be either monoecious or dioecious. Explain with the help of one example each.

[Delhi Set-III, 2016]

Ans. Monoecious Angiosperms : Plants bear both male and female unisexual flowers on the same plant. e.g., Cucurbits/coconut/maize.

Dioecious Angiosperms : Plants bear either male or female unisexual flowers on different plants. e.g., Papaya/date palms.

[CBSE Marking Scheme, 2016]

Detailed Answer :

The plants are said to be monoecious if both male and female unisexual flowers are present on the same plant and if the unisexual male and female flowers are present on separate plants then they are called as dioecious.

Q. 9. Out of many papaya plants growing in your garden, only a few bear fruits. Give reasons.

[Outside Delhi Set-III, 2016]

Ans. Unisexual/Dioecious/male and female flowers are borne on separate plants, only plants bearing female flowers will bear fruits. Monoecious (hermophrodite) Papaya plants bear fruit too.

[CBSE Marking Scheme, 2016]

Detailed Answer :

Papaya has both dioecious and monoecious plants bearing unisexual or bisexual flowers. They can occur in three sexual forms-male, female and hermaphrodites. A fruit is formed when fertilization occurs in the ovary of the female flower. So, if a male or a female plant is growing alone, it will produce flowers but not fruits as both male and female is required for fruit formation. However, hermaphrodite papaya plant will always bear fruits, as their flowers contain both male and female parts.

Q. 10. A single pea plant in your kitchen garden produces pods with viable seeds, but the individual papaya plant does not. Explain.

Ans. Pea : Flowers of pea plants are bisexual, monoecious / self-pollinated (to produce pods with viable seeds).

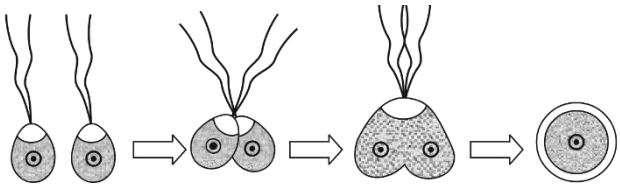
Papaya : Refer to S.A.T.Q.-I (Q. No. 9.)

[CBSE Marking Scheme, 2016]

Detailed Answer :

Pea plant bears bisexual flowers. Therefore, the single pea plant can produce viable seeds after self-pollination. Papaya, on the other hand is a dioecious plant, bearing unisexual flowers that requires cross-pollination for viable seed production. Thus, they cannot produce viable seeds.

Short Answer Type Questions-II **(3 marks each)**

Q. 1. 

(i) State the type of gametes shown in the diagram above.

(ii) Identify the process taking place and the resultant structure.

(iii) Name an organism that reproduces in this manner.

[CBSE SQP 2016-17]

Ans. (i) Isogametes

(ii) Syngamy or fertilization and zygote

(iii) Cladophora/Chlamydomonas.

[CBSE Marking Scheme, 2016]

Q. 2. Meiosis is an essential event in the sexual life cycle of any organism. Give two reasons.

[Foreign 2015]

Ans. Meiosis is an essential event in the sexual cycle of any organism because :

(i) It maintains the number of chromosomes fixed (2n) from generation to generation. Haploid gametes are formed as a result of meiosis. Diploid (2n) condition is restored during fertilization.

(ii) It increases the genetic diversity and variation due to crossing over between homologous chromosomes and their random segregation.

Q. 3. A moss plant is unable to complete its life cycle in dry environment. State two reasons.

[Outside Delhi, Set-III 2015]

Ans. A moss plant can not complete its life cycle in dry condition because of following two main reasons :

(i) It requires water for the dehiscence of antheridium-the male sex organ and the opening of the archegonium-the female sex organ.

(ii) It requires the presence of water for the flagellated antherozoids (the male gametes) to swim and reach the female gamete (egg or ovum) situated deep in the archegonium under the influence of a chemical (maleic acid), accomplishing fertilization.

Q. 4. Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilisation.

[Outside Delhi Set-II, 2014]

Ans. (i) Rotifers/honeybees/some lizards/turkey.

(ii) Parthenogenesis.

[CBSE Marking Scheme, 2014]

Q. 5. Differentiate between parthenocarpy and parthenogenesis. Give one example of each.

[Outside Delhi/Delhi, 2018]

Or

How is parthenocarpy different from parthenogenesis ? Give an example of each.

[Delhi Set-I, Comptt. 2013]

Ans.

Parthenogenesis	Parthenocrapy
New organism develops without fertilization.	Formation of fruit without fertilization.
e.g. Drones / male honey bee / turkey / rotifers / some lizards / any other correct example.	e.g. banana / grapes / any other correct example.

[CBSE Marking Scheme, 2018]

Detailed Answer:

The phenomenon of development of fruit from the ovary in the flowering plants without the stimulus of fertilization is called parthenocarpy and the fruits so formed are called parthenocarpic fruits. e.g., banana. Whereas the phenomenon in which the egg or ovum develops into an embryo and then into a new organism

without the act of fertilization is called parthenogenesies e.g., male honeybee, rotifers and green algae like Ulothrix.

Q. 6. Why is a whiptail lizard referred to as parthenogenetic ?
[Delhi Set-I, 2012]

Ans. Whiptail lizard is referred to as parthenogenetic because the embryos of whiptail lizards are developed from egg without undergoing the process of fertilization. The unfertilized embryos gives rise to new organism.

Q. 7. Some animals like honey bees are called parthenogenetic animals. Why?

[Delhi Set-I, 2012; Delhi Comptt. 2010]

Ans. Male honey bees are formed from unfertilised egg. Therefore, these animals are called as parthenogenetic animals.

Q. 8. The turkey usually produces females for several generations. How is this possible ?

[CBSE SQP 2012]

Ans. This is possible due to parthenogenesis. In birds like turkey, only the female gamete undergoes development to form new organisms without fertilisation. This phenomenon is called parthenogenesis.

Q. 9. Write two major adaptations in animals exhibiting external fertilization.

[Outside Delhi, Set-I, 2012]

Ans. (i) There is a great tendency of synchronization between male and female sexes i.e, they release the mature gamete simultaneously in water.

(ii) They release a large number of gametes in the surrounding medium (water) so that there may be greater chances of syngamy i.e., the fusion of male and female gametes.