

Short Answer Questions-I (PYQ)

[2 Marks]

Q.1. Name the units of vegetative propagation in water hyacinth. Explain giving reasons why it has become the most invasive aquatic weed.

Ans. Offsets are the unit of vegetative propagation in water hyacinth. Since the formation of hyacinth offsets does not involve two parents, the process involved is asexual, therefore they spread quickly.

Q.2. Name the vegetative propagules in the following:

Q. Agave

Ans. Agave—Bulbil

Q. Bryophyllum

Ans. Bryophyllum—leaf buds/adventitious buds.

Q.3. Explain the significance of meiocytes in a diploid organism.

Ans. In a diploid organism, meiocytes undergo meiosis to form haploid gametes. These help to restore $2n$ (diploidy) through zygote formation or syngamy.

Q.4. The cell division involved in gamete formation is not of the same type in different organisms. Justify.

Ans. The parents may be haploid or diploid but the gametes always have to be haploid. Diploid parents undergo meiosis to produce haploid gametes, whereas haploid parents undergo mitosis to produce haploid gametes.

Q.5. Coconut plant is monoecious while date palm is dioecious. Why are they called so?

Ans. Coconut palm is monoecious, as both the male and female reproductive structures are borne on the same plant (bisexual) while date palm is dioecious because male and female reproductive structures are borne on different plants (unisexual).

Q.6. Why are papaya and date palm plants said to be dioecious whereas cucurbits and coconut palms monoecious, in spite of all of them bearing unisexual flowers?

Ans.

(i) Papaya and date palm plants are dioecious, because male and female flowers are present on different plants, that is each plant is either male or female.

(ii) Cucurbits and coconut palms are monoecious, because male and female flowers are present on the same plant.

Q.7. A list of three flowering plants is given below. Which ones out of them are (i) monoecious and (ii) bearing pistillate flowers?

List: Date palm, Cucurbits and Pea.

Ans.

(i) Monoecious plant—Cucurbits

(ii) Bearing pistillate flowers—Date palm.

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

Ans. In some flowering plants, both male and female flowers may be present on the same individual (monoecious) or on separate individuals (dioecious). Some examples of monoecious plants are cucurbits and coconuts and of dioecious plants are papaya and date palm.

Q.9. 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 or self-pollinated and produce pods with viable seeds.

Papaya is a dioecious or unisexual plant bearing male and female flower on separate plants. It is unable to produce viable seeds as there is no cross-pollination. It could be a male plant which is unable to produce fruit and seeds.

Q.10. Out of many papaya plants growing in your garden, only a few bear fruits. Give reason.

Ans. Papaya plant is either unisexual or dioecious, i.e., male and female flowers are borne on separate plants. Only plants bearing female flowers will bear fruits.

Q.11. How does the floral pattern of Mediterranean orchid *Ophrys* guarantee cross pollination?

Ans. The orchid bears flowers which resemble the female wasp in colour, smell, as well as appearance. The male pollinators mistake them as their female counterparts. Therefore, in the process of their pseudocopulation they pollinate the flower

Q.12. Explain the importance of syngamy and meiosis in a sexual life cycle of an organism.

Ans. In the sexual life cycle of an organism, meiosis results in formation of haploid gametes which fuse together by syngamy and the diploid nature of the organism is restored in the zygote.

Q.13. A moss plant produces a large number of antherozoids but relatively only a few egg cells. Why?

OR

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

Ans. Antherozoids are motile male gametophytes which have to swim on the water surface to fertilise the immotile female gametophytes, i.e., egg. Since, during its transfer many antherozoids get destroyed, a large number of them are produced.

Q.14. A liverwort plant is unable to complete its life-cycle in a dry environment. State two reasons.

Ans. For sexual reproduction to take place in mosses and liverworts the motile male gametophytes, antherozoids, have to swim on the water surface to fertilise the immotile female gametophytes, egg. In dry conditions, the antherozoids do not reach the egg and hence fertilisation cannot occur

Q.15. Why do algae and fungi shift to sexual mode of reproduction just before the onset of adverse conditions?

Ans. Algae and fungi shift to sexual mode of reproduction for survival during unfavourable conditions. Fusion of gametes helps to pool their resources for survival. The zygote develops a thick wall that is resistant to dessication and damage which undergoes a period of rest before germination.

Q.16. Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilisation.

Ans. The phenomenon of development of female gamete directly into an individual without fertilisation is called parthenogenesis, e.g., rotifers, honeybees, lizards and birds.

Q.17. Answer the following questions:

Q. State the difference between meiocyte and gamete with respect to chromosome number.

Ans. Meiocytes contain diploid sets of chromosomes whereas gametes contain haploid sets of chromosomes.

Q. Why is a whiptail lizard referred to as parthenogenetic?

Ans. Whiptail lizard reproduces without fertilisation, i.e., an unfertilised egg develops into a new individual. Therefore, they are referred to as parthenogenetic.

Short Answer Questions-I (OIQ)

[2 Mark]

Q.1. What is fission? What is the basic difference between fission in Amoeba and Paramecium?

Ans. The mode of asexual reproduction in which a parent body splits into two or more daughter cells, each giving rise to a new individual is called fission.

Amoeba undergoes binary fission in which cytoplasm and nucleoid (DNA molecule) divide in any plane giving rise to two equal or unequal daughter cells without mitosis. However, in Paramecium, plane of division runs along the transverse axis of an individual.

Q.2. If the chromosome numbers in meiocytes of human beings, rat, elephant, rice, butterfly and onion are 46, 42, 56, 24, 380 and 32, respectively. What will be the chromosome numbers in gametes of these species?

Ans. The chromosome numbers in the gametes of these species will be

Human beings = 23, rat = 21, elephant = 28, rice = 12, butterfly = 190 and onion = 16.

Q.3. Why dogs and cats have oestrus cycle but human beings have menstrual cycle, though all are mammals?

Ans. Dogs and cats are seasonal breeders. They have heat period during which ovulation takes place. Humans, on the other hand, have this cycle monthly.

Q.4. With which type of reproduction do we associate the reduction division? Analyse the reasons for it.

Ans. Reduction division is associated with sexual reproduction because the diploid organisms undergo meiosis to form haploid gametes.

Q.5. Name the relationship between the first two words and suggest a suitable word

Q. Doob grass : Runner : : Potato :

Ans. Stem modification; tuber

Q. Endogamy : Self-fertilisation : : Exogamy :

Ans. Fertilisation method; Cross-fertilisation.

Q.6. In haploid organisms that undergo sexual reproduction, name the stage in the life cycle when meiosis occurs. Give reasons for your answer.

Ans. Meiosis takes place during the post-zygotic stage. Since the organism is haploid, meiosis cannot occur during gametogenesis. As zygote is diploid but the individual is haploid so number of chromosome has to be reduced to half.

Q.7. The number of taxa exhibiting asexual reproduction is drastically reduced in the higher plants (angiosperms) and higher animals (vertebrates) as compared with lower groups of plants and animals. Analyse the possible reasons for this situation.

Ans. Both angiosperms and vertebrates have a more complex structural organisation. They have evolved very efficient mechanism of sexual reproduction. Since asexual reproduction does not create new genetic pools in the offspring and consequently hampers their adaptability to external conditions, these groups have resorted to reproduction by the sexual method.

Q.8. In a developing embryo, analyse the consequences if cell divisions are not followed by cell differentiation.

Ans. If differentiation does not follow division, embryo will not develop and this will not develop into a new organism.

Q.9. Which of the following are monoecious and dioecious organisms:

Q. Earthworm

Ans. Monoecious

Q. Chawra

Ans. Monoecious

Q. Marchantia

Ans. Dioecious

Q. Cockroach

Ans. Dioecious

Q.10. Zygote forms the major link between one generation and those of the next generation organism. What is the fate of zygote in organisms which show:

Q. haplontic life cycle and

Ans. Zygote of haplontic life cycle divides meiotically during its generation.

Q. diplontic life cycle

Ans. Zygote of diplontic life cycle divides mitotically during embryogenesis.

Q.11. Mention two important characteristics in the sexual reproduction of frogs and bony fishes.

Ans. Both these release the mature gametes simultaneously. They also release a large number of gametes in the water to enhance the chances of syngamy (external fertilisation).

Q.12. What is parthenogenesis? Give two examples from animals.

Ans. The development of a new individual from an unfertilised egg is called parthenogenesis. Parthenogenesis is a special mode of reproduction. It is simpler, easier as well as rapid mode of replication. However, it eliminates the chances of variation in a population so, it does not play important role in evolution process. Examples: Honeybees and some lizards.