THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

AIM HIGH, TOGETHER WE FLY

Grade 12 Biology

Chapter 2: Sexual Reproduction in flowering plants

Question bank 2

Q. 1. (a) Name the organic material exine of the pollen grain is made up of. How is this material advantageous to pollen grain?

(b) Still it is observed that it does not form a continuous layer around the pollen grain. Give reason.

(c) How are 'pollen banks' useful?

Ans. (a) Sporopollenin It is most resistant material to high temperature, strong acids on alkali and no enzymes can degrade it.

(b) Germs pores are present to allow pollen tube to emerge out for pollen germination.

(c) Pollen banks help in storing pollen grains for years for crop breeding programmes.

Q. 2. Write the functions of:

(a) Coleoptile (b) Tapetum (c) Scutellum

Ans. (a) Coleoptile: It protects the plumule of the monocot embryo.

(b) Tapetum: It provides nourishment to developing pollen.

(c) Scutellum: It provides nourishment and protection to the developing embryo.

Q. 3. When and where do tapetum and synergids develop in flowering plants? Mention their functions. [

Ans. Tapetum develop during microsporogenesis in the microsporangium (anther). It nourishes the developing pollen grains.

Synergids develop during megasporogenesis in the megasporangium (ovule). Synergids have filiform apparatus to guide the pollen tube into it.

Q. 4. Where are the following structures present in a male gametophyte of an angiosperm? Mention the function of each one of them.

(a) Germ pore (b) Sporopollenin (c) Generative cell

Ans. (a) Germ pore: Exine of pollen grain. It is the site from where pollen tube emerges.

(b) Sporopollenin: Exine of pollen grains. It protects the pollen grains from high temperature, strong acids and alkali, enzymes and adverse conditions.

(c) Generative Cells: These are present in pollen grains. These give rise to two male gametes.

Q. 5. Make a list of any three outbreeding devices that flowering plants have developed and explain

how they help to encourage cross-pollination.

Ans. (i) Time of pollen release and stigma receptivity are different (not synchronised). This prevents self-pollination.

(ii) Anther and stigma are placed at different positions, so the pollens cannot come in contact with the stigma of the same flower.

(iii) Self-incompatibility, which is a genetic mechanism to prevent the pollen germination on the stigma of the same flower.

Q. 6. Why are angiosperm anthers called dithecous? Describe the structure of its microsporangium.

Ans. The anthers of angiosperms are called dithecous because they are bilobed and each lobe of anther has two theca. Microsporangium is surrounded by four wall layers named as epidermis, endothecium, middle layer and tapetum. In young anther, a group of compactly arranged homogenous cells called sporogenous tissue occupies the centre of each microsporangium which produce microspores or pollen grains.

Q. 7. During an excavation assignment, scientists collected pollen grains of a plant preserved in deeper layers of soil. Analyse the properties of pollen grains which help in the fossilization.

Ans. Pollen has an outer layer called exine which is made of sporopollenin. It is the most resistant organic material known. It can withstand high temperature, strong acids and alkali as well. No enzyme that degrades sporopollenin is so far known.

Q. 8. What will be the ploidy of the cells of the nucellus, microspore mother cell, the functional megaspore and female gametophyte?

Ans. Nucellus : Diploid

Microspore mother cell : Diploid

The functional megaspore : Haploid

Female gametophyte : Haploid

Q. 9. (i) Write the characteristic features of anther, pollen and stigma of wind-pollinated flowers.

(ii) How do flowers reward their insect pollinators? Explain.

Ans. (i) The characteristics of wind-pollinated flowers are: (a) Pollen grains are light in weight, non-sticky, dry and winged, so that they can be easily transported. (b) Well-exposed stamens for easy dispersal of pollen grains in the wind. (c) The stigma is sticky, large, feathery to trap pollen grains in air. (d) Numerous flower are packed together to form inflorescence. (d) The flowers are small and inconspicuous. (ii) Insect pollinators are rewarded in following ways: (a) The flowers offer floral reward like nectar and pollen grain. (b) In some species floral reward provides safe place to lay eggs.

Q. 10. (a) How does cleistogamy ensure autogamy? (b) State one advantage and one disadvantage of cleistogamy to the plant.

Ans. (a) Cleistogamous flowers do not open. Therefore, the pollens have to land on the stigma of the same flower. This ensures autogamy. (b) Advantage: Self-pollination is assured, thus ensuring seed formation. Disadvantage: Least variations observed and it leads to inbreeding depression.

Q. 11. (a) Describe the endosperm development in coconut. (b) Why is tender coconut considered a healthy source of nutrition? (c) How are pea seeds different from castor seeds with respect to endosperm?

Ans. (a) The primary endosperm nucleus (PEN) undergoes successive nuclear divisions to give rise to free nuclei. Subsequently, cell wall is formed towards the periphery and endosperm becomes cellular, leaving free nuclear endosperm in the central part. This division is followed by cytokinesis and thus endosperm becomes cellular and is called cellular endosperm. (b) It is rich in many nutrients like fats, proteins, carbohydrates, minerals, vitamins. Hence, tender coconut is considered a healthy source of nutrition. (c) In peas, the endosperm is used up and there is no endosperm present in the mature seed. In castor, the endosperm remains intact in the mature seed.

Q. 12. Explain any three advantages the seeds offer to angiosperms.

Ans. (i) Since reproductive process such as pollination and fertilisation are independent of water, seed formation is more dependable. (ii) Seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise in other areas. (iii) As they have sufficient food reserves young seedlings are nourished until they are capable of photosynthesis on their own. (iv) The hard seed coat provides protection to the young embryo. (v) Being products of sexual reproduction, they generate new genetic combinations or variations.

Q. 13. (a) How are parthenocarpic fruits produced by some plants and apomictic seeds by some others? Explain. (b) When do farmers prefer using apomictic seeds?

Ans. (a) Parthenocarpic fruits are formed when ovary develops into fruit without fertilisation. Apomictic seeds are formed when formation of seeds take place without fertilisation. (b) To maintain hybrid characters (year after year in a desired plant) and to avoid buying hybrid seeds every year (expensive seeds) farmers prefer using apomictic seeds.

Q. 14. (a) How does a farmer use the dormancy of seeds to his advantage? (b) What advantages a seed provides to a plant?

Ans. (a) Dormancy of mature seeds are important for storage of seeds which can be used as food throughout the year and also to raise crop in the next season. (b) Seeds offer several advantages to angiosperms. Firstly, since reproductive processes such as pollination and fertilisation are independent of water, seed formation is more dependable. Also seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise in other areas. As they have sufficient food reserves, young seedlings are nourished until they are capable of photosynthesis on their own. The hard seed coat provides protection to the young embryo. Being products of sexual reproduction, they generate new genetic combinations leading to variations.

Q. 15. ‘Fertilisation is not an obligatory event for fruit production in certain plants’. Explain the statement.

Ans. This can be observed in parthenocarpic fruits. The ‘seedless fruits’ that are available in the market, such as pomegranate, grapes, etc., are good examples. Flowers of these plants are sprayed by a growth hormone that induces fruit development even though fertilisation has not occurred. The ovules of such fruits, however, fail to develop into seeds.