

Chap 9 (Kingdom Plantae) F.Sc 1st Year Biology Notes

Chapter 9: Kingdom Plantae (Short Questions Answers)

How antheridia and archegonia of *Adiantum* differ from each other?

Each antheridium produces numerous spermatozoids which are spirally coiled and multiciliated. The archegonium consists of a venter and a neck. The venter contains the egg or oosphere and is embedded in thallus. The antherozoids reach the archegonium, by swimming in water.

What are ornamental plants of Fabaceae?

Some important ornamental plants include Lathyrus, Lupinus, Clitoria, Butea etc.

How many genera and species of Caesalpiniaceae are known?

This family includes about 152 genera and about 2300 species, mostly tropical and sub-tropical in distribution. In Pakistan the family is represented by 16 genera and about 60 species.

What are familiar plants of family Caesalpiniaceae.

Tamarindus indica Cassia fistula, Bauhinia variegata.

Give vegetative characters of Caesalpiniaceae.

Habit: Mostly trees or shrubs, some are woody climbers rarely herbs.

Stem: Erect, woody, herbaceous, or climbing.

Leaves: Compound, pinnate, very rarely simple, stipulate.

What is inflorescence and type of flower in Caesalpiniaceae?

Inflorescence: Axillary or terminal raceme or panicle or spikes rarely cymose showy.

Flowers: Bisexual, zygomorphic, rarely actinomorphic, perigynous.

What type of calyx and corolla are found in Caesalpiniaceae?

Calyx: 5 sepals, free or connate at base, often coloured.

Corolla: Mostly 5 petals. Free.

What type androecium and gynoecium are present in Caesalpiniaceae?

Androecium: 10 stamens or fewer, rarely numerous, free or variously united.

Gynoecium: A simple pistil 1-carpel ovary superior, unilocular.

Define the following: seed, ovule and integuments.

Technically a seed may be defined as fertilized ovule, while an ovule is indehiscent megasporangium. The integuments are specialized protective coverings around megasporangium which vary in number.

What are spermatocytes?

All seed producing plants are called spermatophytes e.g., gymnosperms and angiosperms.

What is embryo sac?

The single healthy megaspore retained with the megasporangium germinated to form an egg containing female gametophyte called an embryo sac. In true seed plants (Gymnosperms and Angiosperms) it was reduced to few cells.

What are gymnosperms?

The gymnosperms are heterosporous, vascular plants. They produce seeds but no fruits. The ovules in these plants are usually borne on the exposed surfaces of fertile leaves. They show regular heteromorphic alternation of generations. Examples are Cycas, Pinus, Taxus, Cedrus etc.

Which plants of Fabaceae are important for medicines?

Many plants of this family are important for medicines e.g., Glycyrrhiza glabra for cough and cold, Clitoria ternatea used against snake bite.

The seeds of which plant are used by jewellers, as weights?

The red and white seeds of Abrus precatorious are used by jewellers as weights called "ratti".

What type of placentation and fruit is found in Caesalpinaceae?

Placentation: marginal; stigma simple.

Fruit: Legume.

What is medicinal importance of family Caesalpinaceae?

The leaves of Cassia alata are used to cure ring worm and skin diseases. Cassia senna and obovata are cultivated for the leaves which yield the drug Senna, which is the base for a laxative (facilitating medicine). Oil extracted from the seeds of Cynometera cauliflora is applied externally for skin diseases.

What are ornamental plants of Caesalpinaceae? or Write scientific name of Kachnar and Amaltas.

Common ornamental plants are *Bauhinia variegata* (Kachnar), *Cassia fistula* (Amaltas), *Parkinsonia*, etc.

What is economic importance of *Bauhinia* and *Tamarindus*?

The leaves and flower's bud of *Bauhinia variegata* are used as vegetable. The acidic fruit of *Tamarindus indica* are edible and are rich in tartaric acid. The bark of *Bauhinia perpurea* and *Tamarindus indica* is used in tanning (converting into leather, or give brown colour).

Why seeds are naked in gymnosperms?

In gymnosperms, the megasporophylls bearing ovules are not folded and joined at the margins to form an ovary. For this reason the seeds lie naked on the sporophylls.

Name some important genera of gymnosperms, or Give four examples of gymnosperms given in your book.

The important genera are *Cycas* (sago-palm), *Pinus* (Pines), *Taxus* (Yew), *Picea* (Hemlock) and *Cedrus* (deodar) and *Ginkgo*.

What type of cones are present in *Pinus*?

Male and female cones are produced on the same plant. The male cones are small in size and are produced in clusters on an axis. The female cones are large and conspicuous.

How ovules of gymnosperms differ from those of angiosperms?

The ovules in gymnosperms are usually borne on the exposed surfaces of fertile leaves. These ovules are not enclosed but are naked on the surface of fertile leaves. In angiosperms fertile leaves bearing ovules are folded and joined at the margins to form ovaries in which seeds are enclosed.

What do you know about the male gametophyte and pollen grain of *Pinus*. or Define pollen grain.

The microspore germinates within its own wall to form a small inconspicuous male gametophyte. Male gametophyte is also called micro-gametophyte. Such a microspore

of seed plants that contains the micro-gametophyte or male gametophyte including the gametes is called a pollen grain.

How pollen or male gamete of Pinus is transferred to female gametophyte?

Due to wings pollen can float in air for a longer period of time and can travel long distances. The gymnosperms have successfully evolved a totally new mechanism of transfer of male gamete to the female gametophyte through air.

What are characteristics of megasporangium and female cone of Pinus?

The megasporangium is located on female cone. Each female cone is composed of large number of spirally arranged scales which are woody in texture. At the base of each scale is an ovule. An ovule is actually a megasporangium which is protected by one additional layer called integument. Each megasporangium has a single diploid megaspore mother cell. The megaspore mother cell divides by meiosis to produce four haploid megaspores.

How pollination and fertilization occur in Pinus?

During pollination the pollen land directly on the ovules. Only some pollens are able to form pollen tubes through which male gametes are transferred to the embryo sac for fertilization purpose. More than one egg can be fertilized to form several zygotes, but one zygote usually survives to form a single embryo.

What happens after fertilization in Pinus?

After fertilization the ovule becomes the seed. The seed now contains an embryo along with some stored food material. The seed upon germination shall give rise to new sporophyte plant.

What are angiosperms?

Angiosperms are the flowering vascular plants. The term Angiosperms literally means "enclosed seeded". In these plants fertile leaves bearing ovules are folded and joined at the margins to form ovaries in which seeds are enclosed. The ovary after fertilization is changed into a fruit.

What is a flower?

A flower is a modified shoot which consists of a pedicel, a thalamus or torus, and floral leaves i.e., sepals, petals, stamens and carpels.

What type of androecium is present in Solanaceae?

5 stamens, free but inserted on the corolla tube (epipetalous), rarely stamens 4 and didynamous (arranged in two whorls of 2 each).

What type of gynoecium is found in Potato family?

A compound pistil of 2 united carpels ovary obliquely placed. Superior, bilocular, or imperfectly 4-locular by false septum.

What is Placentation and fruit of Solanaceae?

The placentation is axile. The fruit is a berry or capsule.

What is the economic importance of potato and tomato?

Potato: The most important plant in the family is *Solanum tuberosum* (Potato white or Irish Potato). In Ireland people are completely dependent on Potatoes.

Tomato: *Lycopersicon esculentum* (tomato), the favourite home garden vegetable, was once believed to be poisonous.

What is the economic importance of Brinjal, Capsicum and Physalis?

Solanum melongena (egg plant or brinjal) is food plant.

Capsicum: The fruit of *Capsicum annum* and *Capsicum frutescens* are rich in vitamin C and A, are used as condiment.

Physalis: *Physalis* (Ground-Cherry) produces an edible fruit enclosed in a bladder like persistent calyx, the husk, giving the name husk tomatoes.

What is the economic importance of Nicotiana tobacum, Atropa belladonna and Datura.

Nicotiana tobacum is of great commercial value as its leaves are dried and made into tobacco, which is used in making cigarettes. *Atropa belladonna* and *Datura*, are rich in atropine and daturine (powerful alkaloids) respectively, are used medicinally

What are Ornamental plants of family Solanaceae?

Many, plants are cultivated in the gardens for their beautiful flowers, these include Petunia, Nicotiana, Cestrum and Solanum etc.

Differentiate between essential and non-essential parts of flower?

The sepals and petals are non-essential or non-reproductive parts, and stamens and carpels are the essential or reproductive parts of the flower.

What is the role of sepals and petals in flower?

The sepals and the petals protect the stamens and the carpels. They also attract insects for pollination. When the pollination is over, the sepals usually and the petals always fall off.

What are stamen and carpel?

The stamens and carpels are the reproductive parts of flower. The stamen consists of a filament and an anther. The anther contains microspore mother cell which produces haploid microspores or pollen grains through meiosis.

What is male gametophyte of angiosperms?

Pollen grain germinates to form a pollen tube. The microspore divides by mitotic divisions to form two male gametes and the tube nucleus. At this stage of development, the pollen grain is called male gametophyte, having two male gametes.

What is female gametophyte?

The megaspore present in ovule develops into female gametophyte. This consists of seven cells only. One of these cells is the egg or oosphere.

What is double fertilization?

In angiosperms, the fusion of one male gamete with the egg and the other male gamete with the secondary (fusion) nucleus is called double fertilization.

What is endosperm?

Endosperm is a triploid nucleus formed by the fusion of one gamete and secondary nucleus in angiosperms.

What is the advantage (importance) of double fertilization? or What role double fertilization plays in the storage of food?

It is an important evolutionary advancement in which food storage in fertilized ovule is made only on fertilization i.e., formation of zygote. This actually helps the plant to economize its food resources.

Name the subclasses of class Angiospermae.

The class Angiospermae is divided into two sub-classes: Monocotyledonae and Dicotyledonae.

Distinguish between subclasses Monocotyledonae and Dicotyledonae or differentiate between dicotyledonous (dicots) and monocotyledonous (monocots).

In Monocotyledonae or monocots, the embryo has one cotyledon. The leaf venation is parallel and the floral leaves are usually in three's or multiple of three. The primary root is replaced by an adventitious root system. While in Dicotyledonae or dicots, the embryo has two cotyledons. The leaf venation is in the form of a network (reticulate) and floral leaves are in two's, five's or multiples of these numbers. The primary root persists as a tap root that develops lateral roots.

What are familiar plants of family Rosaceae (rose family) or Enlist names of four genera of family Rosaceae.

Pyrus (pear); Rosa (rose); Malus (apple); Fragaria (strawberry) etc.

What are important fruits of family Rosaceae (rose family).

Important fruits are Apple, Pear, Almond, Apricot, and Strawberry etc.

How many genera and species of Rosaceae are known?

A family about 100 genera and 2000 species, distributed over most of the earth, and abundant in eastern Asia, North America and Europe. In Pakistan 29 genera and about 213 species are reported.

Give vegetative characters of Rose family.

Trees, shrubs and herbs. Herbaceous or woody, branched. Stem of the shrubby plants usually have spines. Alternate, rarely opposite, simple or compound, with paired

stipules, which are sometimes adnate to the petiole; leaf-base conspicuous, spines may also occur on the rachis.

What is the inflorescence of Rosaceae?

Variable, solitary or may be racemose or cymose cluster.

What type of flowers is found in Rosaceae?

Mostly bisexual, and actinomorphic, often perigynous to some degree, usually showy and scented.

What type of calyx and corolla are found in Rose family?

5 Sepal rarely 4, united at the base, usually green. Petals 5, or numerous in : multiple of 5, free rosaceous, large and showy.

What do you know about the androecium and gynoecium?

Androecium: Numerous stamens, sometimes only 5 or 10. **Gynoecium:** A simple pistil of 1 to numerous separate carpels, or various united, ovary. generally superior, sometimes inferior.

What type of Placentation is exhibited by Family Rosaceae?

Placentation basal, when the carpel one or apocarpous, but axile when the carpels are many and syncarpous (fused).

What are Ornamental plants? Give some examples from Rosaceae.

A large number of plants are ornamental and are grown in gardens for their beautiful and scented flowers. Perhaps the most widely cultivated genus for decorative purpose is Rosa, Rose which has been grown in gardens since ancient times and whose named cultivars (a plant variety produced by cultivation) are now numbered in thousands. Many other genera are also grown for their beautiful flowers in the parks and gardens.

What is the use of Crataegus and Pyrus pastia?

The branches of Crataegus provide excellent walking sticks and wood. The wood of Pyrus pastia is used for making tobacco pipes.

Give some uses of rose.

In Asian countries the petals of common rose usually called gulabs are used in making gulkand. Rose Petals are also used in extraction of an essential oil (rose oil) used as perfume. When distilled with water the petals give Rosewater or Ark-Gulab, which is used for curing eye disease, and for many other purposes.

How many genera and species of Solanaceae are there?

It is a family of about 90 genera and 2000 species of tropical and temperate distribution. In Pakistan 14 genera and about 52 species are reported.

What are familiar plants of Family Solanaceae or pea family? or Name two plants of family Solanaceae or give botanical names of potato, tobacco, tomato and red pepper.

Solanum tuberosum (Potato), *Nicotiana tabacum* (Tobacco), *Lycopersicon esculentum* (Tomato) (LB-2006), *Capsicum frutescens* (Red pepper).

Give vegetative characters of Potato family.

Habit: Herbs, shrubs, sometimes trees or vines.

Stem: Mostly herbaceous, erect, branched, hairy or prickly, sometimes tuberous.

Leaves: Alternate or rarely becoming opposite in the floral region, simple, petiolate, rarely sessile.

What is the inflorescence of Solanaceae?

Typically an axillary cyme or combination of cymes sometimes helicoids, or 1. axillary umbellate cymes.

What type of Flower is found in Potato family?

Bisexual usually actinomorphic or weakly zygomorphic, hypogynous, usually Pentamerous.

What type of Calyx and corolla are found in family Solanaceae?

Calyx: 5 united sepals, usually persistent.

Corolla: 5 united petals, corolla rotate to tubular.

How many genera and species are found in Fabaceae (Papilionaceae) or Pea Family?

It is a family of about 400 genera and 9000 species. In Pakistan about 82 genera and about 587 species have been reported.

What are familiar plants of Pea family or Fabaceae?

Lathyrus odoratus (Sweet pea), Arachis nypogea (Peanut), Cicer arietinum (Chick Pea) and Dulbergia sissou (Shisham).

What are vegetative characters of Fabaceae or Pea family?

Habit: Trees, shrubs or herbs.

Stem: Herbaceous, or woody or climber by tendrils (wiry. Coiled thread-like structures).

Leaves: Compound or rarely simple, sometimes partially or completely modified into tendrils, alternate, stipulate; stipules mostly leafy.

What is the inflorescence and type of flower in Fabaceae or Pea family?

Inflorescence: Racemose or solitary axillary.

Flowers: Bisexual, zygomorphic, bracteate, pedicellate. perigynous, pentamerous and papilionaceous.

What type of calyx and corolla are found in Pea family or Fabaceae?

Calyx: 5 sepals, more or less united in a tube, green mostly hairy.

Corolla: Papilionaceous, petals 5, free, usually clawed dissimilar the upper posterior petal is large and conspicuous and is called standard or vexillum, 2-lateral ones free called wings and 2 anterior inner most that fuse to form a cost shaped structure called the keel or carina.

What type of androecium is found in Fabaceae?

10 stamens, mostly diadelphous (united by their filaments in 2 groups), 9 fuse to form a sheath round the pistil, while 10th posterior one is free.

What type of gynaecium is found in Papilionaceae or Fabaceae?

A simple pistil 1-carpeled, with 1-locule; ovary superior; ovule 1 or more; style. long, bent at its base; stigma simple.

What type of placentation and fruit are present in Pea family or Fabaceae?

Placentation: (monocarpellary) marginal.

Fruit: Usually a legume or pod, showing a great variety of forms in various species.

What is economic Importance of Fabaceae as food, forage or fodder crop?

Food: The pulses, belonging to this family, are used as food, some important. and common species of pulse yielding plants are: Gram, Pea, Bean. These pulses are rich in protein contents.

Forage or fodder crop: Medicago sativa Alfalfa is one of the worlds best forage crop for horses. Vicia, Melilotus and Trifolium are also cultivated as main fodder crops.

What is economic importance of Butea and Dalbergia?

Butea and Dalburgia are main timber plants of Fabaceae. Timber is used for building, furniture and fuel.

What is importance of seeds of Arachis hypogea Peanut?

The seeds of Arachis hypogea Peanut are edible and also used for extraction of peanut oil which after hydrogenation is used as vegetable oil.

From where indigo dye is obtained?

Indigo dyes are obtained from Indigofera tinctoria and Butea monosperma, yielding yellow dye from flowers.