

Reproduction is the most important characteristic of all living beings. The mode of reproduction varies but is mainly of two types : (1) Sexual reproduction and (2) Asexual reproduction. In higher plants flower is sexual reproductive organ. Thus the reproduction takes place by various parts of flower.

In angiosperm plants the main sexual reproductive organs are stamen and pistil respectively. moreover accessory organs like sepals and petals are also present.

These types of main and accessory reproductive organs arranged in circular form so suffix word they are suffixed with the word 'whorl' i.e. Gynoecium, androecium, calyx and corolla etc.

- (1) Which are the reproductive methods in lower level organisms ?
 (A) Budding (B) Cell division
 (C) Developed reproductive - organs (D) A and B both
- (2) Which are the reproductive methods in higher level organisms ?
 (A) Budding (B) Cell Division
 (C) Developed reproductive organs (D) A and B both
- (3) In angiosperms which type of reproduction is take place sometimes ?
 (A) Multiple fission (B) Polyembryony (C) Apomixis (D) B and C both
- (4) Which are the Lateral organs in stunted shoots ?
 (A) Carpel, stamen (B) Calyx and corolla (C) Thalamus (D) Petiole
- (5) Which are the sterile appendages of typical flower ?
 (A) Calyx (B) Corolla (C) Gynoecium (D) A and B both
- (6) In typical flower megasporophyll and microsporophyll together and form respectively
 (A) Gynoecium, Androecium (B) Androecium, Gynoecium
 (C) Corolla, Calyx (D) Calyx, Corolla
- (7) Which part of stamen is sterile ?
 (A) Filament (B) Connective (C) Anther (D) A and B both

Answers : (1-D), (2-C), (3-D), (4-D), (5-D), (6-A), (7-D)

- **Pre Fertilization** : The differentiation and further development of the floral primordium to a flower is due to several hormonal and structural changes. In the flower, the androecium (representing the male reproductive organs) and the gynoecium (representing the female reproductive organ) differentiate and develop.

- **Stamen, microsporangium and pollen grain** : A stamen is known as microsporophyll. It is regarded as the male reproductive part of flower. A stamen consists of a filament, connective and an anther. The proximal end of the filament is attached to the thalamus of the flower. The numbers and length of stamens are variable in flowers of different species.

An anther is bilobed and tetrahedral which are known as microsporangia, which is filled with the pollen grains, which consisting different stages in it. Microsporangia arranged in the distinguished layers which are made up by cells.

From these layers pollen grain (microspores) are produced by the process of microsporogenesis and by dehiscence anther are released from the pollen grains.

Pollen grains are produced in different sizes and clusters, which have two layers. Exine and Intine. There is a germ pore in the exine through which the germ tube comes out - which is collect the pollen tube. It carries 2 male gametes upto the ovary.

- (8) Variety of stamens, in different species of plants, is seen in
 (A) Length (B) Number (C) Sterility (D) A and B both
- (9) Microsporagia when developed get converted to
 (A) Pollengrain (B) Stamen (C) Pollensac (D) A and B both
- (10) Name the fibrous layer of microsporangia ?
 (A) Endothecium (B) Endomyocium (C) Myocium (D) Myothecium
- (11) For the dehiscence of anther which layer is helpful ?
 (A) Middle layer (B) Fibrous layer (C) Epidermis (D) Tapetum
- (12) Function of the Tapetum of anther is,
 (A) Gives nutrition to develop anther (B) Gives nutrition to develop pollen grain.
 (C) Gives nutrition to develop epidermis (D) Gives nutrition to develop pollen in other cells.
- (13) The sporogenous tissue undergoes meiotic divisions to form microspore tetrad. Each one has
 (A) Potential to convert into active pollen grain.
 (B) Only one has potential to convert into PMC (Pollen mother cell).
 (C) First meiotic division occurs then it is converted into pollen mother cells.
 (D) First mitotic division occurs then it is converted into pollen mother cell.
- (14) What is pollen tetrad ?
 (A) In microsporogenesis a group of four cells arise by the meiotic divisions occur in pollen mother cell.
 (B) In microsporogenesis a group of four cell arising by mitotic division from pollen mother cell.
 (C) Arrangement of microspores
 (D) Four cells group in anther.
- (15) Which of the following represents the male gametophyte stage ?
 (A) Pollen grain (B) Ovule (C) Pollen tetrad (D) Pollen mother cell
- (16) What is the function of exine of pollen ?
 (A) Give protection against temperature.
 (B) Give protection against concentrated acid and base.
 (C) Made of resistant organic substance.
 (D) All the above
- (17) Name the spot in exine where sporopollenin is absent ?
 (A) Embryonic, micropylar (B) Micropyle. (C) Germ pore (D) Seed micropyle
- (18) Pollen grains are stored as a fossils, because
 (A) Its intine are thickened by pectin and cellulose (B) Its wall are made up of two layers
 (C) Sporopollnin is present. (D) It has Germ pore.
- (19) Intine of pollen is thickened by which substance ?
 (A) Pectin (B) Cellulose (C) Sporopollinin (D) A and B both
- (20) From which stage development of male gametophyte starts ?
 (A) When pollen is presented with in anther. (B) When pollen grain becomes bilayered.
 (C) When anther dehiscence can occur. (D) When anther get matures.

- (21) When intine of pollen comes out from the germ pore it is called
 (A) Style (B) Pollen tube (C) Pollengrain tube (D) A and B both
- (22) Formation of male gametes occurs in pollen tube by
 (A) Mitotic division of vegetative cell
 (B) By the mitotic division of tube cell.
 (C) By the mitotic division of generative cell.
 (D) By the process of degradation of tube cell.
- (23) When pollen tube develops in style, its terminal region will contain ?
 (A) Vegetative cell (B) Germ cell (C) Pollenmother cell (D) None of these
- (24) Which part of the pollen grain possesses huge storage nucleus.
 (A) Vegetative cell (B) Generative cell
 (C) Pollen mother cell (D) None of these

Answers : (8-D), (9-C), (10-A), (11-B), (12-B), (13-A), (14-A), (15-A), (16-D), (17-C), (18-C), (19-D), (20-A), (21-B), (22-C), (23-A), (24-A)

- A megasporophyll is the female reproductive part containing stigma, style and ovary. Inside the ovary is the ovarian cavity or locule. The placenta is located inside the ovarian cavity. From the placenta arise megasporangia which are called ovules. The ovule is attached to the placenta by funicle. Funicle and ovule meet at hilum. Ovule has abundant reserve food material. The nucellus is enclosed in integuments. A small opening at the apex of integuments is the micropyle. Opposite the micropyle is the chalazal end. A large oval cell in the nucellus towards the micropylar end is the embryo sac or female gametophyte.

The formation of megaspores from the megaspore mother cell (MMC) is megasporogenesis. It divides meiotically to form 4 haploid megaspores. Of these, 3 degenerate and only 1 becomes functional to form the female gametophyte. This is called monosporic development.

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- (25) Which plant is monocarpellary ?
 (A) Papaya (B) Maize (C) Hibiscus (D) Pea
- (26) Identify parts of carpel
 (A) Stigma, style (B) ovary (C) A and B both (D) Pollen tube
- (27) Which part of the carpel accepts pollen ?
 (A) Style (B) Pollen tube (C) Stigma (D) Ovary
- (28) Name the plant in which number of ovules is one in ovary
 (A) Wheat (B) Mango (C) Papaya (D) A and B both
- (29) By which structure ovule is attached with placenta ?
 (A) Chorionic duct (B) Funicle (C) Oviduct (D) Embryonic duct.
- (30) Region where ovule is attached with funicle
 (A) Egg nucleus (B) Funicle nucleus
 (C) Hilum (D) Embryonic nucleus

- (31) Point of attachment between ovule and funicle ?
 (A) Egg nucleus (B) Funicle nucleus (C) Hilum (D) Embryonic nucleus
- (32) Opposite to micropylar end chalazal end is, it is also known as
 (A) Hilum (B) Planetal part (C) Antipolar (D) None of these.
- (33) In nucelus, at the micropylar end, oval shaped cell is present it is known as
 (A) Embryosac (B) Female gametophyte (C) Storage cells (D) A and B both
- (34) Megasporogenesis process starts from which cell ?
 (A) Megaspore mother cell (B) Egg cell (C) Egg - apparatus (D) Synergid cell
- (35) How is differentiation occur in ovule ?
 (A) From the synergid cell which lies at micropylar end.
 (B) From the megaspore mother cell which lies at micropylar end.
 (C) From the eggs which lies at micropylar end.
 (D) From the antipolar cell which lies at micropylar end
- (36) What is monosporic development ?
 (A) Process of formation of embryo sac from only one megaspore.
 (B) Formation of embryo sac from four megaspores.
 (C) Four single cell megaspore development
 (D) Three antipodal cell and one egg cell
- (37) Which cells are present at micropylar end ?
 (A) One egg cell and two synergid cells (B) Two egg cells and one syner gid cell
 (C) Three antipodal cells (D) One antipodal cell and one egg cell.
- (38) The nuclei situated at chalazal end it known as
 (A) Egg cell (B) Synergid cell (C) Antipodal cell (D) Secondary nucleus
- (39) Where is the embryosac present in the secondary nucleus ?
 (A) Chalazal End (B) Micropylar end (C) Middle area (D) None of there
- (40) What is discovery of Panchanan and Maheshwari ?
 (A) How many numbers of megaspore nuclei participate in female gametophyte ?
 (B) How many cells are found in female gametophyte ?
 (C) How many numbers of cells are present in female gametophyte ?
 (D) Given the development of female gametophyte.

Answers : (25-D), (26-C), (27-C), (28-D), (29-B), (30-C), (31-C), (32-A), (33-D), (34-A), (35-B), (36-A), (37-A), (38-C), (39-C), (40-A)

- **Pollination and its types :**

The process of transfer of pollen released from the anther to the stigma of a carpel is called pollination.

- There are two types / kinds (1) Self pollination and (2) Cross pollination

- Self pollination is of two types : Autogamy and Geitonogamy

Thus, for the self pollination, plants have certain types of adaptations like. Homogamy, cleistogamy etc.

- Cross pollination also occurs in certain plants and for the cross pollination Dichogamy, self sterility, Heterostyly and herkogamy like adaptation contrivances can be seen.

- (41) What it is called when both male and female flowers are borne on single plant ?
 (A) Dioecious (B) Monoecious (C) Apiaceae (D) Lamiaceae
- (42) In which members of the given family self fertilization occur ?
 (A) Apiaceae (B) Lamiaceae (C) Cactaceae (D) All above
- (43) In the process of self fertilization How Lamiaceae does stigma come near the anther ?
 (A) Rapid growth occurs in style (B) Visible movement of style
 (C) Style develop upto the stigma (D) Stigma of style large and flat.
- (44) In the process of pollination pollen grain is deposited on other flower that phenomenon is known as a
 (A) Allogamy (B) Xenogamy (C) Geitonogamy (D) Cleistogamy.
- (45) When anther and stigma mature at the same time it is known as
 (A) Cleistogamy (B) Dichogamy (C) Self sterility (D) Homogamy
- (46) In which plant Homogamy is found ?
 (A) Viola (B) Catharanthus roseus (C) Oxalis (D) Commelina.
- (47) What is cleistogamy ?
 (A) Flowers never open (B) Flowers open after long time of generation
 (C) Flowers open immediately (D) Flowers open after time of some generation
- (48) In which type of flower self fertilization occurs in closed buds ?
 (A) Frequent flower (B) Cleistogamous flower (C) Allogamy (D) Xenogamy
- (49) In which plant chasmogamous flowers are bright coloured and attractive ?
 (A) Viola (B) Oxalis (C) Commelina (D) Catharanthus
- (50) What is the synonym for cross pollination ?
 (A) Geitonogamy (B) Allogamy (C) Cleistogamy (D) Xenogamy
- (51) In bisexual flowers, maturation occurs in stamen and carpel at different time it is known as
 (A) Cleistogamy (B) Self sterility (C) Heterostyle (D) Herkogamy
- (52) When Pollen reaches upto stigma even though fertilization does not take place, it called
 (A) Cleistogamy (B) Self sterility (C) Heterostyly (D) Herkogamy
- (53) What type of adaptation is it when styles have different length in flowers ?
 (A) Cleistogamous (B) Self sterility (C) Heterostyly (D) Herkogamy
- (54) In bisexual flowers physical barrier between anther and stigma is present it is known as
 (A) Cleistogamy (B) Self sterility (C) Heterostyly (D) Herkogamy

Answers : (41-B), (42-D), (43-B), (44-C), (45-D), (46-B), (47-A), (48-B), (49-C), (50-B), (51-A), (52-B), (53- C), (54-D)
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- **Agents for pollination** : Various transporting agents are required for carrying pollen from one flower to stigma of a flower to another plant. Plants use abiotic (wind and water) and biotic (animals) agents to achieve pollination. Majority of plants use biotic agents for pollination. Only a small proportion of plants use abiotic agent. Each type of plants possess some distinct characters related to their pollinating agent. Anemophily - pollination by wind, Hydrophily - pollination by water,

zoophily - pollination by animals; Entomophily - Pollination by insects etc. According to these changes in characters in plants.

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- (55) Which type of vectors / pollinatory are more useful in most of plants ?
 (A) Biotic (B) Abiotic (C) Wind (D) Water
- (56) In anemophily pollen is
 (A) Less amount of pollen is produced, no wastage is there.
 (B) Pollen is produced in less amount if pollinated by insects
 (C) Pollen is produced in large amount, more possibility of wastage
 (D) Pollen is produced in large amount, but immature pollen are more in number
- (57) Which type of pollen are seen in anemophilous plant ?
 (A) Small, dry (B) Smooth, light (C) Spiny, sticky (D) A and B both.
- (58) In anemophilous plants arrangement of flowers is
 (A) Male flowers are at a height and female flowers are dwarf.
 (B) Male flowers are dwarf and female flower is at a height.
 (C) Male and female flowers both are at the same height.
 (D) Male and female flowers both are dwarf.
- (59) How does stigma occur in anemophily ?
 (A) Branched, feathery, (B) Hairy, sticky
 (C) Towards the top (D) A and B both
- (60) Identify the characteristic of flower in which plant is pollen grains are produced in large amount ?
 (A) Contain honey (B) Attractive (C) Smellless (D) All three
- (61) What is hydrophily ?
 (A) Water pollination (B) Insect pollination (C) Wind pollination (D) Animal pollination
- (62) How many genera are pollinated by water ?
 (A) 10 (B) 20 (C) 30 (D) 40
- (63) Which type of plants are mostly water pollinated ?
 (A) Monocots (B) Dicots (C) Gymnosperms (D) Angiosperms.
- (64) Zostera is a
 (A) Vallisneria (B) Hydrilla (C) Marine weed (D) Algae
- (65) In seaweed / Marine weed, which type of the female flowers are produced ?
 (A) Deep in water (B) Free in water
 (C) Floating on the water surface (D) A and C both
- (66) Which type of the pollen grains are present in hydrophilous plant ?
 (A) Covered by cellulose (B) Covered by lignin
 (C) Covered by mucilage (D) Covered by pectin.
- (67) Which of the following are associated with zoophily ?
 (A) Sunbird and humming bird (B) Bat, squirrel
 (C) A and B both (D) None of these.
- (68) Who pollinates Aloe vera and Carrisa like plants ?
 (A) Sunbird (B) Humming bird (C) Snails (D) A and B both.
- (69) Who pollinates Kigelia plant ?
 (A) Bat (B) Lemur (C) Gecko lizard (D) Garden lizard.
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- (70) Which is the most effective pollinator, from the following.
 (A) Honey bees (B) Butterfly
 (C) Wasp (D) Ants
- (71) Which characters are attractive for insects involved in entomophily flowers ?
 (A) Various arrangement (B) Specific shape, colour and odour
 (C) Attractive inflorescence (D) All the above
- (72) Amorphophalus and Yucca plants are respectively pollinated by which insects ?
 (A) Fly, Honeybee (B) Honey bee, Butter fly
 (C) Fly, moth (D) Moth, Fly.

Answers : (55-A), (56-C), (57-D), (58-A), (59-D), (60-C), (61-A), (62-C), (63-A), (64-C), (65-B), (66-C), (67-C), (68-D), (69-A), (70-A), (71-D), (72-C)

Outbreeding Devices : Many flowering plants produce bisexual flowers and pollen grains are likely to come in contact with the stigma of the same flowers. Continued self-pollination result in inbreeding depression. Flowering plants have developed many devices to discourage self-pollination and to encourage cross-pollination. Maturity of pollens and stigma at different times and dichogamy like devices can seen.

- (73) Flowering plants have developed which devices to discourage self - pollination and encourage cross pollination ?
 (A) Outbreeding devices (B) Autogamy
 (C) Geitonogamy (D) A and B both
- (74) In which plant, the stigma becomes receptive much before pollens are released ?
 (A) Palms (B) Sunflower (C) Primula (D) Malva
- (75) Which plant releases the pollen long time before the stigma becomes receptive ?
 (A) Palms (B) Sunflower (C) Primula (D) Malva
- (76) In which plant anthers and stigma located at different positions ?
 (A) Palms (B) Sunflower (C) Primula (D) Malwa
- (77) Prevention of pollen germination and pollen tube development in a carpel by the pollen of the same flower or other flowers of the same plant, is called as,
 (A) Inbreeding (B) Geitonogamy (C) Self incompatibility (D) A and B both
- (78) In which type of plants, self fertilization can be prevented, but not in geitonogamy ?
 (A) Monoecious (B) Dioecious (C) Triocious (D) Tetraocious.
- (79) Which types of plants are inhibition selffertilization and geitonogomy both ?
 (A) Monoecious (B) Dioecious
 (C) Triocioms (D) Tatraocious.

Answers : (73-D), (74-B), (75-A), (76-C), (77-C), (78-A), (79-B)

Pollen-pistil Interaction : Nature does not guarantee the transfer of the pollen of the same species on the stigma (compatible pollen.) Often pollen from other species or a self incompatible pollen from the same plant, can also land on the stigma.

- **Artificial Hybridization** : In artificial hybridization desired pollen grains are used for pollination and the stigma is protected from unwanted pollen. This is achieved by emasculation and bagging techniques for which different types of methods are available and by the using that we get the plant with desirable characters.
- (80) Which method is useful for artificial hybridization ?
 (A) Emasculation (B) Bagging
 (C) Fumigation (D) A and B both
- (81) From the bisexual flowers, with the help of forceps anthers are removed from the floral bud method is
 (A) Bagging (B) Emasculation
 (C) Fumigation (D) A and B both

Answers : (80-D), (81-B)

Double fertilization : When pollen becomes deposited on stigma of carpel, there is development of pollen tube on the stigma. The pollen tube grows through the style enters the ovary and reaches an ovule. Two male gametes are included within the pollen tube. Two male gametes are released in the ovary which fertilizes egg cell and secondary nucleus respectively, This is called double fertilization.

- (82) When two male gametes are released in the cytoplasm of the Z synergids, the structures found in the embryo sac are,
 (A) Three antipolar cells (B) One egg cell
 (C) One secondary nucleus (D) All the above.
- (83) Male gametes which enter the embryo sac are fused with
 (A) Secondary nucleus (B) Nucleus of egg cell.
 (C) A and B both (D) Antipodal cells
- (84) Where do double fertilization and zygote formation occur in embryo sac ?
 (A) Towards the antipodal cell end (B) Toward chalazal end
 (C) Towards the pollen tube end (D) Towards the micropylar end
- (85) During double fertilization, in embryosac, where is the endosperm nucleus formed ?
 (A) Towards the antipodal end (B) Towards the chalazal end
 (C) Middle of embryo sac (D) Towards the micropylar end.
- (86) Which structure is developed from the endosperm nucleus ?
 (A) Ovary (B) Zygote
 (C) Endosperm (D) Eggcell

Answers : (80-A), (81-D), (82-D), (83-C), (84-D), (85-C), (86-C)

Post - Fertilization : Structure and Events : Following double fertilization, events of endosperm and embryo development, maturation of ovules(s) and ovary into fruit are collectively termed post-fertilization events.

- **Formation of endosperm** : As stated earlier, the endosperm develops from the primary

endosperm nucleus (3n) by its repeated mitotic division and forms a triploid endosperm tissue. Lateron, this merges with the cotyledons or independent – depending on the type of plants.

- (87) In a common endospermic, development what is PEN ?
 (A) Primary endosperm nucleus. (B) Primary embryo and nucleus
 (C) Primary embryo and cellular nucleus (D) Formation of primary endosperm tissue
- (88) In a fresh coconut, the fluid is
 (A) Embryonic fluid (B) Free endospermic nucleus
 (C) Cellular endosperm (D) cytoplasm of degradable cells
- (89) In a fresh coconut, the white kernel present inside is
 (A) Embryonic fluid (B) Frce endospermic nucleus
 (C) Cellular endosperm (D) Cytoplosm of degradable cells
- (90) In which plant endosperm is consumed by the developing embryo ?
 (A) Dicot (B) Castor
 (C) Coconut (D) B and C both
- (91) In which plants endosperm persists in mature seeds ?
 (A) Dicot (B) Castor
 (C) Coconut (D) B and C both.

Answers : (87-A), (88-B), (89-C), (90-A), (91-D)

Embryo :

Embryo develops from the zygote which is located near the micropyle. Zygotes divides after formation of a certain amount of endosperm. A four celled pro-embryo stage is followed by the formation of suspensor and an octant. At last the embryo is formed. This process is seen in Capsella (dicotyledenous) plants, and so it is called as the capsella type embryo development.

- (92) In embryo development division of basal cell is transverse and apical cell divides longitudinal and produce four celled structure it is known as
 (A) Proembryo (B) Primary embryo
 (C) Tetrad cellular (D) A and B both
- (93) The developing embryo is pushed towards the middle of embryo sac by what ?
 (A) Apical octant (B) Basal cell (C) Suspensor (D) Hypophysis cell
- (94) Name the large apical cell of the suspensor.
 (A) Basal cell (B) Apical cell (C) Hyphysis cell (D) Micropylar cell.
- (95) Where is apical octant located ?
 (A) Towards hilum (B) Towards micropyle.
 (C) Towards upper side of hypophysis (D) Towards lower side of hypophysis.
- (96) Where basal octant is located ?
 (A) Towards hilum (B) Towards micropyle
 (C) Towards upper side of hypophysis (D) Towards lower side of hypophysis.
- (97) From the chalazal octant which region of embryo develop ?
 (A) Shoot apex (B) Epicotyl (C) Cotyledons (D) All the above

- (98) Which regions of embryo develop from the micropylar octant ?
 (A) Central part of radicle (B) Hypocotyl
 (C) A and B both (D) Peripheral region of radicle root.
- (99) Which region is formed from the hypophysis ?
 (A) Central region of radicle (B) Peripheral region of radicle
 (C) Root cap (D) B and C both.
- (100) Which regions develop from chalazal octant and micropylar octant respectively ?
 (A) Epicotyl, Hypocotyl (B) Hypocotyl, epicotyl
 (C) Peripheral region of radicle, central region of radicle
 (D) Central region of radicle, peripheral region of radicle.
- (101) Monocot embryo has only one cotyledon. This type of cotyledon is known as
 (A) Coleoptile (B) Coleorhiza (C) Scutelum (D) A and B both

Answers : (92-A), (93-C), (94-C), (95-A), (96-B), (97-D), (98-C), (99-D), (100-A), (101-C)

Apomixis : Apomixis is a modified form of reproduction in which seeds are produced without fertilization. This special mechanism is seen in species of Asteraceae and grasses. In other words, apomixis is a form of asexual reproduction that mimics sexual reproduction. Development of embryo from unfertilized cell or from a diploid cell is also Apomixis.

In Apomixis, since chiasmata formation or conjugation of chromosomes does not occur, no variations are introduced. The desirable characters of the species continue, indefinitely. Thus this phenomenon is very important in Apomictic species.

- (102) In which species apomixis is found ?
 (A) Asteraceae (B) Grass (C) Apomictic (D) A and B both.
- (103) Which reproductive method is in the form of asexual reproduction in which it mimics sexual reproduction ?
 (A) Polyembryony (B) Apomixis (C) Simple embryonic (D) A and C both
- (104) Plants shows apomixis these plants are known as
 (A) Apomictic (B) Astereceae (C) Sporophytic (D) Adventive.
- (105) If seed develops from nucellus or integuments and other cell, it is known as
 (A) Generative apospory (B) Somatic apospory
 (C) Haploid parthenogenesis (D) Sporophytic budding.
- (106) Apomixis development of embryo from unfertilized egg is called
 (A) Haploid parthenogenesis (B) Haploid apogamy
 (C) Somatic apogamy (D) Somatic apospory
- (107) From any cell of embryo sac apart from the egg is called
 (A) Haploid parthenogenesis (B) Haploid apogamy
 (C) Somatic apogamy (D) Somatic - apospory.
- (108) If embryo is developed from unfertilized egg, then the embryo will be
 (A) Triploid (B) Haploid (C) Diploid (D) Without chromosomes.
- (109) Cell of ovule lying outside the embryo sac is referred to as
 (A) Apomictic (B) Adventive embryonic cells
 (C) Sporophytic budding (D) Sporophytic

- (110) In which species sexual and asexual reproduction occur simultaneously ?
(A) Apomictic (B) Adventive (C) Sporophytic (D) B and C both.

Answers : (102-D), (103-B), (104-A), (105-B), (106-A), (107-B), (108-B), (109-B), (110-A)

Polyembryony : The phenomenon of development of more than one embryo in the seed is called polyembryony. Polyembryony is commonly observed in conifers (gymnosperms). It is also recorded in angiosperm plants. It may be due to the presence of more than one egg cell in the embryo sac or more than one embryo sac in the ovule. It plays an important role in plant breeding and horticulture.

- (111) Which plants commonly shows Polyembryony ?
(A) Monocot (B) Dicot (C) Gymnosperms (D) Angiosperms
- (112) What is the reason for polyembryony ?
(A) In embryo sac more than one egg cells are present.
(B) More than one embryo sac in the ovule.
(C) In embryo sac number of ovule is more than one.
(D) In embryosac more than two ovules and numerous endospermic nucleus are present.

Answers : (111-C), (112-A)

- **Fruit Formation and Development of seed :**

In the angiosperms fertilization produces changes not only in embryo - sac but also in the ovary and at times, in other parts of the flower. Ovules mature in to seeds. The wall of ovary develops into the wall of fruit called pericarp. The fruits may be fleshy or dried and spread with mechanism of seed dispersal. In several plants thalamus also participates in the formation of fruit formation. Fruit is a result of fertilization but in some species do fruit formation occurs without fertilization (Parthenocarpic fruits.)

In angiosperm, the seed is the final product of sexual reproduction. It is often described as a fertilized ovule. Seeds are formed inside the fruits. A seed typically consists of seed coats, cotyledon (s), and an embryo axis. The cotyledons of the embryo are a simple structure, generally thick and swollen due to stored food reserve. Seeds can be non endospermic or endospermic seed.

- (113) If thalamus participates in the formation, the fruit is known as
(A) True fruit (B) False fruit (C) Unfertilized fruit (D) Seedless fruit.
- (114) In fruit formation is from the ovary the fruits are known as
(A) True fruit (B) False fruit (C) Unfertilized fruit (D) Seedless fruit.
- (115) Fertilised ovule means
(A) Fruit (B) True fruit (C) seed (D) Unfertilized fruit.
- (116) Why cotyledons of seed are thick and swollen ?
(A) Cotyledons plays important role in embryonic development.
(B) Reserve food is stored in it.
(C) Formation of cotyledons by suspensor
(D) Numerous free nuclei are here.
- (117) In non endospermic seed why stable endosperm is not present ?
(A) Amount of water is more in seed. (B) Amount of water is less in seed.
(C) Metabolic activities are quick in seed.
(D) During the embryonic development embryo is completely consumed.

- (118) Which plant possesses persistent residual nucellus ?
 (A) Pepper (B) Clove (C) Beet (D) A and C both
- (119) What happens due to seed dormancy ?
 (A) It can be stored easily (B) Can be sowing in next few years.
 (C) Problem occurs in seed germination (D) All the above
- (120) How old were the date palm seeds discovered from the palace of King Herod.
 (A) 200 (B) 2000 (C) 1000 (D) 10,000

Answers : (113-B), (114-A), (115-C), (116-B), (117-D), (118-D), (119-D), (120-B)

- (121) Identify mis match from the following.
 (A) Perisperm - pepper (B) Non endospermic seed - Ground nut
 (C) Endospermic seed - Pea (D) Fertilized fruits - Banana
- (122) Identify mis match from the following.
 (A) Vernonia - papus (B) Martynia - Hook like structure
 (C) Ruellia - mechanism dispersal (D) Cotton - Hairy outgrowth
- (123) Identify mis match from the following ?
 (A) Anemophily - Grass (B) Entomophily - wasps
 (C) Hydrophily - Grass (D) Kigelia - Bat.
- (124) Identify proper matching pair from the following ?
 (A) Unfertilized fruits - Ground nut (B) False fruit - Apple
 (C) Dry pericarp - Guava (D) Fleshy pericarp - mustard
- (125) Identify proper matching pair from the following ?
 (A) Proembryo - four cellular structure (B) Suspensor - sixteen cellular structure
 (C) Hypophysis cell - six cellular structure. (D) Basal cell - unicellular structure.
- (126) Identify proper matching pair from the following ?
 (A) Acarpellary - flower of pea (B) Many numbers of ovule - orchid
 (C) Monoecious-papaya (D) polyembryony -onion.
- (127) Which sentence is related to funicle ?
 (A) It attaches embryo sac with micropyle (B) It attaches pericarp with seed.
 (C) It attaches ovary with anther. (D) It attaches placenta with ovule.
- (128) Find the odd one out.
 (A) Antipodal cell (B) Synergid cell (C) Vegetative cell (D) Egg cell.
- (129) Which is not related to anemophily ?
 (A) Hairy and sticky stigma
 (B) Pollen grain produced in large amounts
 (C) Attractive inflorescence
 (D) Male flowers are located higher than female flowers
- (130) Which option is not related ?
 (A) Aloe - moth - Entomophily (B) Hemp - winds - anemophily
 (C) Zostera - Water - Hydrophily (D) Kigelia - Bat - zoophily.

Answers:(121-C),(122-D),(123-C), (124-B), (125-A), (126-D), (127-D), (128-C), (129-C), (130-A)

• **A - Assertion R - Reason type Questions :**

Choose the propare option given following question for answer :

(A) A and R both are true and R is correct explanation of A.

(B) A and R both are correct but R is not the correct explanation of A.

(C) A is correct but R is wrong.

(D) A is wrong but R is correct.

(131) Assertion A : During dormancy, the seed is without water.

Reason R : In dormancy metabolic activities of embryo is slow.

(A) (B) (C) (D)

(132) Assertion A : Flowering plants develop methods for cross pollination ?

Reason R : Continuous self pollination creates in breeding depression.

(A) (B) (C) (D)

(133) Assestion A : All flowers have four whorls.

Reason R : Flowers are organs of sexual reproduction.

(A) (B) (C) (D)

(134) Assertion A : Stamen consists of anthers connective and filament.

Reason R : Stamen is male reproductive organ which produce pollen grains.

(A) (B) (C) (D)

(135) Assertion A : Male and female gametes conjugate to produce zygote.

Reason R : Zygote produces new plant

(A) (B) (C) (D)

(136) Assertion A : Mitosis occurs on MMC (Megaspore mother cell) and produce four haploid megaspore.

Reason R : Formation of embryo sac is from megaspore

(A) (B) (C) (D)

(137) Assertion A : Development of pollen tube occurs from the pollen grain.

Reason R : Germination of pollen tube occurs where there is no sporopollenin.

(A) (B) (C) (D)

(138) Assertion A : The phenomenon of development of more than one embryo in the seed is called polyembryony.

Reason R : Polyembryony may be due to the presence of more than one egg cell in the embryosac.

(A) (B) (C) (D)

(139) Assertion A : Asteraceae is apomitic plant.

Reason : Reproduction occur by apomixis.

(A) (B) (C) (D)

Answers : (131-B), (132-A), (133-D), (134-A), (135-B), (136-D), (137-A), (138-A), (139-A)

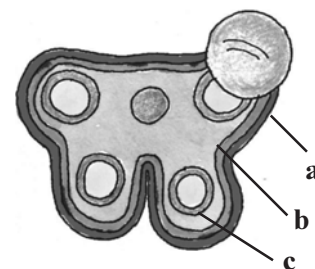
- (140) **Column - I** **Column - II**
- | | | |
|--|---|--|
| (1) Hollow bag like structure | (p) Ovule | (A) : (1 - t), (2 - u), (3 - q), (4 - s) (5 - r) |
| (2)End of the mitosis creation of small nucleus | (q) Megaspore - mother cell | (B) : (1 - r), (2 - t), (3 - p), (4 - s) (5 - q) |
| (3)Structure made up by integuments and megasporangia | (r) Anther | (C) : (1 - t), (2 - u), (3 - p), (4 - v) (5 - q) |
| (4)Structure made up by three nuclei at micropylar end | (s) Antipodal cell | (D) : (1 - r), (2 - u), (3 - p), (4 - v) (5 - t) |
| (5)Bilayered uninucleate structure | (t) Pollen grains
(u) Generative cell
(v) Egg apparatus | |
- (141) **Column - I** **Column - II**
- | | | |
|-------------------------|-----------------|--|
| (1)Non endospermic seed | (p) Banana | (A) : (1 - s), (2 - r), (3 - q), (4 - p) |
| (2)Endospermic seed | (q) Beet | (B) : (1 - r), (2 - s), (3 - q), (4 - p) |
| (3)Perisperm | (r) Castor seed | (C) : (1 - q), (2 - r), (3 - s), (4 - p) |
| (4)Parthono carpic | (s) Pea. | (D) : (1 - p), (2 - s), (3 - q), (4 - r) |
- (142) **Column - I** **Column - II**
- | | | |
|----------------|--|--|
| (1)Homogamy | (p) Species which exhibit crosspollination | (A) : (1 - s), (2 - r), (3 - p), (4 - q) |
| (2)Geitonogamy | (q) Self pollination in closed floral bud | (B) : (1 - s), (2 - p), (3 - q), (4 - r) |
| (3)Xenogamy | (r) Pollination between the two flowers of one plant | (C) : (1 - s), (2 - q), (3 - r), (4 - p) |
| (4)Cleistogamy | (s) More possibility of self pollination | (D) : (1 - r), (2 - s), (3 - q), (4 - p) |
- (143) **Column - I** **Column - II**
- | | | |
|---|--|--|
| (1)Embryo from unfertilized egg | (p) Sporophytic | (A) : (1 - q), (2 - r), (3 - t), (4 - p) |
| (2)Embryo from integument cell | (q) Haploid apomixis / Parthenogenesis | (B) : (1 - q), (2 - s), (3 - t), (4 - r) |
| (3)Embryo from any other cell of embryosac except egg | (r) Somatic sporophytic | (C) : (1 - q), (2 - t), (3 - s), (4 - r) |
| (4)Embryo from any cell of Chalazal region | (s) genetic apospory
(f) Haploid apogamy. | (D) : (1 - r), (2 - q), (3 - p), (4 - t) |
- (144) **Column - I** **Column - II**
- | | | |
|----------------|--------------------|--|
| (1) Moths | (a) Grass | (A) : (1 - d), (2 - c), (3 - a), (4 - b) |
| (2) Anemophily | (b) Amorphophallus | (B) : (1 - c), (2 - a), (3 - d), (4 - b) |
| (3) Hydrophily | (c) Yucca | (C) : (1 - b), (2 - a), (3 - d), (4 - c) |
| (4) Flies | (d) Zostera | (D) : (1 - c), (2 - d), (3 - b), (4 - a) |
- (145) **Column - I** **Column - II**
- | | | |
|-----------------|-------------------------|--|
| (1) Anemophily | (p) Mucilage | (A) : (1 - r), (2 - s), (3 - p), (4 - q) |
| (2) Hydrophily | (q) Dried, smooth light | (B) : (1 - s), (2 - r), (3 - q), (4 - p) |
| (3) Zoophily | (r) Hairy spiny | (C) : (1 - q), (2 - p), (3 - s), (4 - r) |
| (4) Entomophily | (s) Edible | (D) : (1 - p), (2 - r), (3 - s), (4 - q) |

- (146) **Column - I** **Column - II**
- | | | |
|-----------------|------------------------|--|
| (1)Cactaceae | (p) Geitonogamy | (A) : (1 - q), (2 - r), (3 - s), (4 - p) |
| (2)Catharanthus | (q) Self fertilization | (B) : (1 - r), (2 - q), (3 - s), (4 - p) |
| (3)Commilina | (r) Homogamy | (C): (1 - q), (2 - p), (3 - s), (4 - r) |
| (4)Maize | (s) Cleistogamy | (D) : (1 - r), (2 - s), (3 - q), (4 - p) |
- (147) **Column - I** **Column - II**
- | | | |
|-----------------------|----------------|--|
| (1)Apomixis | (p) Apiaceae | (A) : (1 - q), (2 - s), (3 - p), (4 - r) |
| (2)Polyembryony | (q) Astaraceac | (B) : (1 - r), (2 - s), (3 - p), (4 - q) |
| (3)Self fertilization | (r) Conifers | (C) : (1 - q), (2 - p), (3 - r), (4 - s) |
| (4)Cleistogamous | (s) Conifers | (D) : (1 - r), (2 - p), (3 - s), (4 - q) |
- (148) **Column - I** **Column - II (Mechamism of seed disersal)**
- | | | |
|---------------|-------------------------|--|
| (1)Xanthium | (p) Papus | (A) : (1- q), (2-s), (3-t), (4- p) (5- r) |
| (2)Cotton | (q) Stiff hairs | (B) : (1-q), (2-t), (3 - s), (4 - r) (5 - p) |
| (3)Vernonia | (r) Hook like structure | (C) : (1-s), (2- t), (3- p), (4- q) (5 - r) |
| (4)Calotropis | (s) Hairy out growth | (D) : (1-t), (2- p), (3- q), (4- r) (5 - s) |
| (5)Martynia | (t) Hairy sepals | |
- (149) **Column - I** **Column - II**
- | | | |
|-------------------------|--------------------|--|
| (a)One ovule in ovary | (i) Viola | (A) : (a - iv), (b - ii), (c - i), (d - iii) |
| (b)Many ovules in ovary | (ii) Commelina | (B) : (a - v), (b - iv), (c - ii), (d - i) |
| (c)Homogomy | (iii) Catharanthus | (C) : (a - iv), (b - v), (c - iii), (d - ii) |
| (d)Clietogamy | (iv) Papaya | (D) : (a - v), (b - iv), (c - iii), (d - ii) |
| | (v) Mango | |
- (150) **Column - I** **Column - II**
- | | | |
|-------------------------|---------------|--|
| (a)Self parthenogenesis | (i) Lemon | (A) : (a - v), (b - iv), (c - iii), (d - i) |
| (b)Parthenogenesis | (ii) Mango | (B) : (a - i), (b - ii), (c - iii), (d - iv) |
| (c)Adventive embryony | (iii) Poaceae | (C) : (a - iv), (b - iii), (c - ii), (d - i) |
| (d)Polyembryony | (iv) Malva | (D) : (a - i), (b - iii), (c - ii), (d - v) |
| | (v) Mango | |

Answers : (140-D), (141-A), (142-A), (143-A), (144-B), (145-C), (146-A), (147-A), (148-A), (149-D), (150-C)

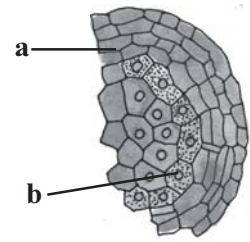
- (151) Indicates parts a, s, c, in given diagram

- | | | |
|---------------------|------------------|------------------------|
| (A) a - Connective | b - Epidermis, | c - Endothecium |
| (B) a - Connective, | b - Endothccium, | c - Tapetum |
| (C) a - Epidermis, | b - Endothecium, | c - Sporophytic tissue |
| (D) a - Epidermis, | b - Endothecium, | c - Tapetum |



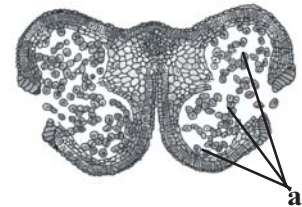
(152) Indicate part a, b in given diagram.

- (A) a = middle layer, b = Tapetum
- (B) a = Endothecium, b = Tapetum
- (C) a = Middle layer, b = Microspore mother cell
- (D) a = Endothecium, b = Microspore mother cell



(153) What does 'a' represent in the given figure ?

- (A) It is representative of gametophyte stage.
- (B) It has two layer other than plasma membrane.
- (C) A and B both
- (D) By the meiosis dividing production of male gametes occurs



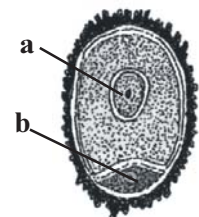
(154) Identify the diagram.

- (A) Pollen tetrad
- (B) Pollen mother cell
- (C) Mature pollengrain
- (D) Mega spore mother cell



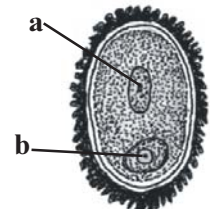
(155) Identify part a, b in given diagram respectively ?

- (A) a - Cytoplasm b - Intine (Inner coat)
- (B) a - Nucleus, b - Inner coat
- (C) a - Cytoplasm, b - Outer coat
- (D) a - Nucleus, b - Outer coat



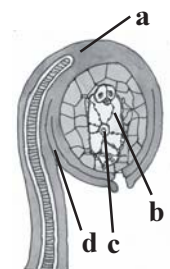
(156) Identify part a, b in given diagram respectively ?

- (A) a - Tube nucleus, b - Generative cell
- (B) a - Generative cell, b - tube nucleus
- (C) a - cytoplasm b - tube cell
- (D) a - Nucleus b - Germ pore



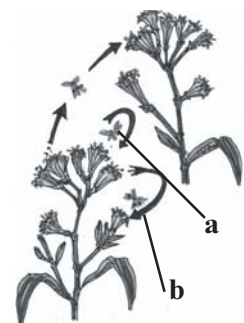
(157) Identify correct name of parts a,b,c,d. in given diagram.

- (A) a - Chalaza, b - Secondary nucleus, c - Egg cell d - hilum diagram
- (B) a - Chalaza, b - Secondary nucleus, c - Synergid cell d - Hilum
- (C) a - Chalaza, b - Embryo sac, c - Egg cell, d - hilum
- (D) a - Chalaza, b - Embryo sac, c - Synergid cell, d - Funicle.

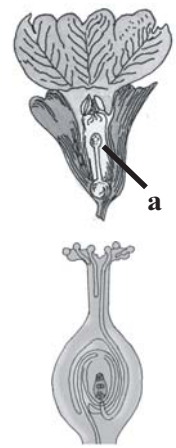


(158) Identify processes which are indicated by a, b in diagram

- (A) a - Self pollination, b - Cross pollination
- (B) a - Cross pollination, b - Self pollination
- (C) a - Self fertilization, b - Geitonogony
- (D) a - Self fertilization, b - Cross pollination



- (159) Identify part a,b in given diagram
 (A) Primula, a - Stigma, b - Anther
 (B) Primula, a - Anther, b - Stigma
 (C) Malva, a - stigma, b - Anther
 (D) Malva, a - Anther, B - Stigma



- (160) Identify given figure
 (A) Carpel
 (B) L.S of flower which showing growth of pollen tube.
 (C) Female gametophyte
 (D) Germination of pollen grain

Answers : (151-C), (152-B), (153-C), (154-C), (155-D), (156-A), (157-C), (158-C), (159-B), (160-B)

● **Questions for NEET Specially :**

- (161) How many whorls of are present in typical flower ?
 (A) Two (B) Three (C) Four (D) Five
- (162) Which is the sterile part of carpel ?
 (A) Ovary (B) Stigma (C) Style (D) B and C both
- (163) Intine of pollen at the time of germination comes out and is convert into
 (A) Pollen tube (B) Ovary (C) Style (D) Stigma
- (164) Integuments while covering the embryosac leave an aperture called
 (A) Micropyle (B) Ovule pore (C) Chalaza (D) A and B both.
- (165) At the maturity, embryo sac of typical angiospern has how many cells ?
 (A) 8 (B) 7 (C) 4 (D) 3
- (166) Which type of flower open at the time of dehiscence of anther ?
 (A) Chasmogamous flowers (B) Cleistogamous flower
 (C) Aerial flowers (D) None of these
- (167) Species exhibiting cross pollination is known as
 (A) Xenogamy (B) Recombmation (C) Allogamy (D) Homogamy
- (168) What is anemophily ?
 (A) Water pollination (B) Insect pollination (C) Wind pollination (D) Animal pollination
- (169) What is zoophily ?
 (A) Water pollination (B) Insect pollination (C) Wind pollination (D) Animal pollination
- (170) Modified form of reproduction in which seed formation occurs without fertilization is known as
 (A) Polyembryony (B) Simple embryony (C) Apomixis (D) A and C both

Answers : (161-C), (162-C), (163-C), (164-D), (165-B), (166-C), (167-A), (168-C), (169-D), (170-C)

