

**SAMPLE CONTENT**

**FOUNDATION**



# MHT-CET BIOLOGY

*From vision to victory*

Includes  
Authentic  
Questions from  
Latest MHT-CET  
Examination

- Based on Latest Paper Pattern
- Grasp the Terminology
- Key Notes for Good Practice
- Quick Review
- Previous Years' Questions

## Std. XII

**Target** Publications<sup>®</sup> Pvt. Ltd.

XII  
Foundation  
MHT-CET  
**BIOLOGY** MULTIPLE CHOICE  
QUESTIONS

Target Publications

Printed at: **Star Print**, Mumbai

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# Reproduction in Lower and Higher Plants

## Grasp the Terminology

Term	Meaning
<b>Dithecous anther</b>	Anther with two anther lobes
<b>Tetrasporangiate anther</b>	Dithecous anther with four pollen sacs.
<b>Microsporogenesis</b>	Formation of microspores by the meiosis of diploid microspore mother cells.
<b>Megasporogenesis</b>	Process of formation of haploid megaspores from diploid megaspore mother cell (MMC) by meiotic division.
<b>Parthenocarpy</b>	Development of fruit without fertilization.

## Key Notes For Good Practice

- Pollen grain/microspore is the first cell of the male gametophyte.
- Vegetative cell helps in formation of pollen tube.
- Continued self-pollination results in the inbreeding depression.
- Double Fertilization is a characteristic feature of angiosperms.

## Quick Review

### Types of reproduction:

Types of  
Reproduction

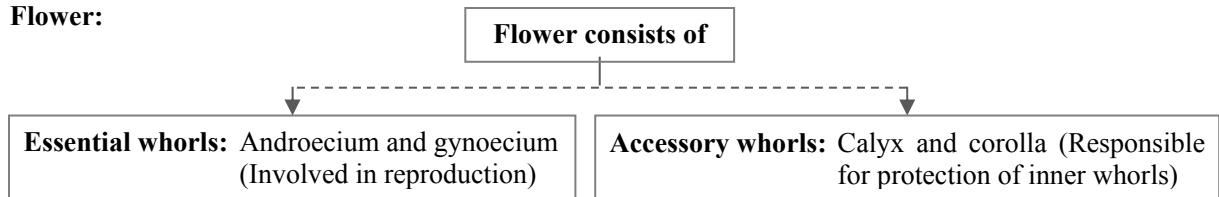
- Asexual → Offspring produced by a single parent with/without gamete formation.
- Sexual → Offspring produced by two parents (of opposite sex) and fusion of male and female gamete is involved.

### Asexual reproduction in lower organisms:

Sr. No.	Method	Description	Examples
1.	<b>Binary fission</b>	Parental cell divides into two halves and each half grows rapidly into an adult.	<i>Amoeba</i> , <i>Paramecium</i>
2.	<b>Fragmentation</b>	Multicellular organisms break into fragments and each fragment can develop into new individuals.	<i>Spirogyra</i>
3.	<b>Budding</b>	Small buds are produced which initially remain attached to the parent cell, but later get separated and mature into new organisms (cells).	Yeast, <i>Protosiphon</i>
4.	<b>Spore formation</b>	Flagellated, motile zoospores are formed which grow independently into new individuals.	<i>Chlamydomonas</i>
5.	<b>Conidia</b>	Conidia are asexual reproductive structures.	<i>Penicillium</i>
6.	<b>Gemmules</b>	Gemmules are asexual reproductive structures.	<i>Marchantia</i>



➤ **Flower:**



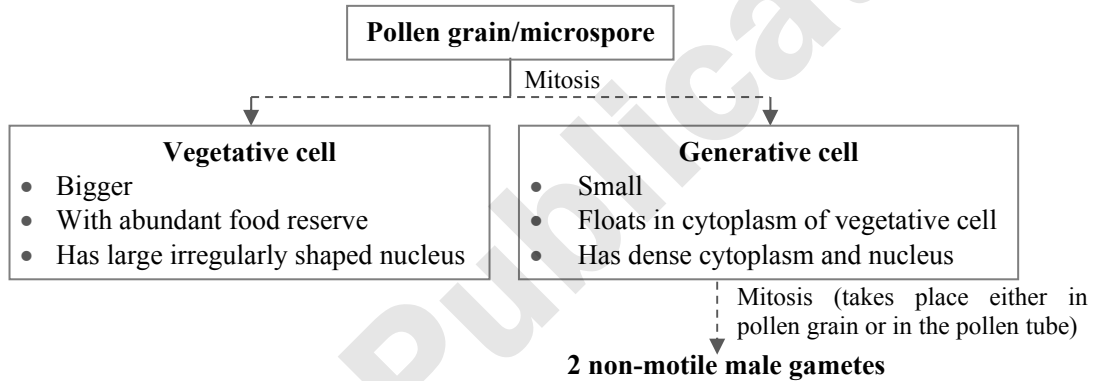
- **Structure of anther:** Angiospermic anther is **bilobed** and **tetrasporangiate**.  
**Wall layers of microsporangium** (from outer side to inner side):  
 Epidermis → Endothecium → Middle layers → Tapetum  
 (Outermost) (Innermost)

➤ **Structure of pollen grain (microspore):**

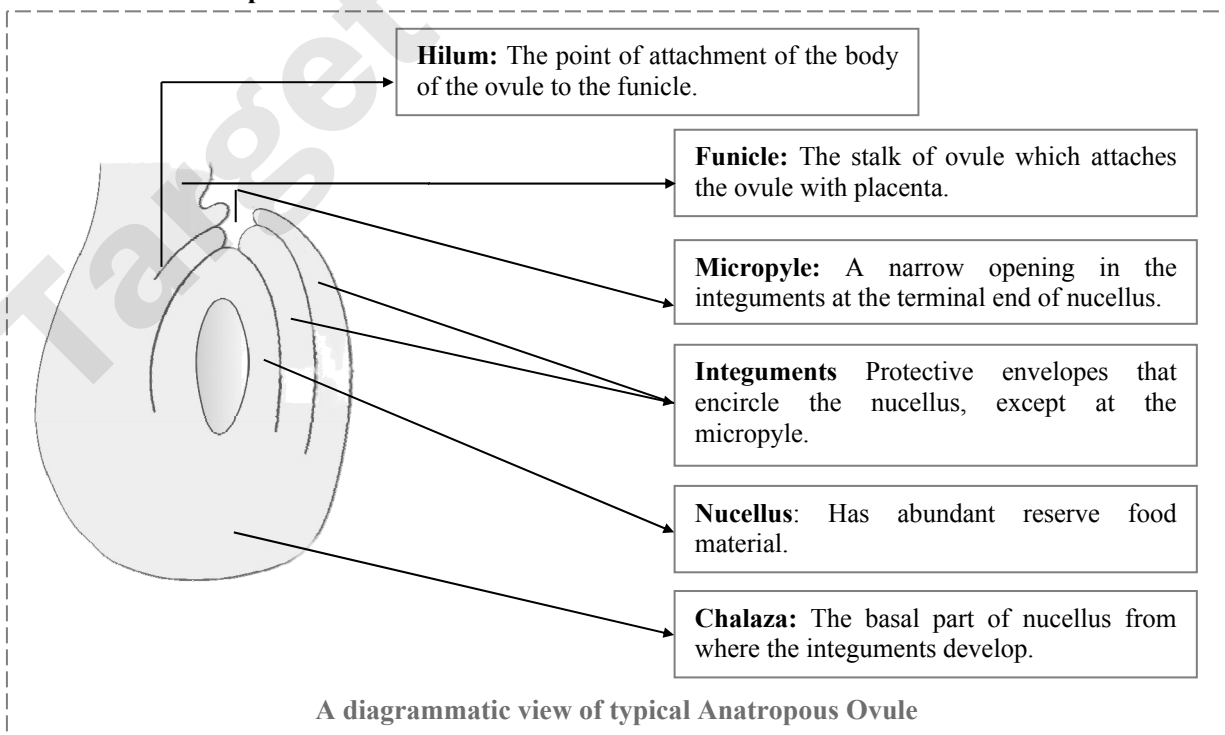
Pollen grain has a double layered wall			
1.	<b>Exine</b>	Outer, thick and resistant layer	Composed of sporopollenin
2.	<b>Intine</b>	Inner layer	Composed of cellulose and pectin.

**Germ pore:** The thin areas of exine where sporopollenin is absent.

➤ **Development of male gametophyte:**

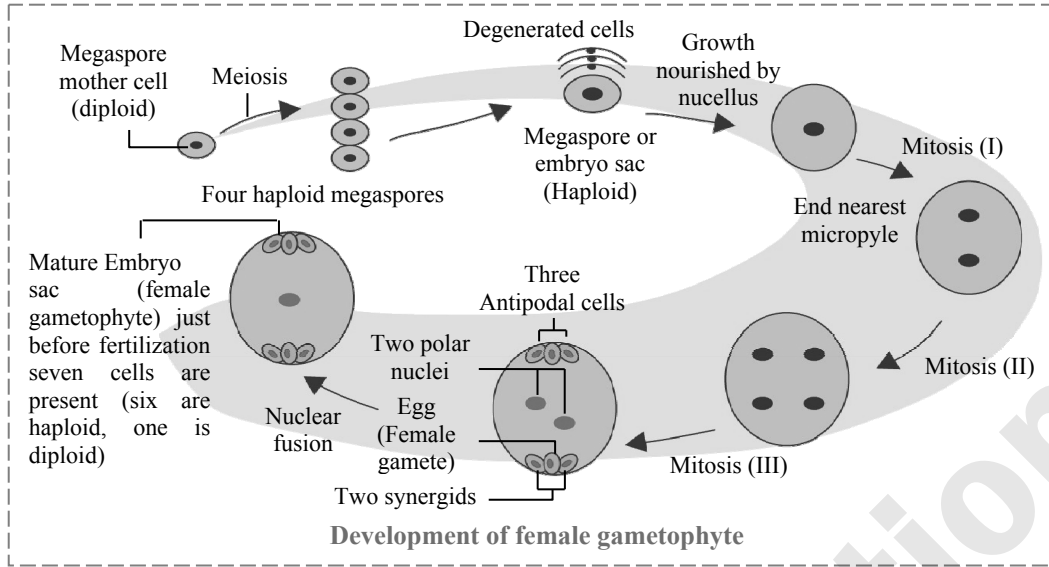


➤ **Structure of Anatropous Ovule:**

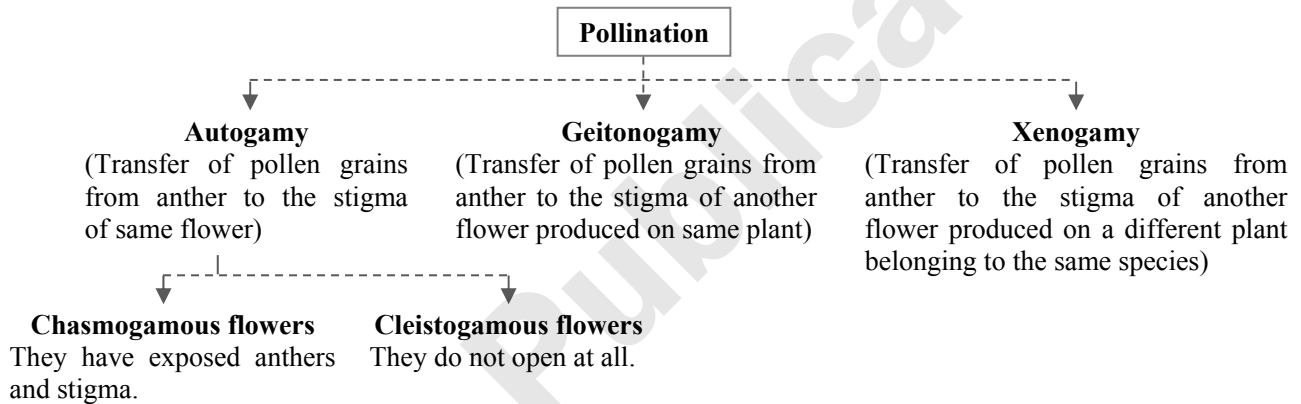




➤ **Megasporogenesis: 7-celled and 8-nucleated Embryo sac**



➤ **Types of pollination:**



➤ **Agencies of pollination:**

Agencies of pollination		Definition	Examples
<b>Anemophily</b>		Pollination through wind	Wheat, rice, corn, rye, barley, oats, <i>Potamogeton</i> , <i>Halogaris</i> , etc.
<b>Hydrophily</b>	<b>Hypohydrophily</b>	Pollination takes place below the water surface in submerged female flowers.	<i>Zostera</i>
	<b>Epihydrophily</b>	Pollination occurs on the surface of water.	<i>Vallisneria</i>
<b>Entomophily</b>		Pollination through the agency of insects	Rose, Jasmine, <i>Cestrum</i> , <i>Salvia</i> , Lotus, water hyacinth, water lily, etc.
<b>Ornithophily</b>		Pollination by birds	<i>Bombax</i> , <i>Callistemon</i> (Bottle Brush), <i>Butea</i> , etc.
<b>Chiropterophily</b>		Pollination carried out by bats	<i>Anthocephalus</i> , <i>Adansonia</i> , <i>Kigelia</i> .

**Caution**

Some species of *Potamogeton* are entomophilous, anemophilous or hydrophilous.

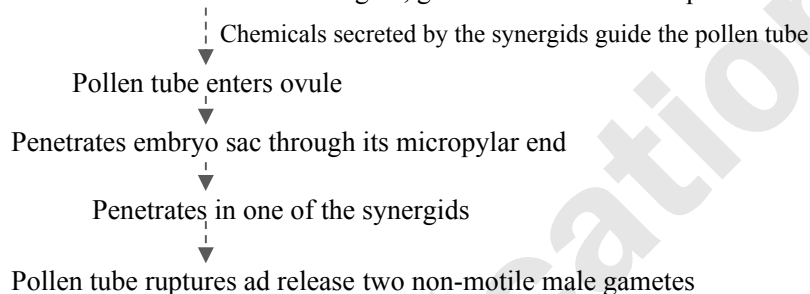


➤ **Outbreeding Devices (Contrivances):**

<b>Unisexuality (dioecism)</b>	Plant bears either male or female flowers.	
<b>Dichogamy</b>	<b>Protandry</b>	Anthers mature first, but the stigma of the same flower is not receptive at that time.
	<b>Protogyny</b>	Stigma of carpel matures earlier than anthers of the same flower.
<b>Prepotency</b>	Pollen grains of other flowers germinate rapidly over the stigma than the pollen grains from the same flower.	
<b>Heterostyly (heteromorphy)</b>	Stigmas and anthers are placed at different levels	
<b>Herkogamy</b>	Natural physical barrier is present between two sex organs and avoid contact of pollen with stigma of same flower.	
<b>Self-incompatibility</b>	Genetic mechanism due to which the germination of pollen on stigma of the same flower is inhibited.	

➤ **Double Fertilization:**

Pollen grain reaches the surface of the stigma, germinates and forms a pollen tube.



**Syngamy:** Male Gamete(n) + Female Gamete(n) = Diploid Zygote (2n)

**Tripe Fusion:** Male Gamete(n) + Secondary Nucleus(2n) = Triploid Primary Endosperm Nucleus (3n)

Students can scan the given Q. R. Code in *Quill - The Padhai App* to get information about Double fertilization.



➤ **Development of endosperm:**

Type of endosperm	Formation of endosperm	Examples
<b>Nuclear Type (most common type)</b>	Primary endosperm nucleus repeatedly divides mitotically without wall formation ↓ Formation of large number of free nuclei ↓ A big central vacuole appears in the centre of cell which pushes the nuclei towards the periphery. ↓ Wall formation occurs between the nuclei ↓ Formation of multicellular endosperm	Wheat, sunflower and coconut (cell wall formation remains incomplete) Coconut has multicellular endosperm in the outer part and free nuclear as well as vacuolated endosperm in the centre.
<b>Cellular Type</b>	Primary endosperm nucleus repeatedly divides mitotically ↓ Wall formation	<i>Balsam, Petunia, Adoxa</i> , etc.
<b>Helobial Type</b>	Primary endosperm nucleus divides mitotically ↓ Formation of transverse wall, which divides the cell unequally. ↓ Smaller cell is called chalazal cell and larger cell is the micropylar cell. ↓ Nuclei in each cell divide by free nuclear divisions ↓ Walls develop between nuclei in micropylar chamber	<i>Asphodelus</i>



➤ **Development of embryo:**

<b>Embryo develops at</b>	Micropylar end of embryo sac where zygote is present.
<b>Stages of embryo development</b>	Zygote → proembryo → globular → heart-shaped → mature embryo.
<b>Embryo consists of</b>	Embryonal axis and two cotyledons: <b>Epicotyl</b> → Terminates with plumule <b>Hypocotyl</b> → Terminates in radicle

➤ **Post fertilization changes:**

Sr. No.	Pre fertilization structure	Post fertilization structure
1.	Ovule (megasporangium)	Seed
2.	Ovary (carpel)	Fruit
3.	Secondary nucleus	Endosperm
4.	Outer integument	Testa (outer seed coat)
5.	Inner integument	Tegmen (inner seed coat)
6.	Micropyle	Opening in the seed

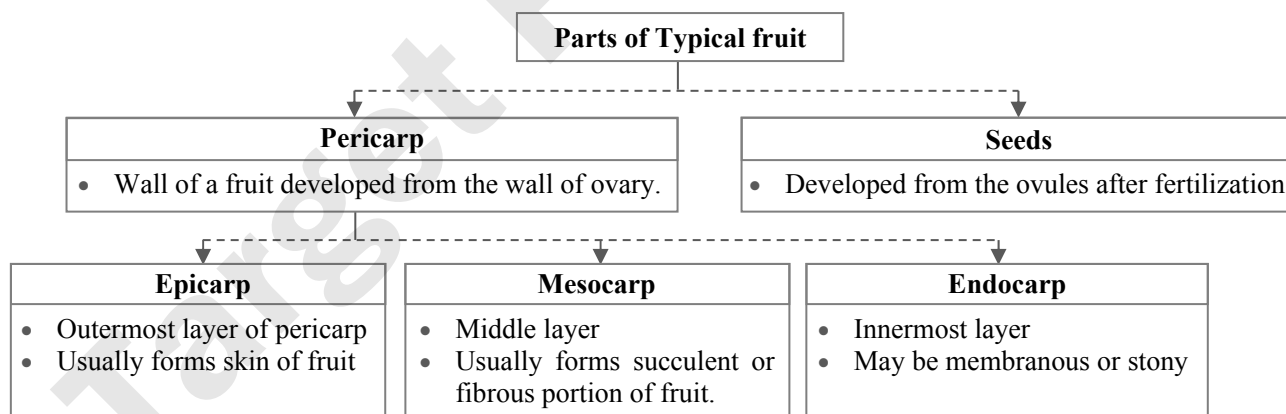
➤ **Depending upon presence and absence of endosperm, seeds are of two types:**

Endospermic or albuminous seeds	Non-endospermic or ex-albuminous seeds
These seeds possess endosperm.	These seeds do not have endosperm.
Generally, monocot seeds are endospermic. In some seeds (e.g. black pepper, beet), remnants of nucellus are persistent (perisperm).	Generally, dicot seeds are non-endospermic.
E.g. Maize, rice, castor, wheat, barley, etc.	E.g. Pea, beans, groundnut, mustard, etc.

**Caution**

Though castor is a dicot seed, it is endospermic.

➤ **Development of fruit:** A fruit is regarded as a mature or ripened ovary.



➤ **Apomixis:**

<b>Characteristics</b>		<ul style="list-style-type: none"> <li>• Formation of embryo(s) through asexual reproduction without gamete formation and fertilization</li> <li>• There is no meiosis and syngamy.</li> <li>• Embryo develops in the ovule and ovule develops to form seed.</li> </ul>
<b>Types</b>	<b>Apogamy</b>	A gametophyte organ or cell produces embryo like structure without fertilization
	<b>Apospory</b>	Sporophyte (2n) cell produces a gametophyte (2n) without undergoing meiosis.





Categories	Recurrent apomixis	<ul style="list-style-type: none"> <li>• <b>Diplospory:</b> The unreduced embryo sac is derived from the megaspore mother cell (2n).</li> <li>• <b>Apospory:</b> The nucellar cells give rise to apomictic embryo sac.</li> </ul>
	Non-recurrent apomixis	The embryo arises either from the egg by parthenogenesis or from some other haploid cells of gametophyte through <b>apogamy</b> . Plants produced are generally sterile
	Adventive Embryony	Embryos may develop from somatic nucellus or integuments along with normal zygotic embryo. It gives rise <b>polyembryony</b> .

**Caution**

- Apomixis** – Formation of seeds without fertilization.  
**Parthenocarp** – Formation of seedless fruits without fertilization.

➤ **Polyembryony:** It is the presence of more than one embryo in a seed.

<b>Adventive polyembryony</b>	An embryo develops directly from the diploid cell of nucellus and integuments.
<b>Cleavage polyembryony</b>	Zygote proembryo sometimes divides (cleaves) into many parts or units. Each unit then develop into an embryo.

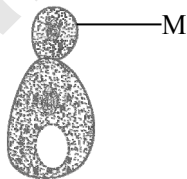
**Classical Thinking**

### 1.1 Asexual Reproduction

- Which of the following term is used to describe morphologically and genetically identical individuals produced by asexual reproduction?  
 (A) Microspores (B) Clones  
 (C) Embryos (D) Megaspores

- The most common type of asexual reproduction in filamentous algae is  
 (A) binary fission (B) budding  
 (C) fragmentation (D) sporulation

- Identify the asexual reproductive structure 'M' in the following diagram.



- (A) Zoospore (B) Bud  
 (C) Gemmule (D) Conidium

- A type of asexual reproduction in a unicellular organism in which parent cell divides to produce two equal cells which develop into two new individuals is called  
 (A) budding (B) binary fission  
 (C) sporulation (D) fragmentation

- Which of the following organisms show binary fission mode of reproduction?

- (A) Hydra, Yeast  
 (B) *Penicillium*, VAM  
 (C) *Paramecium*, *Amoeba*  
 (D) *Chlamydomonas*, sponges

- Penicillium* produce non-motile spores called  
 (A) gemmae (B) conidia  
 (C) fragments (D) bud

- Gemmae formation is commonly seen in  
 (A) *Amoeba* (B) *Paramecium*  
 (C) Sponges (D) Algae

- The asexual reproduction in angiosperm occurs naturally through vegetative parts such as root, stem, leaf or buds. Such type of reproduction is called

- (A) vegetative propagation  
 (B) fragmentation  
 (C) syngamy  
 (D) binary fission

- Stock and scion are used in

- (A) cutting  
 (B) grafting  
 (C) layering  
 (D) micropropagation



10. An artificial method which involves joining the parts of two different plants in such a way that they unite and continue their growth as one plant is called  
(A) grafting  
(B) fragmentation  
(C) cutting  
(D) micropropagation
11. A technique of grafting in which a single bud with a small part of bark and living tissue is grafted on the particular stock is called  
(A) cutting (B) bud grafting  
(C) cloning (D) stocking

### 1.2 Sexual Reproduction

1. Which of the following is the initial stage of the sporophyte?  
(A) Haploid zygote  
(B) Diploid zygote  
(C) Haploid microspores  
(D) Haploid megaspores
2. From the following identify the correct arrangement of floral whorls from outer to inner side in a flower.  
(A) calyx, gynoecium, androecium, corolla  
(B) calyx, corolla, androecium, gynoecium  
(C) corolla, calyx, androecium, gynoecium  
(D) gynoecium, androecium, corolla, calyx
3. Individual members of androecium are called as  
(A) stamens (B) filaments  
(C) style (D) stigma
4. Fertile part of a stamen is  
(A) filament (B) anther  
(C) connective (D) both (B) and (C)
5. Two anther lobes are connected to each other by  
(A) tapetum (B) pollen sacs  
(C) connective (D) endothecium
6. Each monothealous anther contains \_\_\_\_\_ pollen sac/s.  
(A) three (B) four  
(C) two (D) one
7. Ditheous anther is  
(A) monosporangiate (B) bisporangiate  
(C) trisporangiate (D) tetrasporangiate
8. \_\_\_\_\_ is the outermost layer of anther which is protective in function.  
(A) Epidermis (B) Endothecium  
(C) Tapetum (D) Pollen sac
9. Endothecium layer of anther lobes is present  
(A) outside the epidermis  
(B) inner to epidermis  
(C) in the innermost region  
(D) in the middle region

10. Generally in the wall of the anther lobes, how many middle layers are present?  
(A) Seven to eight (B) One to two  
(C) Ten to twelve (D) Nine to ten
11. \_\_\_\_\_ is the inner most nutritive layer of anther wall.  
(A) Tapetum (B) Endothecium  
(C) Middle layer (D) Epidermis
12. In an immature anther, inner to the tapetum, the microsporangium contains a compact mass of  
(A) haploid sporogenous tissue  
(B) diploid sporogenous tissue  
(C) triploid sporogenous tissue  
(D) tetraploid sporogenous tissue

### 1.3 Microsporogenesis

1. Microsporogenesis is the formation of \_\_\_\_\_.  
(A) pollen sac (B) anther  
(C) pollen grains (D) pollen tube
2. Microsporogenesis takes place inside  
(A) pollen grain (B) microsporangia  
(C) endothecium (D) tapetum
3. Meiosis can be observed in  
(A) cells of middle layer  
(B) microspore mother cells  
(C) microspores  
(D) anther wall
4. Each pollen grain is  
(A) multicellular, binucleate, spherical structure  
(B) unicellular, uninucleate, spherical or oval, haploid structure  
(C) multicellular, uninucleate, oval, diploid structure  
(D) unicellular, binucleate, spherical, haploid structure.
5. The double layer wall of pollen grain is called  
(A) exine (B) intine  
(C) sporoderm (D) epiderm
6. The thick, highly resistant outer layer of pollen wall is called  
(A) exine (B) intine  
(C) endothecium (D) tapetum
7. Exine is interrupted at one or more places, called as  
(A) megaspore (B) germ pore  
(C) microspore (D) tube pore
8. The intine of a pollen grain is made up of  
(A) cellulose and pectin  
(B) lipid and protein  
(C) pectin and lignin  
(D) lignin and cutin



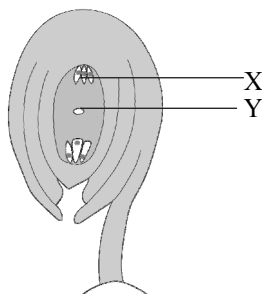
9. Which of the following has proved helpful in preserving pollen as fossils?  
(A) Oil content  
(B) Cellulosic intine  
(C) Pollenkitt  
(D) Sporopollenin
10. The development of male gametophyte is  
(A) exosporic only  
(B) endosporic only  
(C) both exosporic and endosporic  
(D) either exosporic or endosporic
11. Before pollination, protoplast of pollen grain undergoes \_\_\_\_\_ to form two unequal cells.  
(A) mitosis  
(B) meiosis  
(C) both mitosis and meiosis  
(D) none of these
12. In the pollen grain before pollination, the smaller cell formed after mitotic division is called  
(A) tube cell (B) generative cell  
(C) germ cell (D) stalk cell
13. Larger cell of pollen grain formed before pollination is called  
(A) generative cell (B) vegetative cell  
(C) prothialial cell (D) stalk cell
14. Generative cell of a microspore undergoes which type of division?  
(A) Mitosis (B) Meiosis  
(C) Endomitosis (D) Budding
15. Male gametes are formed from  
(A) stalk cell (B) tube cell  
(C) prothialial cell (D) generative cell
16. In most of the angiosperms, pollen grains are released at  
(A) 4-celled stage (B) 2-celled stage  
(C) 3-celled stage (D) pollen tube stage
17. 3-celled stage of the male gametophyte representing fully formed mature male gametophyte, is reached  
(A) before pollination  
(B) after pollination  
(C) during fertilization  
(D) after fertilization
18. Pollen tube is formed from  
(A) pollen wall (B) callose layer  
(C) exine (D) intine
19. Generally, in a pollen tube, \_\_\_\_\_ moves to the tip of the tube.  
(A) generative nucleus  
(B) tube nucleus  
(C) male gametes  
(D) stalk cell

#### 1.4 Structure of Anatropous ovule

1. The ovule of an angiosperm is technically equivalent to  
(A) megaspore  
(B) megasporangium  
(C) megasporophyll  
(D) megaspore mother cell
2. Flower in which gynoecium possesses many free carpels is called as  
(A) Apocarpous (B) Uniovulate  
(C) Syncarpous (D) Multiovulate
3. Which tissue of the ovary attaches the funiculus to an ovule in plants?  
(A) placenta (B) exine  
(C) nucellus (D) sporoderm
4. A type of ovule, in which micropyle is directed downwards and is present adjacent to the funiculus is called  
(A) anatropous (B) campylotropous  
(C) circinotropous (D) amphitropous
5. Stalk of ovule is called  
(A) pedicel (B) peduncle  
(C) funicle (D) petiole
6. Nucellus consists of  
(A) parenchyma (B) collenchyma  
(C) sclerenchyma (D) perisperm
7. The base of the ovule is called  
(A) chalaza (B) raphae  
(C) micropyle (D) placenta
8. Protective covering of nucellus which develops from the chalazal part of nucellus is called  
(A) integuments (B) embryo sac  
(C) micropyle (D) chalaza
9. The narrow opening of integuments at the terminal end of nucellus is called  
(A) funicle (B) embryo sac  
(C) micropyle (D) chalaza
10. In a mature ovule, nucellus shows the presence of an oval shaped, haploid structure at micropylar end called  
(A) embryo sac (B) chalaza  
(C) funicle (D) nucellus
11. In an anatropous ovule, antipodal cells are present towards the  
(A) micropylar region  
(B) chalazal region  
(C) egg  
(D) central cell



12. Identify labels 'X' and 'Y' in the given diagram of an anatropous ovule.



- (A) X- Egg; Y- Male gamete  
(B) X- Synergid; Y- Egg cell  
(C) X- Antipodals; Y-Secondary nucleus  
(D) X- Nucellus; Y- Male gamete
13. Integument  
(A) gives protection to nucellus and embryo sac  
(B) after fertilization converted into seed coats  
(C) provides nutrition to the embryo sac  
(D) both (A) and (B)
14. Tegmen develops from  
(A) outer integuments  
(B) inner integuments  
(C) chalaza  
(D) perisperm
15. \_\_\_\_\_ forms the passage for the entry of pollen tube in ovule during fertilization.  
(A) Micropyle (B) Integuments  
(C) Nucellus (D) Egg Apparatus
16. \_\_\_\_\_ in the egg apparatus play supportive role and degenerate after fertilization.  
(A) Antipodals (B) Polar nuclei  
(C) Synergids (D) Nucellus

### 1.5 Megasporogenesis

1. Formation of megaspores is called as  
(A) microsporogenesis  
(B) megasporogenesis  
(C) porogamy  
(D) chalazogamy
2. The first cell of female gametophyte is  
(A) megaspore  
(B) microspore  
(C) megaspore mother cell  
(D) microspore mother cell
3. Where does meiosis occur in an ovule?  
(A) Megaspore mother cell  
(B) Integument  
(C) Megaspore  
(D) Archosporium
4. In angiosperms, the arrangement of megaspores in a tetrad is  
(A) decussate (B) tetrahedral  
(C) linear (D) isobilateral

5. The 3-celled egg apparatus at the micropylar end comprises of  
(A) egg cell and male gamete  
(B) synergids and polar bodies  
(C) egg and synergids  
(D) egg and antipodals
6. Synergids show hair like projection called as  
(A) antipodal  
(B) filiform apparatus  
(C) tegmen  
(D) funicle
7. The female gametophyte (*Polygonum* type) at the time of fertilization is  
(A) 4-nucleated and 4-celled  
(B) 7-nucleated and 8-celled  
(C) 8-nucleated and 7-celled  
(D) 8-nucleated and 8-celled

### 1.6 Pollination

1. The process of transfer of pollen grains from anther to the stigma of flower is called  
(A) fertilization (B) pollination  
(C) crossing over (D) transformation
2. Self-pollination means  
(A) occurrence of male and female sex organs in the same flower.  
(B) germination of pollens within the anther.  
(C) transfer of pollens from anther to the stigma within same flower.  
(D) transfer of pollens from anther of a flower to the stigma of another flower produced on different plant.
3. Pollination between different flowers on the same plant is  
(A) xenogamy (B) anemophily  
(C) geitonogamy (D) cleistogamy
4. The transfer of pollen grains from anther of a flower to the stigma of another flower produced on a different plant belonging to the same species is called  
(A) autogamy (B) geitonogamy  
(C) xenogamy (D) syngamy
5. Which of the following are abiotic agents of pollination?  
(A) Wind, water (B) Insects, birds  
(C) Bees, bats (D) both (B) and (C)
6. The transfer of pollen grains through wind is described as  
(A) hydrophily (B) anemophily  
(C) entomophily (D) ornithophily



7. Anemophilous flowers are  
 (A) small, inconspicuous without bright colours, fragrance and nectar.  
 (B) large with bright colours and pleasant fragrance.  
 (C) large with thick and fleshy floral whorls.  
 (D) large and stout.
8. Largest amount of pollen is produced by plants which show pollination by  
 (A) birds (B) animal  
 (C) wind (D) water
9. Which of the following characteristic is a wind pollinated flower likely to have?  
 (A) Large coloured flowers  
 (B) Fragrance  
 (C) Feathery stigmas  
 (D) Heavy spiny pollen
10. Stamens with long filaments and versatile, exposed anthers are seen in  
 (A) hydrophilous flowers  
 (B) entomophilous flowers  
 (C) anemophilous flowers  
 (D) ornithophilous flowers
11. Which of the following is NOT an anemophilous plant?  
 (A) Wheat (B) Maize  
 (C) Barley (D) *Ceratophyllum*
12. The transfer of pollen grains through the agency of water is called  
 (A) anemophily (B) entomophily  
 (C) hydrophily (D) ornithophily
13. Adaptation shown by pollen grain by hydrophilous flower is  
 (A) hairy exine of pollen grains  
 (B) mucilage coat on pollen grains  
 (C) heavy weight pollen grains  
 (D) winged pollen grains
14. Which of the following floral adaptations are adapted by hydrophilous flowers?  
 (A) Flowers are small and inconspicuous.  
 (B) Flowers are without fragrance and nectar.  
 (C) Perianth and other floral parts are unwettable.  
 (D) All of the above
15. Pollination taking place below the surface of water in hydrophytes bearing submerged female flowers is called  
 (A) hypohydrophily (B) epihydrophily  
 (C) anemophily (D) entomophily
16. When pollination occurs on the surface of water it is called  
 (A) hypohydrophily (B) epihydrophily  
 (C) anemophily (D) ornithophily
17. \_\_\_\_\_ flowers produce ribbon-like pollen grains without exine.  
 (A) Anemophilous  
 (B) Entomophilous  
 (C) Ornithophilous  
 (D) Hypohydrophilous
18. In *Ceratophyllum*, pollination is  
 (A) hydrophilous (B) chiropterophilous  
 (C) entomophilous (D) anemophilous
19. In *Vallisneria*, pollination occurs  
 (A) on surface of water  
 (B) below surface of water  
 (C) through wind  
 (D) deep in water
20. Pollination through the agency of insects is known as  
 (A) entomophily (B) ornithophily  
 (C) hydrophily (D) anemophily
21. Attractants and rewards are required for  
 (A) anemophily (B) entomophily  
 (C) hydrophily (D) cleistogamy
22. Bright coloured flower is an adaptation for  
 (A) zoophily (B) hydrophily  
 (C) entomophily (D) anemophily
23. In Rose, Jasmine and *cestrum* pollination is carried out by  
 (A) air (B) water  
 (C) insects (D) birds
24. Bird pollination is  
 (A) entomophily (B) anemophily  
 (C) hydrophily (D) ornithophily
25. Find the odd pair from the following.  
 (A) Anemophily – wind  
 (B) Hydrophily – water  
 (C) Ornithophily – insect  
 (D) Chiropterophily – bat
26. Which of the following is/are an ornithophilous plant/s?  
 (A) *Bombax*  
 (B) *Callistemon* (Bottle Brush)  
 (C) *Butea*  
 (D) All of these
27. Chiropterophily is the pollination carried out by  
 (A) insect (B) bat  
 (C) birds (D) animals
28. \_\_\_\_\_ plants are nocturnal and open their flower during night.  
 (A) Chiropterophilous (B) Entomophilous  
 (C) Ornithophilous (D) Hydrophilous
29. Which of the following involves comparatively greater wastage of pollen?  
 (A) Ornithophily (B) Anemophily  
 (C) Entomophily (D) Chiropterophily



### 1.7 Outbreeding Devices (contrivances)

- Which of the following is/are outbreeding device/s that prevent/s self-pollination?  
(A) Unisexuality (B) Protogyny  
(C) Protandry (D) All of these
- Protogyny is a condition in which  
(A) gynoecium matures earlier than the androecium.  
(B) androecium matures earlier than the gynoecium.  
(C) both androecium and gynoecium mature at the same time.  
(D) gynoecium remains sterile and fruit formation does not occur.
- When the anthers mature earlier than the stigma in the same flower, the condition is known as  
(A) herkogamy (B) protandry  
(C) heterostyly (D) dichogamy
- In primrose, there are two or three types of flowers in which stigmas and anthers are placed at different levels, this condition is called  
(A) protogyny (B) dichogamy  
(C) heterostyly (D) herkogamy
- A genetic mechanism due to which the germination of pollen on stigma of the same flower is inhibited is called  
(A) self-sterility  
(B) heterostyly  
(C) self-incompatibility  
(D) both (A) and (C)

### 1.8 Pollen-Pistil Interaction

- Events from deposition of pollen grain on the stigma to the entry of pollen tube in the ovule are called  
(A) pollination  
(B) fertilization  
(C) pollen-pistil interaction  
(D) self-incompatibility
- In the process of pollination in angiosperms, the receptive part in the flower receives  
(A) male gametes (B) pollen tube  
(C) pollen grains (D) insects
- After a successful germination, the tip of the pollen tube enters in one of the \_\_\_\_\_ and then ruptures to release the contents.  
(A) synergids (B) antipodals  
(C) eggs (D) polar nuclei
- \_\_\_\_\_ induces pollen germination and tube growth *in vitro*.  
(A) Conc. H<sub>2</sub>SO<sub>4</sub> (B) Sucrose  
(C) Abscisic acid (D) Dilute HCl

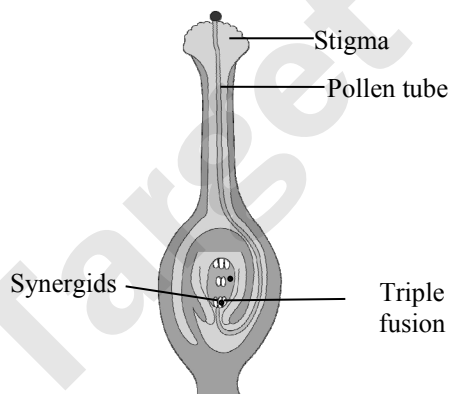
- In \_\_\_\_\_ only desired pollen grains are hand pollinated and used for fertilization.  
(A) hybridization  
(B) self-incompatibility  
(C) vegetative propagation  
(D) asexual reproduction

### 1.9 Double Fertilization

- Double fertilization is  
(A) Fusion of two male gametes with one egg  
(B) Fusion of one male gamete with two polar nuclei  
(C) Fusion of two male gametes of a pollen tube with two different eggs  
(D) Syngamy and triple fusion
- Double fertilization is exhibited by  
(A) Gymnosperms (B) Algae  
(C) Angiosperms (D) Fungi
- When pollen tube enters through micropyle, it is known as  
(A) mesogamy (B) siphonogamy  
(C) porogamy (D) chalazogamy
- Complete the given analogy by selecting the correct option.  
Entry of pollen tube through  
Chalaza: Chalazogamy :: Integuments: \_\_\_\_\_  
(A) Syngamy (B) Porogamy  
(C) Siphonogamy (D) Mesogamy
- A pollen tube always enters the embryo sac near the  
(A) egg apparatus (B) antipodals  
(C) secondary nucleus (D) chalaza
- The fertilization process in which non-motile male gametes are transported upto the female gamete through a pollen tube is called  
(A) syngamy (B) siphonogamy  
(C) chalazogamy (D) mesogamy
- Syngamy means  
(A) fusion of similar spores  
(B) fusion of dissimilar spores  
(C) fusion of cytoplasm  
(D) fusion of gametes
- Syngamy results in  
(A) diploid zygote  
(B) triploid zygote  
(C) diploid endosperm  
(D) triploid endosperm
- In double fertilization, the first male gamete fuses with egg and second male gamete fuses with  
(A) PEN  
(B) secondary nucleus  
(C) zygote  
(D) antipodal cells



10. Triple fusion means, fusion of  
 (A) two antipodals with male gametes  
 (B) two eggs with a male gamete  
 (C) two male gametes with one egg  
 (D) one male gamete with secondary nucleus
11. In angiosperm, triple fusion is necessary for the formation of  
 (A) seed coat (B) fruit wall  
 (C) embryo (D) endosperm
12. In angiosperms, triple fusion results in the formation of  
 (A) primary endosperm nucleus  
 (B) zygotic nucleus  
 (C) secondary nucleus  
 (D) polar nucleus
13. Real function of the 'endosperm' is to  
 (A) supply nutrition to the growing embryo  
 (B) form integuments of ovule  
 (C) form funicle of ovule  
 (D) none of these
14. Select the INCORRECT statement from the following with respect to double fertilization.  
 (A) Syngamy is a type of generative fertilization.  
 (B) Triple fusion is a type of vegetative fertilization.  
 (C) The growth of pollen tube is guided by the chemicals secreted by the antipodal cells.  
 (D) The zygote develops into an embryo.
15. Identify the INCORRECT label in the given figure of double fertilization.



- (A) Stigma (B) Triple fusion  
 (C) Pollen tube (D) Synergids

### 1.10 Development of Endosperm

1. The primary endosperm nucleus undergoes free nuclear division or karyokinesis in  
 (A) nuclear endosperm  
 (B) cellular endosperm  
 (C) helobial endosperm  
 (D) none of these

2. In cellular endosperm,  
 (A) the primary endosperm nucleus undergoes karyokinesis only.  
 (B) the primary endosperm nucleus undergoes nuclear divisions which is immediately followed by cytokinesis.  
 (C) the first division of primary endosperm nucleus is followed by incomplete wall formation.  
 (D) the central cell is divided into a large micropylar and a small chalazal chamber.
3. Which of the following is the characteristic feature of helobial endosperm?  
 (A) The first division of primary endosperm nucleus is followed by a transverse wall formation.  
 (B) The central cell is divided into a large micropylar and a small chalazal chamber.  
 (C) It is common in Helobiales series of monocots.  
 (D) All of the above
4. In coconut, the endosperm in the centre is  
 (A) diploid (B) multicellular  
 (C) free nuclear (D) helobial
5. Which of the following plant shows cellular type of endosperm?  
 (A) Wheat (B) *Petunia*  
 (C) *Asphodelus* (D) Sunflower

### 1.11 Development of Embryo

1. The process of development of zygote into an embryo is called  
 (A) embryogenesis (B) karyokinesis  
 (C) sporogenesis (D) parthenogenesis
2. During the development of embryo, the zygote forms a wall around itself and is converted into  
 (A) oosphere (B) oospore  
 (C) oogonia (D) oocyte
3. The oospore during embryonic development divides  
 (A) transversely (B) horizontally  
 (C) diagonally (D) vertically
4. The 2-celled stage of embryo is called as  
 (A) suspensor (B) embryonal cell  
 (C) proembryo (D) plumule
5. Role of suspensor is  
 (A) to transport water to the embryo  
 (B) helping in cell division  
 (C) pushing the embryo in endosperm  
 (D) all of these



6. During embryo development, the embryonal initial cell 2-celled pro-embryo undergoes a transverse and two vertical divisions at right angles to each other to form  
(A) tetrad stage (B) octant stage  
(C) triplet stage (D) none of these
7. The first cell of the suspensor towards the micropylar end becomes swollen and function as a  
(A) hypocotyl (B) haustorium  
(C) radicle (D) plumule
8. The lowermost cell of suspensor is known as  
(A) hypocotyl (B) haustorium  
(C) hypophysis (D) scutellum
9. The single shield shaped cotyledon in monocot is called as  
(A) haustorium (B) perisperm  
(C) coleoptile (D) scutellum
10. Fully developed embryo ultimately becomes  
(A) globular shaped  
(B) cordate shaped  
(C) horse – shoe shaped  
(D) kidney shaped
6. What is the function of micropyle in seed?  
(A) Entry of water during germination  
(B) Acts as a first photosynthetic organ  
(C) Entry of oxygen during germination  
(D) Both (A) and (C)
7. A true fruit is developed from \_\_\_\_\_.  
(A) ovule  
(B) thalamus and ovary  
(C) ovary only  
(D) calyx and ovary
8. At the time of fruit formation, ovary wall changes into  
(A) endocarp (B) mesocarp  
(C) epicarp (D) pericarp
9. All the given below are significance of seed and fruit formation, except  
(A) Seeds and fruits develop special devices for their dispersal and thus help in the distribution of the species.  
(B) Fruits protect the seeds in immature condition.  
(C) Fruits derive nutrition from developing seeds.  
(D) Seeds serve as important propagating organs (units) of plant.

### 1.12 Seed and Fruit development

1. Which of the following shows post fertilization changes incorrectly?  
(A) Ovary – Fruit  
(B) Ovule – Seed  
(C) Integuments – Perisperm  
(D) Zygote – Embryo
2. Outer integument and inner integument of an ovule changes into  
(A) seed and fruit respectively  
(B) testa and tegmen respectively  
(C) mesocarp and endocarp respectively  
(D) seed and flower respectively
3. Persistent nucellus in the seed is known as:  
(A) Hilum (B) Perisperm  
(C) Chalaza (D) Tegmen
4. Ex-albuminous seeds differ from albuminous seeds in  
(A) not having endosperm  
(B) not having embryo sac  
(C) having endosperm  
(D) having embryo sac
5. Which of the following are non-endospermic seeds?  
(A) Castor, sunflower  
(B) Coconut, maize  
(C) Wheat, bajra  
(D) Pea, bean

10. \_\_\_\_\_ is a temporary state of metabolic arrest that facilitates the survival of organisms during adverse environmental conditions.  
(A) Dormancy (B) Viability  
(C) Dispersal (D) Parthenocarpy
11. The functional ability of seeds to germinate after considerable dormancy period is called  
(A) viability (B) dispersal  
(C) apomixis (D) polyembryony

### 1.13 Apomixis

1. Formation of seeds without fertilization is called  
(A) amphimixis (B) parthenocarpy  
(C) polyembryony (D) apomixis
2. When diploid sporophyte cell produces a diploid gametophyte without undergoing meiosis is called  
(A) apogamy  
(B) autogamy  
(C) apospory  
(D) adventive polyembryony
3. Read the given statements with respect to non-recurrent apomixis.  
i. In this, megaspore mother cell undergoes usual meiotic division and a haploid embryo sac is formed.  
ii. Plants produced by this method are generally sterile and do not reproduce sexually.





The correct statement/s is/are

- (A) only i (B) only ii  
(C) both i and ii (D) neither i nor ii

4. Adventive embryony can be observed in  
(A) Orange (B) Mango  
(C) Lemon (D) All of these

#### 1.14 Parthenocarpy

1. The development of fruit, without fertilization, is called  
(A) fruit culture (B) cell division  
(C) parthenocarpy (D) parthenogenesis
2. An example of a naturally occurring parthenocarpic fruit is  
(A) Guava (B) Mango  
(C) Banana (D) Apple
3. In parthenocarpic plants, the placental tissue in the unfertilized ovary produces \_\_\_\_\_ which is responsible for enlargement of ovary into fruit.  
(A) auxin IAA (Indole-3 Acetic Acid)  
(B) Cytokinins  
(C) ABA  
(D) Ethylene
4. Parthenocarpy can be induced artificially by  
(A) spraying of gibberellins  
(B) delaying pollination

- (C) use of foreign pollens  
(D) all of these

#### 1.15 Polyembryony

1. Presence of many embryos (Polyembryony) is a characteristic feature of  
(A) *Citrus* (B) Pineapple  
(C) Banana (D) None of these
2. In \_\_\_\_\_, an embryo develop directly from the diploid cell of nucellus and integuments as in *Citrus*.  
(A) adventive parthenogenesis  
(B) adventive polyembryony  
(C) cleavage polyembryony  
(D) cleavage parthenogenesis
3. What is cleavage polyembryony?  
(A) An embryo develop directly from the diploid cell of nucellus and integuments.  
(B) Fruit is developed without the process of fertilization.  
(C) Zygote proembryo divides into many parts or units and each unit then develops into an embryo.  
(D) Megaspore mother cell undergoes usual meiotic division to form a diploid embryo sac.

### MHT-CET Previous Years' Questions

1. Bright colored flower is an adaptation for [2004]  
(A) Zoophily (B) Hydrophily  
(C) Entomophily (D) Anemophily
2. When pollen tube enters the ovule through the micropyle it is known as [2004]  
(A) Syngamy (B) Porogamy  
(C) Chalazogamy (D) Misogamy
3. Syngamy results in [2006]  
(A) Diploid zygote  
(B) Triploid zygote  
(C) Diploid endosperm  
(D) Triploid endosperm
4. Female gametophyte in flowering plants develops after [2007]  
(A) 1 meiosis and 2 mitosis  
(B) 2 meiosis and 2 mitosis  
(C) 1 meiosis and 3 mitosis  
(D) 2 meiosis and 1 mitosis
5. Suspensor is formed from [2008]  
(A) Basal cell (B) Hypophysis  
(C) Terminal cell (D) Haustorium
6. Grafting cannot be done to monocots because they lack [2009]  
(A) Cambium  
(B) Vascular bundle  
(C) Ground tissue  
(D) Parenchymatous tissue
7. Cross pollination does not occur in [2014]  
(A) allogamous flowers  
(B) geitonogamous flowers  
(C) cleistogamous flowers  
(D) chasmogamous flowers
8. An angiospermic male plant with 24 chromosomes in its pollen mother cells is crossed with female plant bearing 24 chromosomes in its root cells. What would be the ploidy of embryo and endosperm respectively formed after this cross? [2014]  
(A) 24 and 48 (B) 24 and 24  
(C) 48 and 72 (D) 24 and 36
9. Which one of the following is NOT a natural method of vegetative propagation? [2015]  
(A) runner (B) foliar buds  
(C) stem tuber (D) grafting



10. Pollen grain develops from \_\_\_\_\_ of anther. [2015]  
(A) epidermis  
(B) endothecium  
(C) tapetum  
(D) sporogenous tissue

11. Considering mode of asexual reproduction, match the Column I with II and select the correct option:

	Column I		Column II
i.	Yeast	a.	fragmentation
ii.	<i>Penicillium</i>	b.	zoospores
iii.	Filamentous algae	c.	budding
iv.	<i>Chlamydomonas</i>	d.	conidia

[2015]

- (A) i – c, ii – d, iii – a, iv – b  
(B) i – b, ii – c, iii – a, iv – d  
(C) i – d, ii – c, iii – b, iv – a  
(D) i – c, ii – b, iii – a, iv – d
12. Environmental biotic factor that helps in pollination is [2015]  
(A) air (B) water  
(C) wind (D) insects
13. Self-pollination which involves two different flowers of the same plant, is called [2015]  
(A) autogamy (B) geitonogamy  
(C) xenogamy (D) hybridization
14. Large stout, nocturnal flowers producing copious nectar and emitting fermenting fruity odour, are the adaptations for [2015]  
(A) Entomophily (B) Ornithophily  
(C) Chiropterophily (D) Anemophily
15. Anemophily is NOT observed in [2015]  
(A) Maize (B) Jowar  
(C) Sugarcane (D) *Salvia*
16. In angiosperms, during development of embryo, the suspensor cells develop from [2015]  
(A) oospore (B) integument  
(C) endosperm (D) cotyledon
17. If there are 1280 microspores in a tetralocular anther, how many microspore mother cells will be there in its each pollen chamber? [2015]  
(A) 80 (B) 160  
(C) 240 (D) 1280
18. Which of the following wall layer of anther shows fibrous thickenings of callose? [2016]  
(A) Epidermis (B) Tapetum  
(C) Middle layer (D) Endothecium
19. The wall of pollen tube is made up of [2016]  
(A) Cellulose and Pectin  
(B) Only sporopollenin  
(C) Lignin and Pectin  
(D) Pectin and Sporopollenin

20. What is the outbreeding device, where the stamens and carpels mature at different times called? [2016]

(A) Monoecy (B) Self sterility  
(C) Dichogamy (D) Heterostyly

21. The CORRECT sequence of events during double fertilization in Angiosperms is [2016]

(A) Triple fusion, syngamy, porogamy  
(B) Syngamy, triple fusion, porogamy  
(C) Porogamy, syngamy, triple fusion  
(D) Syngamy, porogamy, triple fusion

22. In an angiosperm a female plant having  $2n = 24$  is crossed with a male plant having  $2n = 12$ . What will be the chromosome number of the endosperm? [2016]

(A) 12 (B) 18 (C) 24 (D) 30

23. \_\_\_\_\_ is the most convenient and cheap method of artificial vegetative propagation. [2016]

(A) Grafting  
(B) Budding  
(C) Cutting  
(D) Micropropagation

24. Which of the following in embryo sac of angiosperms shows filiform apparatus? [2016]

(A) Antipodals (B) Polar nuclei  
(C) Egg (D) Synergids

25. Which of the following is the first cell of female gametophytic generation in angiosperms? [2016]

(A) Megaspore mother cell  
(B) Microspore mother cell  
(C) Functional megaspore  
(D) Egg cell

26. In angiosperms, megaspores formed after meiosis of megaspore mother cell are arranged in \_\_\_\_\_ [2016]

(A) Isobilateral tetrad (B) Linear tetrad  
(C) Tetrahedral tetrad (D) T-shaped tetrad

27. If the cells of the nucellus in the angiosperm ovule contain 24 chromosomes, what will be the number of chromosomes in the endosperm of a self-pollinated flower? [2017]

(A) 12 (B) 24 (C) 36 (D) 48

28. In some species of family Asteraceae seeds are produced without fertilization. It is called as \_\_\_\_\_ [2017]

(A) apomixis (B) amphimixis  
(C) parthenocarpy (D) vivipary

29. The megasporangium proper of an angiosperm ovule is represented by [2017]

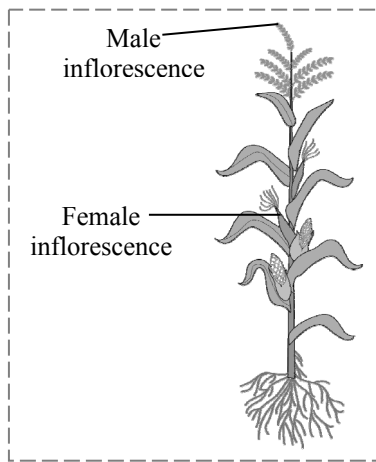
(A) integument (B) funicle  
(C) nucellus (D) micropyle



30. Which one of the following is NOT a disadvantage of self-pollination? [2017]  
 (A) No scope for developing improved varieties  
 (B) Progeny becomes weaker  
 (C) Genetic stability can be maintained  
 (D) Less adaptability to climatic variations
31. Motile zoospores are produced by [2017]  
 (A) *Chlamydomonas* (B) *Penicillium*  
 (C) Bacteria (D) *Amoeba*
32. Which one of the following plants reproduces vegetatively by epiphyllous buds? [2017]  
 (A) Sweet potato (B) Potato  
 (C) Onion (D) *Kalanchoe*
33. Cambium is essential for grafting in plants because [2018]  
 (A) cambia of both stock and scion fuse together  
 (B) cambium produces new leaves  
 (C) cambium produces new roots  
 (D) cambium helps in the production of flowers
34. Which one of the following is NOT true about vegetative propagation? [2018]  
 (A) Easy and cheaper method  
 (B) Rapid propagation  
 (C) Production of genetically similar plants  
 (D) Production of genetically dissimilar plants
35. The exine of pollen grain is made up of [2018]  
 (A) chitin  
 (B) cellulose  
 (C) sporopollenin  
 (D) hemicellulose
36. The development of male gametes in the pollen grains in angiosperms involves \_\_\_\_\_. [2018]  
 (A) only one mitotic division  
 (B) two mitotic divisions  
 (C) both mitotic and meiotic divisions  
 (D) only one meiotic divisions
37. Which one of the following is NOT true about self-pollination? [2018]  
 (A) A sure method  
 (B) Most economic  
 (C) Maintains genetic purity  
 (D) Favors evolution
38. In angiosperms, the fusion of male gamete with the secondary nucleus is considered as "second fertilization" because [2018]  
 (A) it is fusion of two nuclei.  
 (B) secondary nucleus is a sister nucleus of the egg.  
 (C) it takes place in embryo sac.  
 (D) it takes place after pollination.
39. Which character of angiosperms helped in their dominance on earth? [2018]  
 (A) Formation of seeds  
 (B) Formation of endosperm  
 (C) Double fertilization  
 (D) Presence of xylem vessels
40. Double fertilization in angiosperms was first discovered by S.G. Nawaschin in \_\_\_\_\_ plants. [2018]  
 (A) *Lilium* (B) sunflower  
 (C) wheat (D) mango
41. In angiosperms, a male gametophyte is developed from a pollen mother cell by \_\_\_\_\_. [2019]  
 (A) one meiotic and two mitotic divisions  
 (B) two mitotic divisions  
 (C) one mitotic and two meiotic divisions  
 (D) a single meiotic division
42. Progeny resulting from cross pollination are [2019]  
 (A) genetically stable  
 (B) always sterile  
 (C) homozygous and less viable  
 (D) genetically variable
43. Identify the correct sequence of matches with the type of pollination and its characteristics.
- |    |                 |    |                               |
|----|-----------------|----|-------------------------------|
| a. | Ornithophily    | 1. | Nocturnal flower              |
| b. | Entomophily     | 2. | Light pollens                 |
| c. | Chiropterophily | 3. | Funnel shaped corolla         |
| d. | Anemophily      | 4. | Pleasant fragrance and nectar |
- [2019]  
 (A) a-4,b-3,c-1,d-2 (B) a-2,b-1,c-3,d-4  
 (C) a-3,b-4,c-1,d-2 (D) a-3,b-4,c-2,d-1
44. Find out the wrong statement. [2019]  
 (A) Parthenocarpic fruits are generally preferred by consumers.  
 (B) Gibberellins induce parthenocarpy.  
 (C) Parthenocarpic fruits are seedless fruits.  
 (D) Parthenocarpic fruits are developed from fertilized ovary.
45. If the number of chromosomes in an endosperm of seed is 21, what will be the chromosome number in the secondary nucleus? [2019]  
 (A) 7 (B) 28 (C) 14 (D) 21
46. For the formation of 140 angiospermic seeds how many meiotic cell divisions are expected? [2019]  
 (A) 175 (B) 280  
 (C) 560 (D) 240



47. Arrangement of flowers in the given plant favours which type of pollination? [2019]

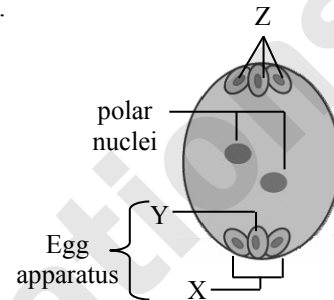


- (A) Omithophilous  
(B) Chiropterophilous  
(C) Anemophilous  
(D) Entomophilous
48. How many pollen grains can be produced from a dithecous tetralocular anther with 75 microspore mother cells in each of its chamber? [2020]  
(A) 1200 (B) 900  
(C) 300 (D) 750
49. During the development of embryo sac, a megaspore mother cell undergoes \_\_\_\_\_ meiosis and \_\_\_\_\_ mitosis respectively. [2020]  
(A) 1, 3 (B) 3, 1  
(C) 1, 4 (D) 4, 1
50. The megasporangium in angiosperms is usually \_\_\_\_\_. [2020]  
(A) unitegmic (B) polytegmic  
(C) tritegmic (D) bitegmic
51. Epihydrophyly is observed in which of the following plants? [2020]  
(A) *Vallisneria* (B) Lotus  
(C) *Ceratophyllum* (D) *Zostera*
52. Match the correct type of pollination in Column II for the flowers in Column I. [2020]

	Column I		Column II
a.	<i>Bombax</i>	i.	Entomophily
b.	<i>Zostera</i>	ii.	Epihydrophyly
c.	<i>Vallisneria</i>	iii.	Hypo-Hydrophyly
d.	<i>Cestrum</i>	iv.	Chiropterophily
e.	<i>Anthocephallus</i>	v.	Ornithophily

- (A) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv), (e)-(v)  
(B) (a)-(iv), (b)-(v), (c)-(i), (d)-(iii), (e)-(ii)  
(C) (a)-(v), (b)-(i), (c)-(ii), (d)-(iii), (e)-(iv)  
(D) (a)-(v), (b)-(iii), (c)-(ii), (d)-(i), (e)-(iv)

53. Generally, embryo sac in angiosperms is \_\_\_\_\_. [2020]  
(A) Bisporic, endosporic, 8 celled and 7 nucleated  
(B) Bisporic, exosporic, 7 celled and 8 nucleated  
(C) Monosporic, endosporic, 7 celled and 8 nucleated  
(D) Monosporic, exosporic, 8 celled and 7 nucleated
54. Identify the correct set of labelling in the given diagram. [2020]



- (A) X - synergids, Y - antipodals, Z - egg  
(B) X-synergids, Y - egg, Z - antipodals  
(C) X-egg, Y - synergids, Z - antipodals  
(D) X-antipodals, Y - egg, Z - synergids
55. The correct sequence of developmental stages of embryo in angiosperms is \_\_\_\_\_. [2020]  
(A) Octant → horse shoe shaped → heart shaped → globular  
(B) Octant → heart shaped → horse shoe shaped → globular  
(C) Globular → octant → heart shaped → horse shoe shaped  
(D) Octant → globular → heart shaped → horse shoe shaped
56. The apical cell of the 2-celled pro-embryo in angiosperms undergoes \_\_\_\_\_ division to form 8-celled octant pro-embryo. [2020]  
(A) Four transverse mitotic  
(B) Four vertical mitotic  
(C) Two meiotic  
(D) One transverse and two vertical mitotic
57. In angiosperms, the embryo sac is \_\_\_\_\_. [2021]  
(A) uninucleate (B) binucleate  
(C) multinucleate (D) enucleate
58. Match the embryonal cell in column - I with their origin given in column - II and choose the correct options given below.

	Column I		Column II
a.	Suspensor initial	i.	Large basal cell of the 2-celled pro-embryo
b.	Embryonal initial	ii.	First cell of the suspensor towards micropylar end.



c.	Haustorium	iii.	Lower most cell of the suspensor
d.	Hypophysis	iv.	Small terminal cell of 2-celled pro-embryo

[2021]

- (A) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)  
 (B) (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)  
 (C) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)  
 (D) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

59. Heterostyly is a contrivance for \_\_\_\_\_: [2021]

- (A) geitonogamy only  
 (B) autogamy only  
 (C) xenogamy only  
 (D) geitonogamy and xenogamy

60. In which of the following plants male flower floats on the surface of water? [2021]

- (A) *Potamogeton* (B) *Zostera*  
 (C) Water lily (D) *Vallisneria*

61. Which one of the following statements is INCORRECT about angiospermic seed/fruit? [2021]

- (A) The micropyle of the ovule persists in the seed.  
 (B) Coconut is a non-endospermic seed.  
 (C) Coconut is a fleshy fruit.  
 (D) Fruit development is triggered by hormones produced by developing seeds.

62. In angiosperms, the embryo is developed at \_\_\_\_\_ of the embryo sac. [2021]

- (A) antipodal side (B) micropylar end  
 (C) chalazal end (D) centre

63. Based on following statements choose the correct option given below.

**Statement - I:** Dormancy is a state of metabolic arrest that facilitates the survival of seeds during unfavourable conditions.

**Statement - II:** Mature and viable seeds do not germinate even in the presence of favourable conditions unless the dormancy period is completed. [2021]

- (A) Both Statement - I and Statement - II are correct.  
 (B) Statement - I is correct but Statement - II is incorrect.  
 (C) Both Statement - I and Statement - II are incorrect.  
 (D) Statement - I is incorrect but Statement - II is correct.

64. Akash went on a field visit and collected some flowers like rice, corn, *Potamogeton*, *Halogaris*, *Salvia* and *Kigellia*. How many anemophilous flowers did he collect? [2021]

- (A) 3 (B) 2 (C) 6 (D) 4

65. Which one of the following favours herkogamy for cross pollination? [2021]

- (A) Barrier between the sex organs.  
 (B) Flowers unisexual.  
 (C) Both the sex organs mature at the same time.  
 (D) Anthers mature before the stigma becomes receptive.

66. Polyembryony was first observed by Leeuwenhoek in the seeds of \_\_\_\_\_. [2021]

- (A) Citrus (B) Mango  
 (C) Orchid (D) Papaya

67. How many of the following statements are true about angiosperms?

- A. The generative cell floats in the cytoplasm of vegetative cell.  
 B. The stalk of ovule is called funiculus.  
 C. Pollen grains are shed at two celled stage.  
 D. Embryo sac is diploid.  
 E. Megaspore mother cell towards chalazal end becomes functional. [2021]

- (A) A, B and C only  
 (B) D and E only  
 (C) A and B only  
 (D) B and C only

68. Which one of the following is unlike other nuclei in the embryo sac of angiosperms regarding ploidy? [2021]

- (A) Male gamete nucleus  
 (B) Egg nucleus  
 (C) Secondary nucleus  
 (D) Antipodal nucleus

69. A big central vacuole develops during the formation of \_\_\_\_\_ type of endosperm [2022]

- (A) Nuclear (B) Helobial  
 (C) Mosaic (D) Cellular

70. Given below are two statements.

**Statement I;** Generally, anther in angiosperms are dithecous having two pollen sacs in each lobe.

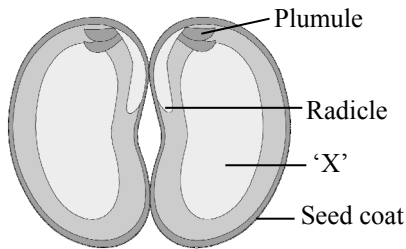
**Statement II:** Each sporangium produces pollens from Sporogenous tissues by the process of sporogenesis.

In light of above statements, select the correct answer from the option given below. [2022]

- (A) Both statement I and statement II are correct.  
 (B) Both statement I and statement II are incorrect.  
 (C) Statement I is correct, and statement II is incorrect.  
 (D) Statement I is incorrect, and statement II is correct.



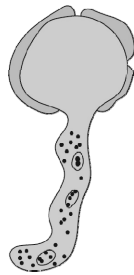
71. Identify the part 'X' marked in the diagram of an open bean seed. [2022]



- (A) Endosperm (B) Cotyledon  
(C) Epicotyl (D) Hypocotyl

72. How many of the following statements are true about the figure given below.

- Germination of pollen grain.
- Motile male gametes.
- Two male gametes and one female gamete.
- Pollen grain without exine.
- Tube nucleus at the tip of pollen tube.



[2022]

- (A) i and v are true (B) ii and iv are true  
(C) i and ii are true (D) ii and iii are true

73. After double fertilization in angiosperms, the products of syngamy and triple fusion are \_\_\_\_\_ and \_\_\_\_\_ respectively. [2022]

- (A) diploid embryo and triploid endosperm  
(B) diploid embryo and diploid endosperm  
(C) triploid embryo and haploid endosperm  
(D) triploid embryo and diploid endosperm

74. Which one of the following shows more than one ovule? [2022]

- (A) Rice (B) Mango  
(C) Tomato (D) Wheat

75. In *Taraxacum*, the unreduced embryo sac is derived from \_\_\_\_\_. [2022]

- (A) haploid nucellus tissue  
(B) diploid microspore mother cell  
(C) diploid megaspore mother cell  
(D) functional megaspore

76. Match the type of pollination given in Column-I with its pollinating agent from Column-II.

	Column-I		Column-II
i.	Ornithophily	a.	Bat
ii.	Entomophily	b.	Wind
iii.	Anemophily	c.	Bird
iv.	Chiropterphily	d.	Insect

[2022]

- (A) i – b, ii – c, iii – d, iv – a  
(B) i – c, ii – a, iii – d, iv – b  
(C) i – d, ii – c, iii – b, iv – a  
(D) i – c, ii – d, iii – b, iv – a

77. Match the plants given in Column-I with their type of endosperm in Column-II. Choose the correct answer from options given below.

	Column-I		Column-II
i.	Coconut	a.	helobial
ii.	<i>Balsam</i>	b.	perisperm
iii.	<i>Asphodelus</i>	c.	nuclear
iv.	Black pepper	d.	Cellular

[2022]

- (A) i – d, ii – c, iii – b, iv – a  
(B) i – a, ii – b, iii – c, iv – d  
(C) i – c, ii – d, iii – a, iv – b  
(D) i – b, ii – v, iii – d, iv – a

78. Embryos develop directly from diploid cells of the nucellus in \_\_\_\_\_. [2022]

- (A) *Citrus* (B) *Cynodon*  
(C) *Mirabilis* (D) *Helianthus*

79. Match the following contrivance from Column-I with its example in Column-II.

	Column-I		Column-II
i.	Protandry	a.	<i>Calotropis</i>
ii.	Prepotency	b.	Tobacco
iii.	Self sterility	c.	Sunflower
iv.	Herkogamy	d.	Apple

[2022]

- (A) i – d, ii – c, iii – b, iv – a  
(B) i – c, ii – d, iii – b, iv – a  
(C) i – b, iii – a, iii – c, iv – d  
(D) i – a, iii – b, iii – c, iv – d

80. In male reproductive whorl of a flower the archesporial cells are formed by \_\_\_\_\_. [2023]

- (A) epidermal cell of anther  
(B) hypodermal cell of anther  
(C) cells of connective  
(D) cells of tapetum

81. A typical anther in most of the angiosperms is \_\_\_\_\_. [2023]

- (A) monothealous, bisporangiate  
(B) monothealous tetrasporangiate  
(C) ditheous, bisporangiate  
(D) ditheous, tetrasporangiate

82. Given below are two statements.

**Statement I:** Self incompatibility is a device that prevents outbreeding.

**Statement II:** Self incompatibility is a genetic mechanism due to which germination of pollen on the stigma of the same flower is inhibited.

In the light of above two statements choose the correct answer from options given below.

[2023]



- (A) Both statement I and statement II are correct.  
 (B) Both statement I and statement II are incorrect  
 (C) Statement I is correct but statement II is incorrect.  
 (D) Statement I is incorrect but statement II is correct.
- 83.** Free nuclear division means [2023]  
 (A) Karyokinesis and cytokinesis occurring simultaneously.  
 (B) Karyokinesis is not followed by cytokinesis immediately.  
 (C) Only cytokinesis  
 (D) Karyokinesis followed by cytokinesis immediately.
- 84.** Given below are two statements regarding Apomixis.  
**Statement I** - Apogamy is a type of apomixis in which gametophytic cell produces embryo like structure without fertilization.  
**Statement II** - Apospory is a process where diploid sporophyte cell produces diploid gametophyte without undergoing meiosis.  
 In light of above statements, select the correct answer from the option given below. [2023]  
 (A) Both statement I and statement II are correct.  
 (B) Both statement I and statement II are incorrect.  
 (C) Statement I is correct and statement II is incorrect.  
 (D) Statement is incorrect and statement II is correct.
- 85.** Stigma and pollen grain represent \_\_\_\_\_. [2023]  
 (A) sporophyte and gametophyte respectively  
 (B) gametophyte and sporophyte respectively  
 (C) gametophyte only  
 (D) sporophyte only
- 86.** If the chromosome number in cells of integuments is 10, then what will be the chromosome number in the synergids, definitive nucleus and antipodal cells in the embryo sac of an angiospermic ovule? [2023]  
 (A) 5, 5, 5 respectively  
 (B) 5, 10, 5 respectively  
 (C) 10, 5, 10 respectively  
 (D) 5, 5, 10 respectively
- 87.** How many pollen mother cells are involved in formation of 8 pollen tetrads? [2023]  
 (A) 4 (B) 8 (C) 16 (D) 32
- 88.** Identify the correct sequence of events of pollen pistil interaction given below.  
 (a) pollen tube grows through the stigma, style and reaches the ovule.  
 (b) Pollen grain lands on the stigma.  
 (c) Pollen germinates to form pollen tube.  
 (d) Pollen tube carrying 2 male gametes enter the ovule.  
 Choose the correct option. [2023]  
 (A)  $b \rightarrow c \rightarrow d \rightarrow a$  (B)  $b \rightarrow c \rightarrow a \rightarrow d$   
 (C)  $b \rightarrow a \rightarrow c \rightarrow d$  (D)  $b \rightarrow d \rightarrow a \rightarrow c$
- 89.** In angiosperms, the generative cell inside the pollen grain divides to form \_\_\_\_\_. [2023]  
 (A) one male gamete  
 (B) two male gametes  
 (C) four male gametes  
 (D) suspensor cell and one male gamete
- 90.** Match the category of apomixis in Column I with its example in Column II and choose the correct option. [2023]
- |      | Column I               |    | Column II        |
|------|------------------------|----|------------------|
| i.   | Diplospory             | a. | Mango            |
| ii.  | Apospory               | b. | <i>Nicotiana</i> |
| iii. | Adventive polyembryony | c. | <i>Taraxacum</i> |
| iv.  | Non-recurrent apomixis | d. | Citrus           |
- (A) i - c, ii - a, iii - b, iv - d  
 (B) i - c, ii - a, iii - d, iv - b  
 (C) i - c, ii - b, iii - a, iv - d  
 (D) i - b, ii - c, iii - d, iv - a
- 91.** Just before fertilization, the angiosperm's embryo sac contains \_\_\_\_\_ and \_\_\_\_\_ nuclei. [2024]  
 (A) six haploid, one diploid  
 (B) five haploid, two diploid  
 (C) six diploid, one haploid  
 (D) seven haploid, one diploid
- 92.** Match the types of endosperms given in Column I with examples given in Column II
- |      | Column I |    | Column II         |
|------|----------|----|-------------------|
| i.   | Cellular | a. | Coconut           |
| ii.  | Nuclear  | b. | <i>Asphodelus</i> |
| iii. | Helobial | c. | <i>Petunia</i>    |
- [2024]  
 (A) i - a ii - b iii - c  
 (B) i - b ii - c iii - a  
 (C) i - c ii - a iii - b  
 (D) i - c ii - b iii - a
- 93.** Given below are two statements :  
**Statement I:** In heteromorphic flowers, pollen grains produced from anther pollinate stigmas produced at same level.  
**Statement II:** In Tobacco the germination of pollen on the stigma of the same flower is inhibited.



In the light of above statements, select the correct option given below: [2024]

- (A) Both statement I and statement II are correct.
- (B) Both statement I and statement II are incorrect.
- (C) Statement I is correct but statement II is incorrect.
- (D) Statement I is incorrect but statement II is correct.

94. The protective sheath of radicle in a monocot seed is \_\_\_\_\_. [2024]

- (A) coleoptile (B) coleorrhiza
- (C) scutellum (D) perisperm

95. After germination of a dicotyledonous endospermic seed, the cotyledons act as \_\_\_\_\_ organ. [2024]

- (A) food storage (B) photosynthetic
- (C) germinating (D) haustorial

96. Given below are two statements. Based on them select the correct option given below.

**Statement I:** As an adaptation in chiropterophilous flowers large amount of edible pollen grains are produced.

**Statement II:** Baobab tree is an example of anemophily. [2024]

- (A) Both Statement I and Statement II are correct.
- (B) Both Statement I and Statement II are incorrect.
- (C) Statement I is correct but Statement II is incorrect.
- (D) Statement I is incorrect but Statement II is correct.

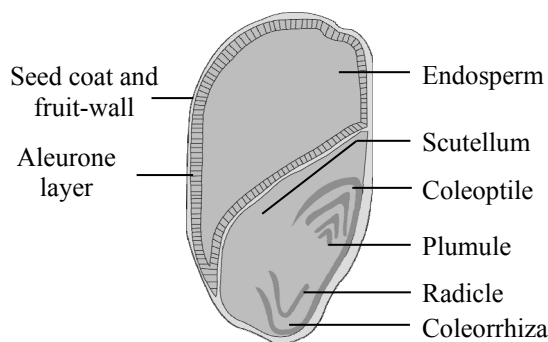
97. Microspore mother cells in anther are immediately enclosed by [2024]

- (A) epidermis (B) tapetum
- (C) middle layers (D) endothecium

98. In angiosperms, apomixis is \_\_\_\_\_. [2024]

- (A) found in all plants
- (B) a mechanism to transfer pollens on stigma
- (C) a mechanism to form seed after fertilization
- (D) mimicry of sexual reproduction

99. Which part of a seed shown in given figure indicates future root? [2024]



- (A) Coleoptile (B) Coleorrhiza
- (C) Plumule (D) Radicle

100. In grafting the part of stem containing bud joined on a rooted stock is called \_\_\_\_\_. [2024]

- (A) explant (B) scion
- (C) bulbil (D) bulb

101. Which one of the following is NOT a significance of polyembryony?

- i. Polyembryony increases the chance of survival of the new plants.
  - ii. Nucellar polyembryony is greatly useful in horticulture.
  - iii. Seedless fruits are formed.
  - iv. Genetically identical plants are produced due to cleavage polyembryony. [2024]
- (A) i and ii only (B) iii only
  - (C) i and iii only (D) iv only

102. Ploidy level is NOT same in \_\_\_\_\_. [2024]

- (A) perisperm and integument
- (B) integuments and embryo
- (C) nucellus and secondary nucleus
- (D) antipodals and secondary nucleus

103. Match the characteristics of anther wall layers given in Column I with their names given in Column II.

	Column I		Column II
i.	Nutritive layer	a.	Epidermis
ii.	Layer with fibrous thickness	b.	Middle layers
iii.	Protective layer	c.	Tapetum
iv.	Layer that disintegrates in mature anther	d.	Endothecium

Choose the correct option given below. [2024]

- (A) i – c, ii – d, iii – b, iv – a
- (B) i – c, ii – d, iii – a, iv – b
- (C) i – c, ii – b, iii – a, iv – d
- (D) i – b, ii – a, iii – c, iv – d

104. Choose the correct option with respect to germ pore. [2024]

- (A) It is the opening of ovule.
- (B) It helps in pollen germination.
- (C) It helps in dehiscence of anther.
- (D) It helps in germination of seed.

105. Root cap is produced from \_\_\_\_\_ of the suspensor. [2024]

- (A) haustorium (B) hypocotyl
- (C) epicotyl (D) hypophysis





106. Read the following statements regarding gynoecium in angiosperms.
- Embryo sac is located towards micropylar end of the ovule
  - Placenta is present inside the ovary locules.
  - Stigma serves as the receptive organ for pollen grains.
  - Cells of the nucellus are haploid with abundant food.
  - Ovules generally have more haploid cells than diploid cells.

Identify the correct set of statements from the following. [2024]

- (A) iii, iv and v only (B) ii, iv and v only  
(C) i, ii and iii only (D) i, ii and v only

107. Identify the correct sequence of ploidy of megaspore mother cell, nucellus and egg respectively in an angiospermic ovary? [2024]

- (A)  $2n, 2n, n$  (B)  $4n, 8n, 2n$   
(C)  $2n, 2n, 4n$  (D)  $4n, 2n, n$

Answer Key

Classical Thinking

1.1:	1. (B)	2. (C)	3. (B)	4. (B)	5. (C)	6. (B)	7. (C)	8. (A)	9. (B)	10. (A)
	11. (B)									
1.2:	1. (B)	2. (B)	3. (A)	4. (B)	5. (C)	6. (C)	7. (D)	8. (A)	9. (B)	10. (B)
	11. (A)	12. (B)								
1.3:	1. (C)	2. (B)	3. (B)	4. (B)	5. (C)	6. (A)	7. (B)	8. (A)	9. (D)	10. (B)
	11. (A)	12. (B)	13. (B)	14. (A)	15. (D)	16. (B)	17. (B)	18. (D)	19. (B)	
1.4:	1. (B)	2. (A)	3. (A)	4. (A)	5. (C)	6. (A)	7. (A)	8. (A)	9. (C)	10. (A)
	11. (B)	12. (C)	13. (D)	14. (B)	15. (A)	16. (C)				
1.5:	1. (B)	2. (C)	3. (A)	4. (C)	5. (C)	6. (B)	7. (C)			
1.6:	1. (B)	2. (C)	3. (C)	4. (C)	5. (A)	6. (B)	7. (A)	8. (C)	9. (C)	10. (C)
	11. (D)	12. (C)	13. (B)	14. (D)	15. (A)	16. (B)	17. (D)	18. (A)	19. (A)	20. (A)
	21. (B)	22. (C)	23. (C)	24. (D)	25. (C)	26. (D)	27. (B)	28. (A)	29. (B)	
1.7:	1. (D)	2. (A)	3. (B)	4. (C)	5. (D)					
1.8:	1. (C)	2. (C)	3. (A)	4. (B)	5. (A)					
1.9:	1. (D)	2. (C)	3. (C)	4. (D)	5. (A)	6. (B)	7. (D)	8. (A)	9. (B)	10. (D)
	11. (D)	12. (A)	13. (A)	14. (C)	15. (B)					
1.10:	1. (A)	2. (B)	3. (D)	4. (C)	5. (B)					
1.11:	1. (A)	2. (B)	3. (A)	4. (C)	5. (C)	6. (B)	7. (B)	8. (C)	9. (D)	10. (C)
1.12:	1. (C)	2. (B)	3. (B)	4. (A)	5. (D)	6. (D)	7. (C)	8. (D)	9. (C)	10. (A)
	11. (A)									
1.13:	1. (D)	2. (C)	3. (C)	4. (D)						
1.14:	1. (C)	2. (C)	3. (A)	4. (D)						
1.15:	1. (A)	2. (B)	3. (C)							

MHT-CET Previous Years' Questions

1. (C)	2. (B)	3. (A)	4. (C)	5. (A)	6. (A)	7. (C)	8. (D)	9. (D)	10. (D)
11. (A)	12. (D)	13. (B)	14. (C)	15. (D)	16. (A)	17. (A)	18. (D)	19. (A)	20. (C)
21. (C)	22. (D)	23. (C)	24. (D)	25. (C)	26. (B)	27. (C)	28. (A)	29. (C)	30. (C)
31. (A)	32. (D)	33. (A)	34. (D)	35. (C)	36. (B)	37. (D)	38. (B)	39. (A)	40. (A)
41. (A)	42. (D)	43. (C)	44. (D)	45. (C)	46. (A)	47. (C)	48. (A)	49. (A)	50. (D)
51. (A)	52. (D)	53. (C)	54. (B)	55. (D)	56. (D)	57. (C)	58. (B)	59. (C)	60. (D)
61. (B)	62. (B)	63. (A)	64. (D)	65. (A)	66. (A)	67. (A)	68. (C)	69. (A)	70. (A)
71. (B)	72. (A)	73. (A)	74. (C)	75. (C)	76. (D)	77. (C)	78. (A)	79. (B)	80. (B)
81. (D)	82. (D)	83. (B)	84. (A)	85. (A)	86. (B)	87. (B)	88. (B)	89. (B)	90. (B)
91. (A)	92. (C)	93. (A)	94. (B)	95. (B)	96. (C)	97. (B)	98. (D)	99. (D)	100. (B)
101. (B)	102. (D)	103. (B)	104. (B)	105. (D)	106. (C)	107. (A)			



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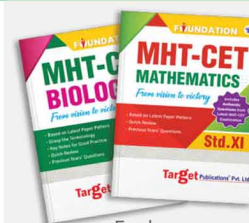
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