1. Name the parts of anangiosperm flower in which development of male and female gametophytes take place.
Ans: Development of male gametophyte (micro- gametogenesis) occurs in pollen sac of anther up to 2 - celled stage. The female gametophyte develops (megagametogenesis) in the nucellus of ovule.

2. Differentiate between microsporogenesis and megasporogenesis. Which type of cell division occurs during these events? Name the structures formed at the end of these two events?
Ans: Differences between microsporogenesis and megasporogenesis are as follows -

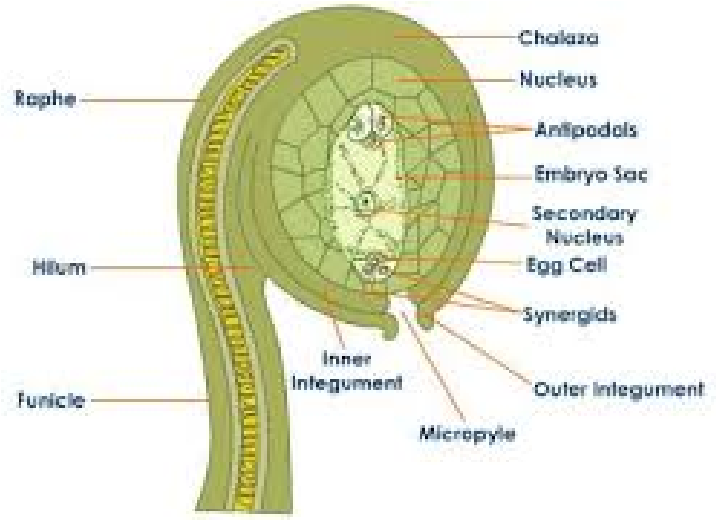
	Microsporogenesis		Megasporogenesis
1.	The process of formation and differentiation of pollen grains from microspore mother cells by meiosis is known as micro-sporogenesis.	1.	The process of formation and differentiation of megaspores from megaspore mother cells by meiosis is known as megasporogenesis.
2.	Pollen grains are produced in the anther which is a broader knob like fertile part of the stamen.	2.	Ovules (which are the future seeds) are formed in the ovary.
3.	All the four pollen grains that are formed from microspore mother cell are functional.	3.	Only one out of the four megaspores is functional.

Each microspore mother cell and megaspore mother cell contain two sets of chromosomes and are therefore diploid. The diploid megaspore mother cell and microspore mother cell enlarges and undergo meiosis to produce, four haploid cells called megaspores and microspores respectively.The chromosome number is reduced by half and therefore megaspores and microspores are haploid. Microsporogenesis and megasporogenesis give rise to pollen grains and embryo sac respectively. Pollen grain is the male gametophyte and embryo sac represents the female gametophyte.

3. Arrange the following terms in- the correct developmental

sequence: Pollen grain, sporogenous tissue, microspore tetrad, pollen mother cell, male gametes.
Ans: Sporogenous tissue - pollen mother cell - microspore tetrad - pollen grains - male gametes.

4. With a neat, labelled diagram, describe the parts of a typical angiosperm ovule.
Ans:



A typical angiospermic ovule is a small structure which is formed in the ovary. Ovule first develops as a projection on the placenta and composed of multilayered cellular tissue called the nucellus. The hypodermal cell of die nucellus enlarges and transformed into megaspore mother cell. This cell undergoes meiosis to produce four haploid cells only one of which develops & forms embryo sac (female gametophyte). An ovule may be surrounded by one or two protective layers called integuments, leaving a small opening at one end termed as micropyle which acts as passage for the entry of the pollen tube into the ovule. Thus, a typical ovule consists of a fully developed embryo sac with the nucellus and integuments.

5. What is meant by monosporic development of female gametophyte?
Ans: In many flowering plants, only one out of the four megaspores enlarges and develops into female gametophyte or embryo sac. The other three megaspores degenerate. This type of embryo sac formation is called as monosporic type of development.

6. With a neat diagram explain the 7-celled, 8- nucleate nature of the female gametophyte.
Ans:

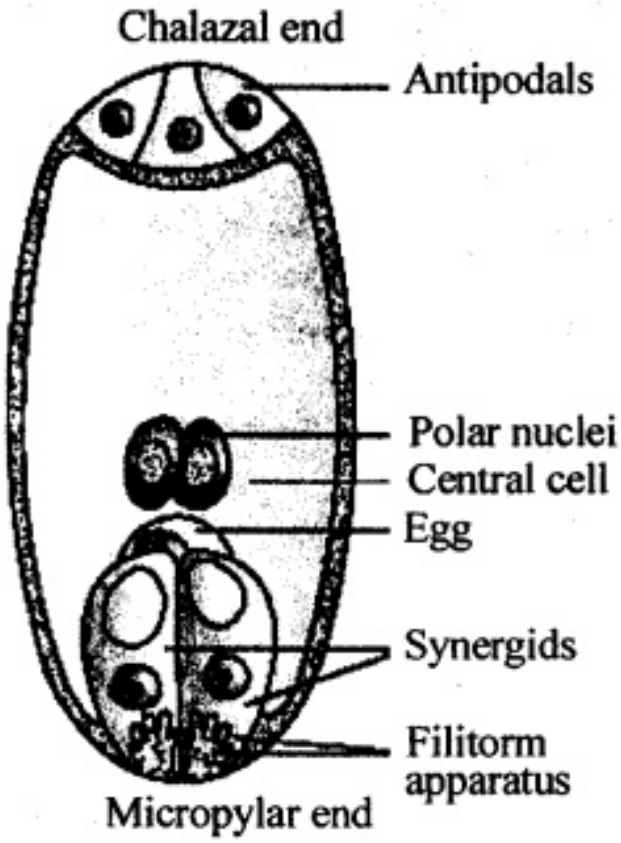


Fig. A diagrammatic representation of the mature embryo sac.

Embryo sac (or female gametophyte) is formed by three successive mitotic divisions that take place in the nucleus of megaspore.

The nucleus of the functional megaspore divides meiotically to form two nuclei which move to the opposite poles, forming the 2-nucleate embryo sac. Two more sequential mitotic nuclear divisions result in the formation of the 4-nucleate and later the 8-nucleate stages of the embryo sac. After the 8-nucleate stage, cell walls are laid down leading to the organisation of the typical female gametophyte or embryo sac. Six of the eight nuclei are grouped together at micropylar and chalazal end and form the egg apparatus and antipodals respectively. The large central cell left over with two polar nuclei. Thus, a typical female gametophyte consists of 7 cells with 8 nucleus.

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