



Blue Print (As per PU Board)

Topic	1 mark questions	2 marks questions	3 marks questions	5 marks questions	Total Marks
Reproduction in Organisms	-	1	1	-	5

One mark questions

1. What is clone?

Sol: Morphologically and genetically similar individuals formed by asexual method of reproduction.

2. Is there any difference between asexual reproductions with vegetative propagation, if yes what it is?

Sol: Yes. Asexual reproduction is common in single celled organism, vegetative reproduction is common among plants.

3. What is syngamy?

Sol: Fusion of male and female gametes is called syngamy (Fertilization).

Two marks questions

4. Bring out differences between asexual with sexual reproduction.

Sol:

Asexual	Sexual
It involves participation of single individual i.e., Uniparental	In involves two separate parents i.e., Biparental
No sex organs are formed	Sex organs are formed
Ne cell division like meiosis	It involves meiosis during gamete formation
No gamete fusion, thus no formation of zygote	Male and female gametes fuse to form Zygote
The offspring are similar to parents due to non-fusion of gametes	The offspring are genetically variants, because of fusion of gametes
The process is quick in absence of process like fertilization and embryogenesis	The process take long duration because it involves fertilization, and embryogenesis.

5. Difference between Male and Female Gametophytes Flowering Plant

Sol:

Male Gametophyte		Female Gametophyte	
1	It is derived from a pollen grain or microspore	1	It is derived from a megaspore
2	It does not remain permanently embedded inside the microsporangium	2	The female gametophyte remains permanently embedded in the mega sporangium or nucellus.
3	It has two phases of growth - pre - pollination and post-pollination	3	All the cells are formed in a single phase of growth
4	Only pre-pollination growth occurs inside the microsporangium. The remaining occurs over the female reproductive organs	4	The whole growth occurs inside the mega sporangium
5	The male gametophyte comes out of the confines of the pollen grain by forming a pollen tube.	5	The female gametophyte remains surrounded by the membrane of the megaspore
6	The male gametophyte is only 3-ceiled	6	The female gametophyte is 7-celled
7	All the cells of the male gametophyte are functional. The tube cell is required to carry the two male gametes, both of which	7	The antipodal cells do not seem to perform any function except absorption of nourishment from nucleolus in certain



	take part in fertilization		cases. Out of synergies only one is required for receiving the pollen tube.
8	The remains of male gametophyte disintegrate after fertilization	8	After fertilization two new structures are produced both of which show active growth.

**6. Differences between Proliferative phase and Secretory phase**

Sol:

Proliferative Phase (Follicular Phase)		Secretory Phase (Luteal Phase)	
1	It extends for about 10-12 days usually from day 6 <sup>th</sup> to 13 in a 28 day cycle.	1	It extends for about 13-14 days after ovulation (usually from days 15 to 28 in a 28 day cycle)
2	Primary follicle changes into Graafian follicle.	2	Empty Graafian follicle changes into corpus luteum.
3	Oestrogens are secreted	3	Progesterone is secreted
4	Endometrium is about 2-3 mm thick. The uterine glands do not secrete watery secretion.	4	Endometrium is about 5 mm. The uterine glands secrete watery secretion.

**Three marks questions**

**7. Write note on gamete transfer.**

Sol: For the act of fertilization (fusion) to take place, the gametes need to be transferred. In most organisms, for this mechanism to complete the male gametes are motile, while the female gametes are non-motile, and the male gametes need a medium for their movement. A large number of male gametes do not make it to the female gamete, and hence, several thousands of male gametes are produced to overcome this loss.

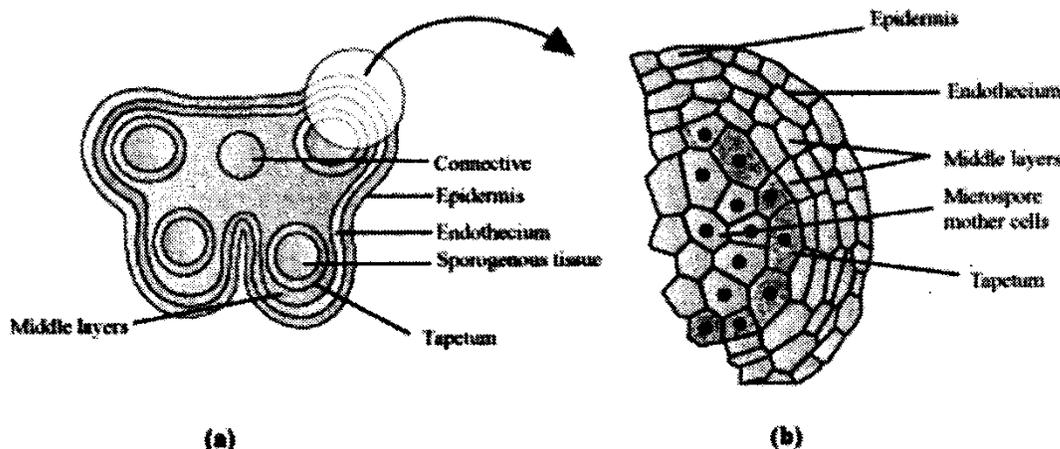
In angiosperms, the pollen grain carries the male gamete and the ovule carries the female gamete. Pollen grains are produced in the anther and need to be transferred to the stigma for fertilization to occur. This is easy in monoecious plants as both the anther and the stigma are present close by in Dioecious plants, it takes place by pollination.

In animals sperms are male gametes produced inside testis in millions. Ovum is female gamete produced inside ovary. The medium required may be water as in case of external fertilization.

**8. Describe the structure of microsporangium**

Sol: The microsporangium is surrounded by four wall layers (epidermis, endothecium, middle layers, and tapetum). The outer three layers are protective and help in dehiscence of anther to release the pollen grains. The tapetum provides nourishment to the developing pollen grains.

In the young anther, the sporogenous tissue forms the centre of each microsporangium.





**9. List the hormones related to spermatogenesis**

Sol: Spermatogenesis starts at puberty by the action of the gonadotropin releasing hormone (GnRH), which in turn causes the release of two gonadotropins called Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH).

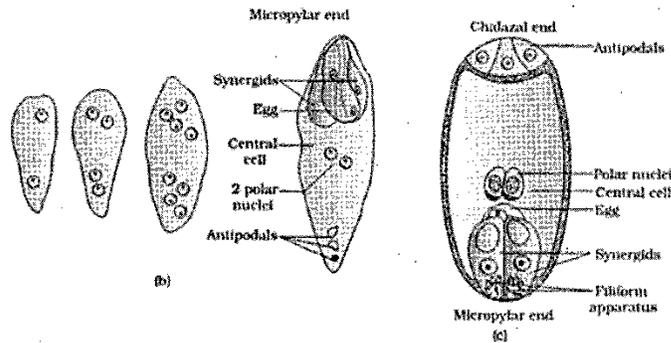
LH acts on Leydig cells and causes them to release androgens, Leydig cells secrete male sex hormone TESTOSTERONE which promotes development of accessory glands & control male secondary sexual characters & stimulate the process of spermatogenesis while the FSH acts on the Sertoli cells, which help in spermiogenesis.

**Five marks questions**

**10. Explain the formation of an embryo sac with diagrams.**

Sol: 1. The functional megaspore grows in size

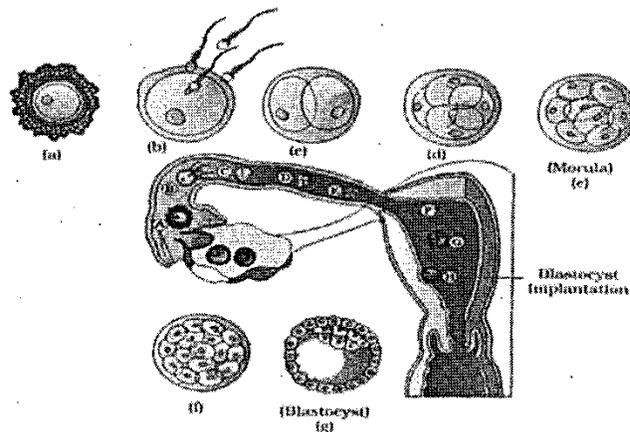
- The nucleus divides mitotically to form two nuclei which move to opposite poles.
- Each nucleus at the poles undergoes two mitotic divisions to form four nuclei in each pole or a total of 8 nuclei
- Two nuclei from each pole move to the centre to form the polar nuclei.
- The other nuclei, three at each pole get surrounded by bit of cytoplasm to form cells.
- The female gametophyte or the embryo sac thus has 7 cells and eight nuclei.



**11. Explain the development of human embryo with diagrams.**

Sol: The Fusion of the sperm and the egg in humans result into formation of the diploid structure called zygote. The zygote starts dividing mitotically as it moves through the oviduct into the uterus to form 2, 4, 8, 16 daughter cells called blastomeres. The stage is called morula.

The Morula divides further and differentiates into blastocysts. The outer layer of blastomeres called trophoblast gets attached to the endometrial layer. The uterine wall divides and enclosed the blastocysts and this is referred to as implantation. The inner layer of blastomeres in the blastocysts gives rise to the embryo.

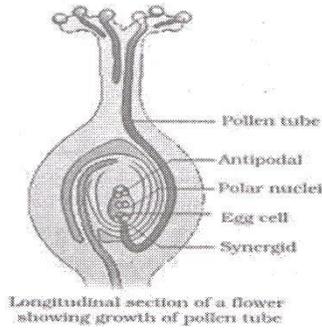




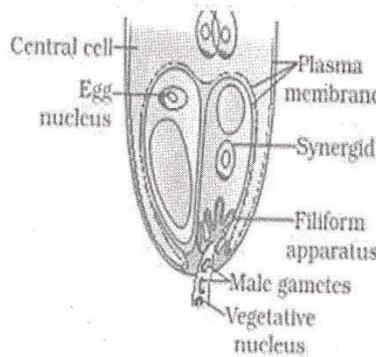
**12. Trace the events that would take place in flower from the time of Pollen grain of species fall on stigma up To completion of fertilization.**

Sol: (i) Germination of Pollen Grains on Stigma

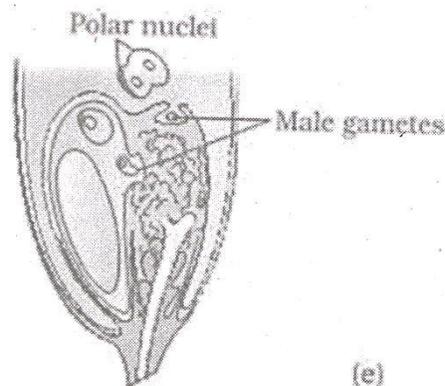
The pollen grains absorb fluid present on stigma & swell up. The exine ruptures at the place of germ pore & intine comes out in the form of tube with its internal contents. This small tubular is called pollen tube & process is called pollen germination.



(ii) Entry of pollen tube into ovule:- The entry of pollen tube into ovule occurs through micropyle or chalaza or through lateral sides of ovule. Only one pollen tube enters inside the embryo sac of an ovule. Normal two synergids are destroyed while entry of pollen tube into embryo sac.



(iii) Discharge of Mate Gameter:- After enter of pollen tube both the male gametes discharged into embryo sac by either forming two pores into pollen tube & each male gamete is discharged through every pore or sometime pollen tube may burst & release the male gametes into embryo sac.



(iv) Fertilization:- The fusion of first male gamete (n) with egg (n) is called fertilization. It results in formation of a diploid zygote (2n). The second male gamete fuses with secondary nucleus (2n) to form triploid endosperm nucleus (3n). This fusion between second male gamete & secondary nuclei is triple fusion. Since process of fertilization occurs twice. It is called double fertilization.