

1. Discuss ovulation

Ovulation is the release of an ovum from the ovarian follicle. This occurs on an abrupt increase in luteinizing hormone. This enables the oocyte complete meiosis 1. The surface of the ovary begins to bulge locally and at the apex, an avascular spot the stigma appears. The luteinizing hormone performs two other functions

It increases collagenase activity: this helps to break the collagen fibers around the follicle

It increases prostaglandin: this causes local muscular contraction in the ovarian wall. This extrudes the oocyte along with some surrounding follicular cells from the region of the cumulus oophorus. The oocyte floats out of the ovary. Some of the cumulus oophorus cells then rearrange themselves around the zona pellucida to form the corona radiata.

2. Differentiate between meiosis 1 and 2

	Meiosis 1	Meiosis 2
1. Prophase	pairing of 46 homologous duplicated chromosome	Pairing does not occur
	Crossing over of 46 homologous duplicated chromosomes	Crossing over does not occur
	Chiasma is formed	Chiasma is not formed
2. metaphase	Alignment of 46 homologous duplicated chromosomes at the equatorial plate	Alignment of 23 duplicated chromosomes at the equatorial plate
3. Anaphase	The centromere does not split during anaphase 1	The centromere splits during anaphase 2
4. Telophase	2 daughter cells are formed	4 daughter cells are formed

3. Discuss the stages involved in fertilization

There are 6 stages involved in fertilization.

1. Passage of sperm through corona radiata: as the sperm tries to pass the corona radiata, the sperm undergoes capacitation. This is the removal of the glycoprotein and seminal plasma membrane from the head region of the sperm cell. This exposes the acrosome.
2. Penetration of zona pellucida: here, the acrosomal reaction takes place. The acrosome contains acrosine (a lysing enzyme) which dissolves the zona pellucida binding sites to allow for penetration of the sperm cell. The cortical granules in the cytoplasm of the oocyte send a message to the zona pellucida to close, this is to avoid polyspermy.
3. Fusion of sperm and oocyte plasma membrane
4. Completion of second meiotic division and formation of female pronucleus: when the sperm enters the cytoplasm of the oocyte, the 2nd meiotic division is complete and the female nucleus becomes the female pronucleus

5. Formation of male pronucleus: the tail of the sperm will degenerate and the nucleus will become enlarged to form the male pronucleus.
6. Zygote formation: the ootid (two haploid nuclei) will become a zygote from the union of the two haploid nuclei.

4. Differentiate between monozygotic and dizygotic twins.

	Monozygotic twins	Dizygotic twins
1.	They are formed when a sperm fertilizes an oocyte and the oocyte divides.	They are formed when two different sperm cells fertilize two different oocytes
2.	They are genetically identical	They are genetically unidentical
3.	They look alike	They do not look alike
4.	They have the same sex	They may have different sexes
5.	They share the same amniotic sac, chorionic sac and placenta.	They do not share amniotic sac, chorionic sac and placenta.