Short Answer Questions-II (PY)

[3 Marks]

Q.1. (i) Draw a sectional view of seminiferous tubule of a human. Label the following cells in the seminiferous tubule:

(a) Cells that divide by mitosis to increase their number.

(b) Cells that undergo Meiosis I.

(c) Cells that undergo Meiosis II.

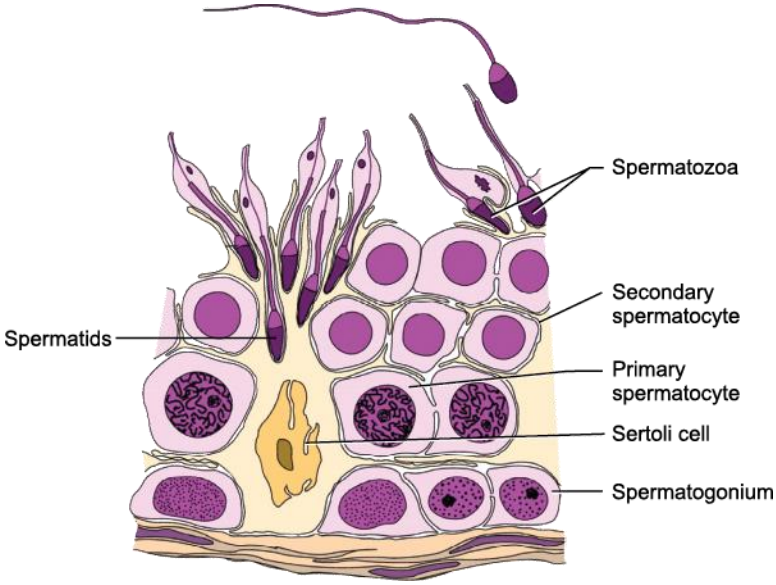
(d) Cells that help in the process of spermiogenesis.

(ii) Mention the role of Leydig cells.

OR

Draw a labelled sectional view of seminiferous tubule of a human male.

Ans. (i)



Diagrammatic sectional view of a seminiferous tubule (enlarged)Hormonal control of spermatogenesis

(a) Cells that divide by mitosis to increase their number—Spermatogonia

(b) Cells that undergo Meiosis I—Primary spermatocytes

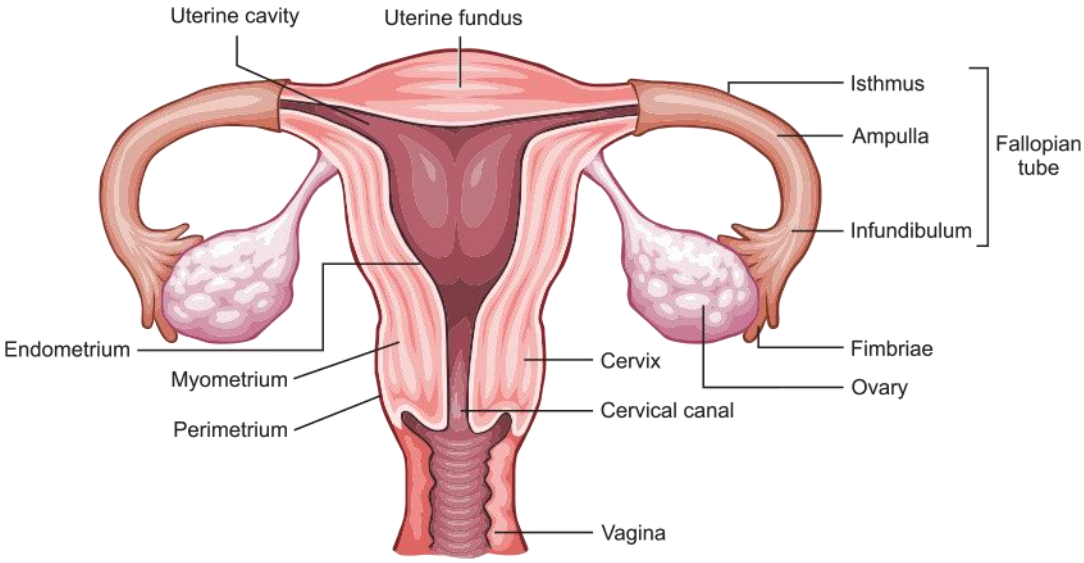
(c) Cells that undergo Meiosis II—Secondary spermatocytes

(d) Cells that help in the process of spermiogenesis—Sertoli cells

(ii) Role of Leydig cells: They synthesise and secrete testicular hormones called androgens.

Q.2. Draw a labelled diagram of the reproductive system in a human female.

Ans.



Diagrammatic sectional view of the female reproductive system

Q.3. Draw a diagram of the microscopic structure of human sperm. Label the following parts in it and write their functions.

(i) Acrosome

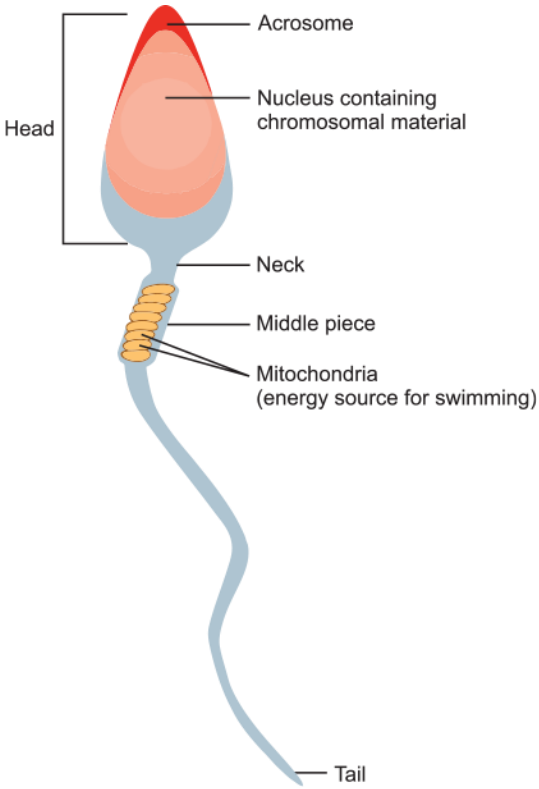
(ii) Nucleus

(iii) Middle piece

OR

Draw a diagram of a human sperm. Label only those parts along with their functions, that assist the sperm to reach and gain entry into the female gamete.

Ans.



Structure of a sperm

(i) Acrosome: Contains hydrolytic enzymes that help in dissolving membranes of the ovum for fertilisation.

(ii) Nucleus: Carries genetic material of male.

(iii) Middle piece: Contains a number of mitochondria that provide energy for the movement of the tail that facilitate sperm motility.

Q.4. (i) Draw a sectional view of human ovary and label

(a) Primary follicle

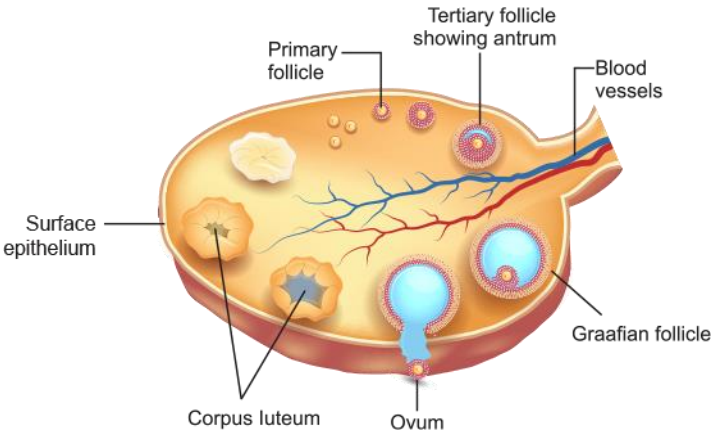
(b) Graafian follicle

(c) Corpus luteum

(ii) Mention the effect of pituitary hormones on the parts labelled.

Ans.

(i)



Sectional view of ovary

(ii) The pituitary hormones FSH and LH effect the growth and development of primary follicle, Graafian follicle and corpus luteum.

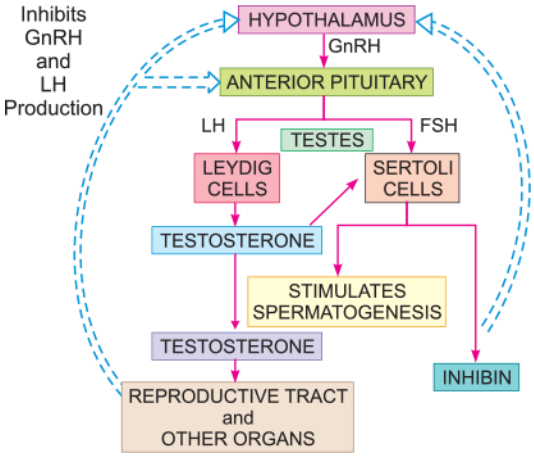
Q.5. Explain the hormonal control of spermatogenesis in humans.

Ans. Hormonal control of spermatogenesis

Spermatogenesis is initiated at the age of puberty by the gonadotropin releasing hormone (GnRH) secreted by the hypothalamus.

The increased levels of GnRH stimulate the anterior pituitary which then secretes the FSH (follicle stimulating hormone) and LH (luteinising hormone). **FSH** stimulates Sertoli cells to secrete some factors which help in spermiogenesis.

LH acts on the Leydig cells and causes the secretion of testosterone from the testes.



Flow chart showing the hormonal control of the human male reproductive system

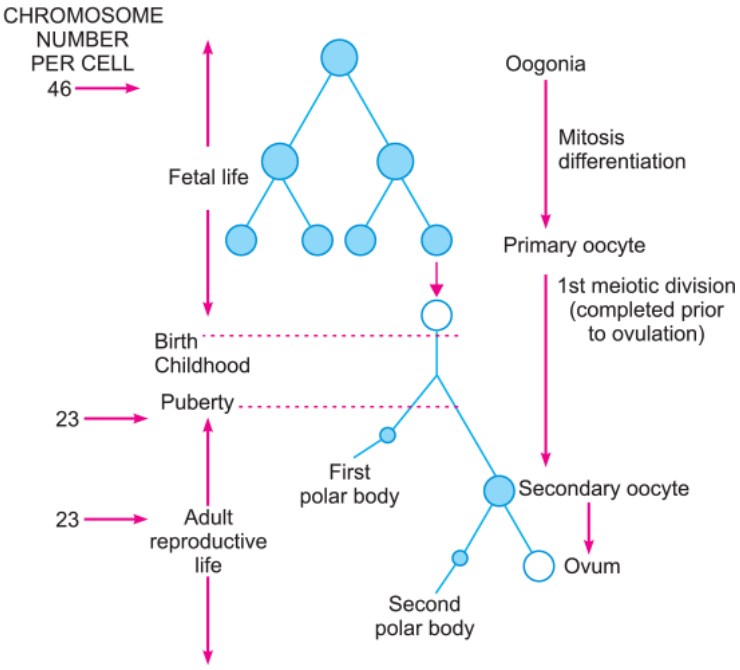
Q.6. Explain the steps in the formation of an ovum from an oogonium in humans.

Ans. Oogenesis

The process of formation of a mature female gamete is called oogenesis. It occurs in the ovaries. It consists of the following three phases:

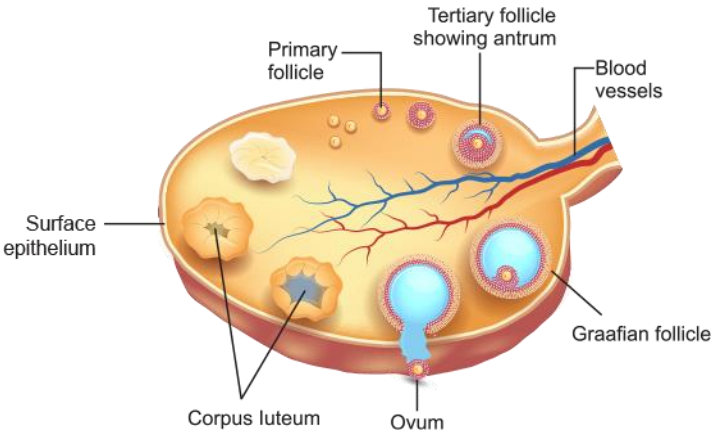
(a) Multiplication phase: Oogenesis is initiated during the embryonic development stage when a couple of million gamete mother cells (oogonia) are formed within each foetal ovary. No more oogonia are formed and added after birth. These cells start division and enter into prophase-I of the meiotic division. They get temporarily arrested at this stage and are called primary oocytes.

(b) Growth phase: Each primary oocyte then gets surrounded by a layer of granulosa cells. This structure is called the primary follicle. A large number of these follicles degenerate during the phase from birth to puberty. At puberty, only 60,000 to 80,000 primary follicles are left in each ovary. The primary follicles get surrounded by more layers of granulosa cells and a new theca to form secondary follicles.



Systematic representation of oogenesis

(c) Maturation phase: In the first maturation phase, the secondary follicle soon transforms into a tertiary follicle. The primary oocyte within the tertiary follicle grows in size and completes its first meiotic division to form a large, haploid, secondary oocyte and a tiny first polar body. The tertiary follicle changes into a mature follicle—the Graafian follicle—which ruptures to release the **secondary oocyte** (ovum) from the ovary by a process called **ovulation**. The second maturation phase occurs after fertilisation when the meiotic division of the secondary oocyte is complete. This second meiotic division results in the formation of a second polar body and a haploid ovum (ootid).



Sectional view of ovary

***** Oogenesis is completed when the sperm penetrates the ovum.

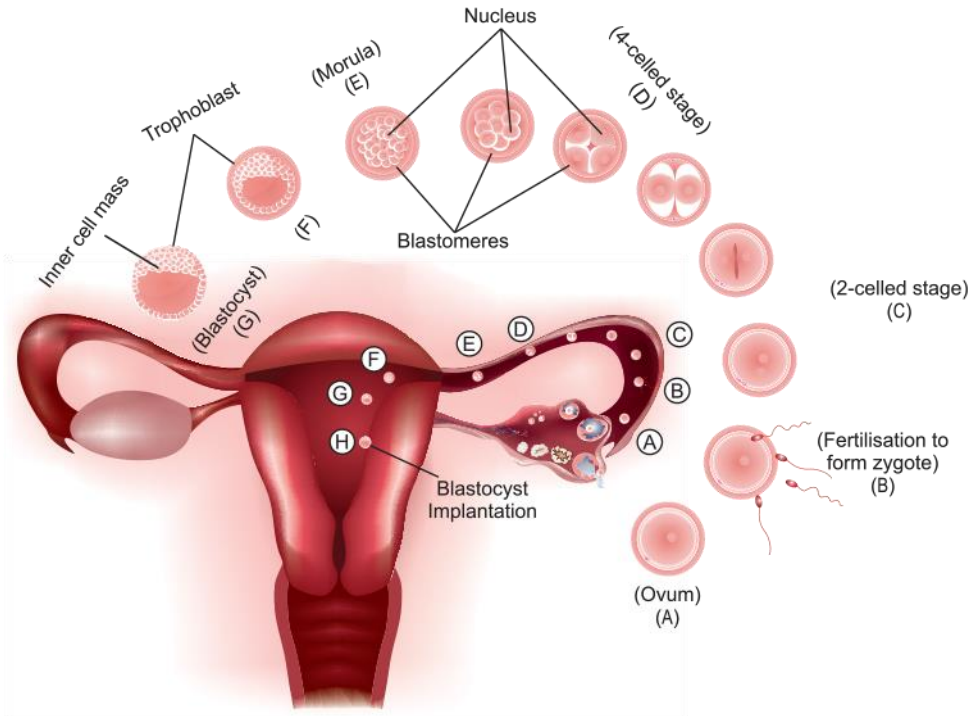
Q.7. Draw the following diagrams related to human reproduction and label them.

(i) The zygote after the first cleavage division

(ii) Morula stage

(iii) Blastocyst stage (sectional view)

Ans.



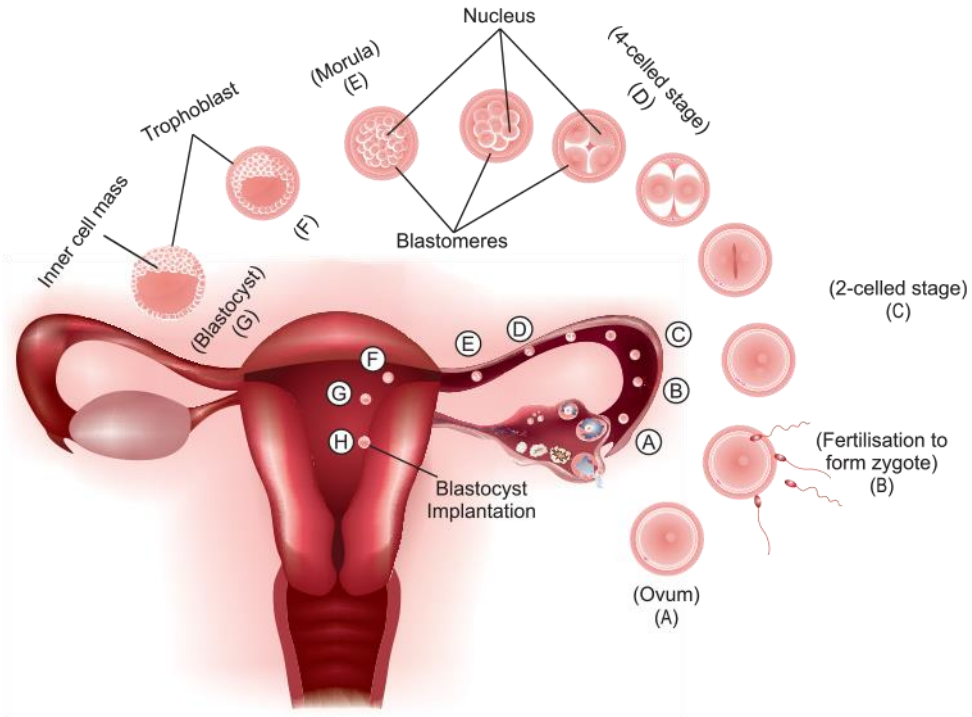
Transport of ovum, fertilisation and passage of growing embryo through fallopian tube

Q.8. Name the stage of human embryo at which it gets implanted. Explain the process of implantation.

OR

Draw a labelled diagram of a human blastocyst. How does it get implanted in the uterus?

Ans.

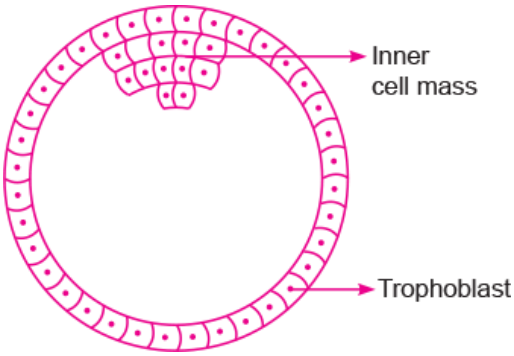


The human embryo gets implanted at blastocyst.

The trophoblast layer of the blastocyst get attached to the endometrium and the inner cell mass gets differentiated as the embryo. After attachment the uterine cell divides rapidly and covers the blastocyst. As a result the blastocyst becomes embedded in the endometrium of the uterus.

Q.9. Draw a labelled diagram of the embryonic stage that gets implanted in the human uterus. State the functions of the two parts labelled.

Ans.



Trophoblast helps in implantation or attachment to endometrium.

Inner cell mass gets differentiated into an embryo.

Q.10. Name the source of gonadotropins in human females. Explain the changes brought about in the ovary by these hormones during menstrual cycle.

OR

Describe how the changing levels of FSH, LH and progesterone during menstrual cycle induce changes in the ovary and the uterus in human female.

Ans. Gonadotropins (LH and FSH) are secreted by the anterior lobe of pituitary gland.

Gonadotropins (LH and FSH) increase gradually during the follicular phase (proliferative phase) of menstrual cycle and stimulate follicular development as well as secretion of estrogen by the growing follicles.

LH and FSH attain a peak level in the middle of the cycle (about 14th day) and rapid secretion of LH induces rupture of Graafian follicle followed by ovulation (release of ovum).

LH stimulates transformation of Graafian follicle into corpus luteum.

Q.11. When and where do chorionic villi appear in humans? State their function.

Ans. Chorionic villi appear after implantation on the trophoblast.

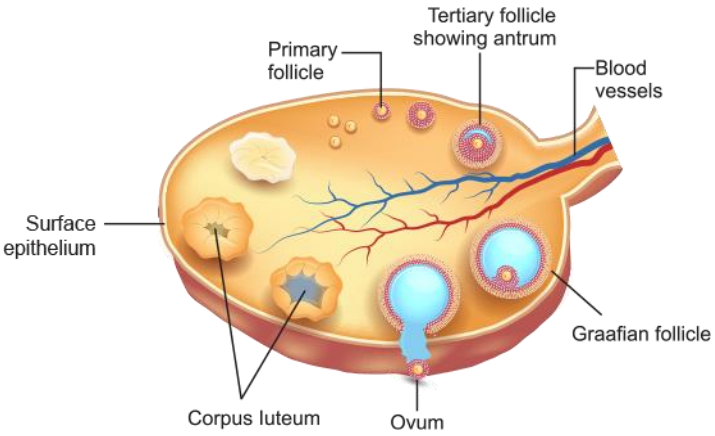
It becomes interdigitated with uterine tissue to form the placenta and increases the surface area for exchange of materials between the mother and the embryo.

Q.12. Answer the following questions.

Q. Draw a sectional view of human ovary. Label the following parts:

(a) Primary follicle
(b) Ovum
(c) Graafian follicle
(d) Corpus luteum

Ans.



Q. Name the hormones influencing (i) ovulation, (ii) development of corpus luteum.

Ans.

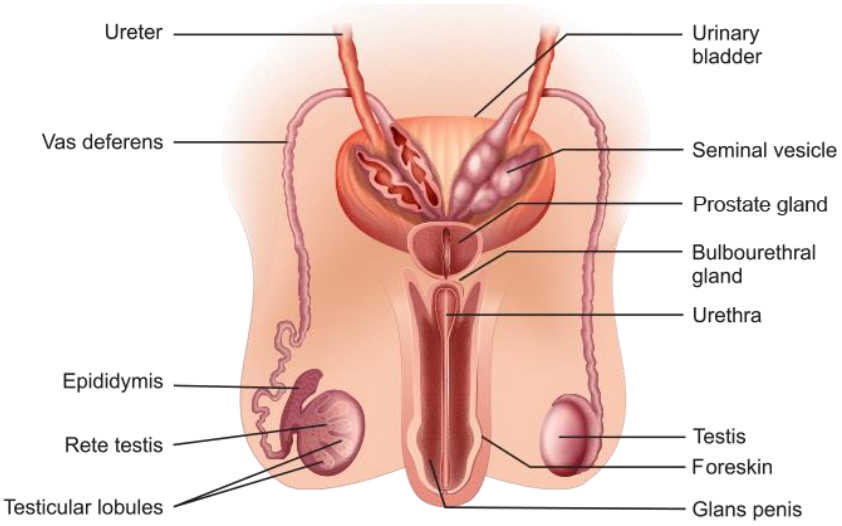
(a) Ovulation: Gonadotropins like luteinising hormone and follicular stimulating hormone, and estrogen.

(b) Development of corpus luteum: Luteinising hormone and progesterone.

Q.13. Answer the following questions.

Q. Draw a labelled diagrammatic view of human male reproductive system.

Ans.



Q. Differentiate between:

(a) Vas deferens and vas efferentia

(b) Spermatogenesis and spermiogenesis

Ans.

(a)

S.No.	Vas deferens	Vas efferentia
(i)	Carries sperm from epididymis to urethra.	Carries sperm from testis to epididymis.
(ii)	One in number from each testis.	Many in number.

(b)

Spermatogenesis	Spermiogenesis
Production of sperms (by meiosis).	Spermatids are transformed to spermatozoa.

Q.14. (i) Draw a diagram of the structure of a human ovum surrounded by corona radiata. Label the following parts:

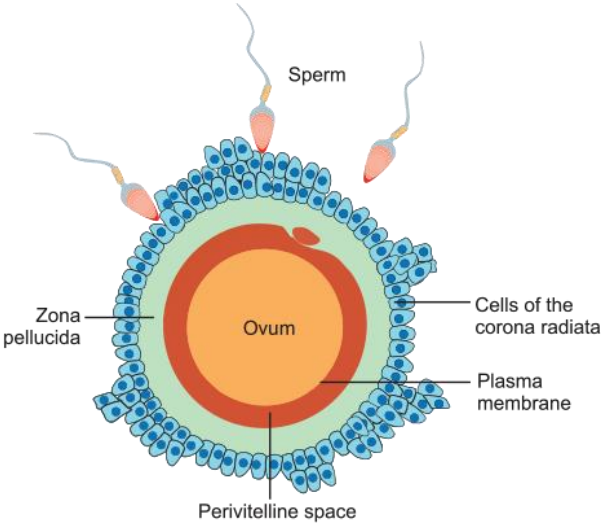
(a) Ovum

(b) Plasma membrane

(c) Zona pellucida

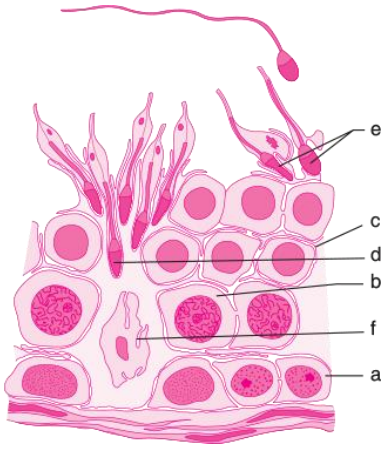
(ii) State the function of zona pellucida.

Ans. (i)



(ii) Zona pellucida allows the entry of one sperm into the cytoplasm of the ovum and then undergoes changes to prevent entry of additional sperms.

Q.15. Study the figure given:



(i) Pick out and name the cells that undergo spermiogenesis.

(ii) Name ‘a’ and ‘b’ cells. What is the difference between them with reference to the number of chromosomes?

(iii) Pick out and name the motile cells.

(iv) What is ‘f’ cell? Mention its function.

(v) Name the structure of which the given diagram is a part.

Ans.

(i) d—Spermatids

(ii) a—Spermatogonium, b—Primary spermatocyte

They both are diploid and have 46 chromosomes each.

(iii) e—Spermatozoa

(iv) f—Sertoli cell. It provides nutrition to the germ cells.

(v) Seminiferous tubule.

Q.16. (i) How is placenta formed in the human female?

(ii) Name any two hormones which are secreted by it and are also present in a non-pregnant woman.

Ans.

(i) The chorionic villi and uterine tissue become interdigitated with each other and jointly form a structural and functional unit called placenta.

(ii) Estrogen and progestogens.

Q.17. It is commonly observed that parents feel embarrassed to discuss freely with their adolescent children about sexuality and reproduction. The result of this parental inhibition is that the children go astray sometimes.

(i) Explain the reasons that you feel are behind such embarrassment amongst some parents to freely discuss such issues with their growing children.

(ii) By taking one example of a local plant and animal, how would you help these parents to overcome such inhibitions about reproduction and sexuality?

Ans. (i) The reasons behind this embarrassment are illiteracy, their conservative attitude, misconceptions and social myths.

(ii) It can be seen in animals such as honey bee and plants such as orchid ophrys flower that sexual attraction is a natural phenomenon. The male honey bee assumes the petal of orchid as its female partner and pseudocopulates with it. So, sexuality is a natural phenomenon and parents should speak to their children about it.

Short Answer Questions-II (OIQ)

[3 marks]

Q.1. Name and write the functions of the paired accessory glands in human male reproductive system.

Ans.

S. No.	**Paired accessory glands**	**Functions**
(*i*)	It consists of follicle cells.	Secretions of this gland constitutes seminal plasms which is rich in fructose, calcium and certain enzymes
(*ii*)	Bulbourethral gland/Cowper's gland	Help in lubrication of the penis

Q.2. Write a brief account of the structure and functions of placenta.

Ans. Placenta connects the foetus to the uterus through an umbilical chord. Both the foetal and the maternal tissues contribute to its formation. The foetal part is the chorionic villi and the maternal part is the uterine mucosa.

The functions of placenta are:

(i) Provides nutrients and oxygen to the developing embryo.

(ii) Removes CO2 and waste materials from the embryo.

(iii) Acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogens, progesterones that are essential to maintain pregnancy.

Q.3. What is pregnancy hormone? Why is it so called? Name two sources of this hormone in a human female.

Ans. Progesterone is known as the pregnancy hormone. It is called so because it prepares the uterus for implantation of the blastocyst to the uterine wall and helps in the formation of placenta. Corpus luteum and placenta are the two sources of this hormone.

Q.4. What is meant by each of the following:

Q. Primary follicle

Ans. Primary follicle: It is an ovarian follicle in which the primary oocyte is surrounded by a layer of granulosa cells.

Q. Secondary follicle and

Ans. Secondary follicle: When a primary follicle becomes surrounded by more layers of granulosa cells and a new theca, it is called a secondary follicle.

Q. Tertiary follicle

Ans. Tertiary follicle: When a fluid-filled cavity called antrum develops in the secondary follicle, it is called tertiary follicle.

Q.5. Distinguish between:

Q. Corona radiata and Zona pellucida

Ans.

S. No.	**Corona radiata**	**Zona pellucida**
(*i*)	It consists of follicle cells.	It is a single membrane.
(*ii*)	It envelops the egg outside the zona pellucida.	It is above the vitelline membrane making the membrane thick
(*iii*)	The cells provide nourishment to the egg at the time of release from the ovary.	It protects the egg.

Q. Blastula and Gastrula

Ans.

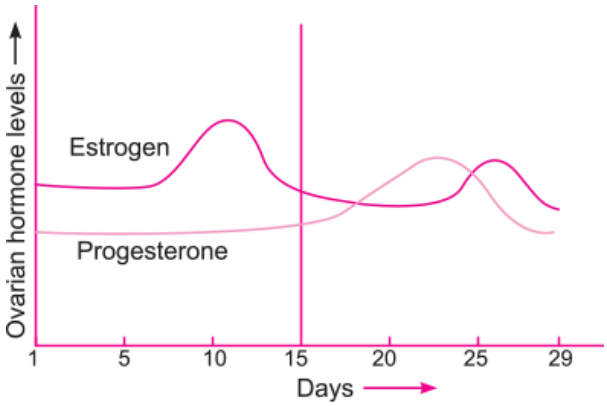
S. No.	**Blastula**	**Gastrula**
(*i*)	It is a single-layered embryo.	It is a three-layered embryo.

(*ii*)	The cavity of the blastula is known as theblastocoel.	The cavity of the gastrula is known as archenteron.
(*iii*)	It results after the cleavage.	It is formed from blastula due to the movement of cells into 3 germ layers.

Q.6. What happens to the blastocyst immediately after implantation?

Ans. After implantation, finger-like projections appear on the trophoblast called chorionic villi which surround the uterine tissue and maternal blood. The chorionic villi and uterine tissue become interdigitated with each other and jointly form a structural and functional unit between developing embryo and maternal body called placenta. The placenta is connected to the embryo through an umbilical cord which helps in the transport of substances to and from embryo. The inner cell mass differentiates into the three germ layers—outer ectoderm, middle mesoderm and inner endoderm. These primary germ layers give rise to all the tissues and organs, starting as the primordia.

Q.7.



Read the graph given above showing the levels of ovarian hormones during menstruation and correlate the uterine events that take place according to the hormonal levels on:

(i) 6–15 days

(ii) 16–25 days

(iii) 26–28 days (if the ovum is not fertilised)

Ans.

(i) Regeneration of endometrium.

(ii) Uterus gets highly vascularised, ready for embryo implantation.

(iii) Disintegration of the endometrium leading to menstruation.