



Grade 12 Biology

Chapter 3: Human Reproduction

Question bank 2

Q. 34. 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. 35. 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.

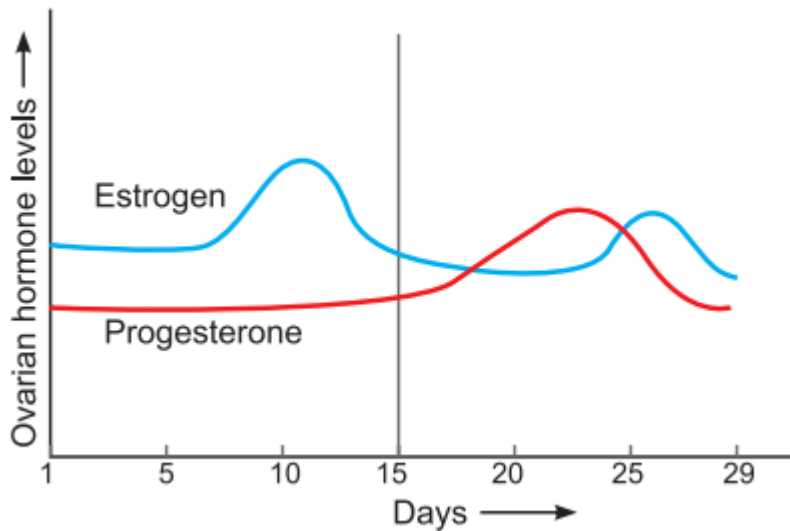
Q. 36. (i) How is placenta formed in the human female? (ii) Name any two hormones which are secreted by it and are also present in a non-pregnant woman.

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 progesterone.

Q. 37. 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, social myths and generation gap. (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.

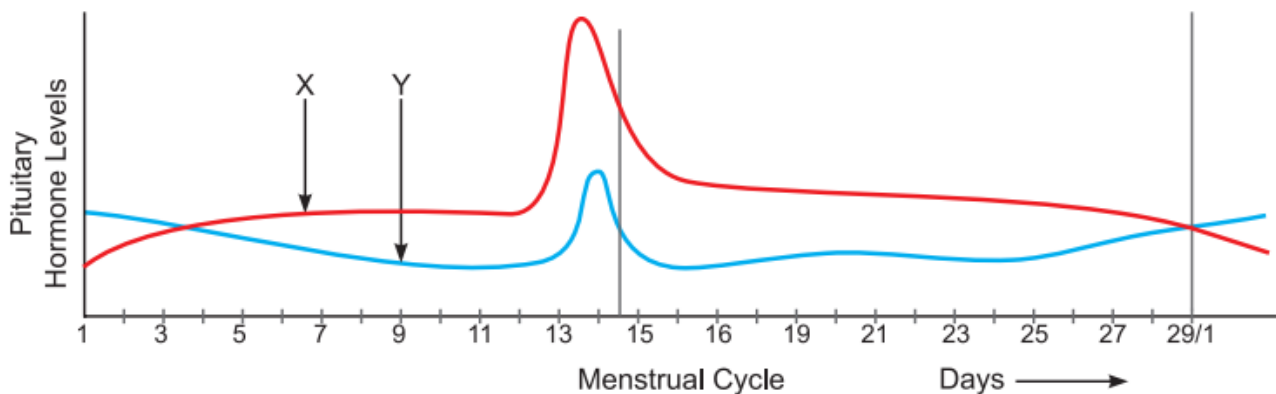
Q. 38.



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.

Q. 39. Study the graph given below and answer the questions that follow: [HOTS] (a) Name the hormones 'X' and 'Y'. (b) Explain the ovarian events (i), (ii) and (iii) under the influence of hormones 'X' and 'Y'.



Ans. (a) Hormone 'X': Luteinising hormone. Hormone 'Y': Follicle stimulating hormone. (b) (i) FSH is secreted by the anterior pituitary which stimulates the ovarian follicle to secrete estrogen, which in turn stimulates the proliferation of the endometrium of the uterine wall. (ii) Both LH and FSH attain a peak level in the middle of cycle (about 14th day). Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge induces rupture of Graafian follicle and thereby the release of ovum (ovulation). (iii) The remaining cells of ovarian follicles are stimulated by the LH to transform into corpus luteum. The corpus luteum secretes large amount of progesterone which is essential for maintenance of the endometrium.

Q. 40. (a) Write the specific location and the functions of the following cells in human males: (i) Leydig cells (ii) Sertoli cells (iii) Primary spermatocyte.

(ii) Explain the role of any two accessory glands in human male reproductive system.

(a)

	Cells	Location	Function
(i)	Leydig cells	Outside seminiferous tubules in interstitial space	Synthesis and secretion of testicular hormones called androgens.
(ii)	Sertoli cells	Inside the seminiferous tubules	Provide nutrition to the germ cells.
(iii)	Primary spermatocyte	Inner wall of seminiferous tubules	Undergo meiotic divisions to form secondary spermatocyte and then haploid sperms.

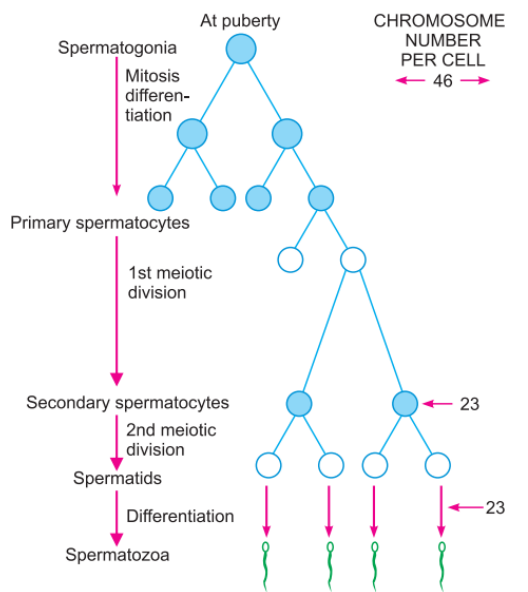
(b) The two accessory glands are: (i) Prostate gland: It surrounds the urethra and produces a milky secretion which forms a considerable part of semen. This secretion contains citric acid, lipids and enzymes. The secretion nourishes and activates the spermatozoa to swim. (ii) Seminal vesicles: These secrete mucous and a watery alkaline fluid that contains fructose which provides energy to the sperms.

Q. 41. (a) Where does spermatogenesis occur in human testes? Describe the process of spermatogenesis upto the formation of spermatozoa. (b) Trace the path of spermatozoa from the testes upto the ejaculatory duct only.

OR

Schematically represent and explain the events of spermatogenesis in humans.

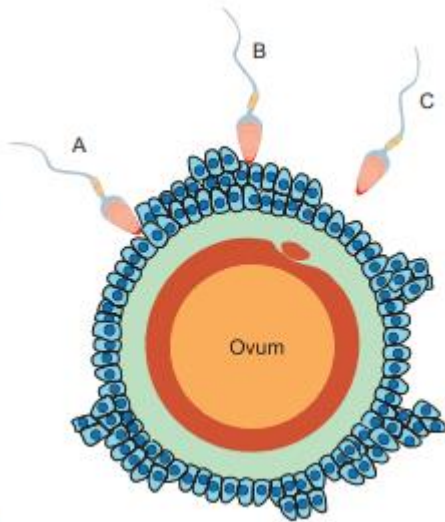
(a) Spermatogenesis occur in seminiferous tubules.



(b) The path of spermatozoa is as follows:

Seminiferous tubules - Rete testis - Vasa efferentia - Epididymis - Vas deferens - Ejaculatory duct

Q. 42. Given alongside is the diagram of a human ovum surrounded by a few sperms. Observe the diagram and answer the following questions: (a) Compare the fate of sperms shown in the diagram. (b) What is the role of zona pellucida in this process? (c) Analyze the changes occurring in the ovum during the process. (d) Mention what helps in the entry of sperm into the ovum. (e) Specify the region of female reproductive system where the event represented in the diagram takes place.



Ans. (a) A is able to penetrate/fertilize the ovum, whereas B and C are unable to penetrate/fertilise B and C will degenerate. (b) Zona pellucida ensures the entry of only one sperm into the ovum (c) Induces completion of meiotic division of the secondary oocyte, formation of second polar body and a haploid ovum (d) Enzymes of acrosome (e) Ampullary-isthmic junction of the fallopian tube

Q. 43. Enumerate the events in the ovary of a human female during: (i) Follicular phase (ii) Luteal phase of menstrual cycle. [

Ans. (i) In the follicular phase, following events occur: 1. The primary follicles in the ovary grow to form a fully mature Graafian follicle. 2. The endometrium of uterus regenerates through proliferation. 3. The secretion of gonadotropins (LH and FSH) gradually increases.

(ii) In the luteal phase, following events occur: 1. The parts of Graafian follicle remaining after the rupture, transform into the corpus luteum. 2. The corpus luteum secretes large amounts of progesterone.

Q. 44. Explain the ovarian and uterine events that occur during a menstrual cycle in a human female, under the influence of pituitary and ovarian hormones respectively.

Ans. Release of gonadotropins (FSH and LH) from pituitary, during follicular phase or 5-14 days of menstrual cycle leads to growth of primary follicle to Graafian follicle (GF.) in the ovary. Estrogen from growing follicle helps in proliferation of uterine endometrium or its repair. High level of LH at middle, i.e., 14th day of the menstrual cycle, leads to rupture of GF causing release of ovum. This is called ovulation. The remaining cells of GF transform into corpus luteum (CL) under the influence of LH. CL secretes progesterone that maintains endometrium in preparation for pregnancy. Level of FSH and LH fall due to rise of progesterone and estrogen (25th day of the cycle), leading to degeneration of CL. Level of progesterone falls, leading to disintegration of uterine endometrium and menstruation starts (0-5 day of the cycle).

Q. 45. During the reproductive cycle of a human female, when, where and how does a placenta develop? What is the function of placenta during pregnancy and embryo development?

Ans. After implantation, uterus, chorionic villi and uterine tissue become interdigitated (physically fused) to form a structural and functional unit between the developing embryo and the maternal body called placenta. Functions: (a) Placenta facilitates supply of oxygen and nutrients to the embryo. (b) Removes carbon dioxide, waste material and excretory material produced by the embryo. (c) Produces hCG/hPL, estrogens and progesterones.

Q. 46. Write the differences between spermatogenesis and oogenesis.

S.No.	Spermatogenesis	Oogenesis
(i)	It is the process of formation of haploid spermatozoa from diploid male germ cells of the testes.	It is the process of formation of haploid ova from the gamete mother cells (oogonia) in the ovary.
(ii)	It occurs in testes.	It occurs in ovaries.
(iii)	Spermatogonia changes to primary spermatocyte.	Oogonia changes to primary oocyte.
(iv)	A primary spermatocyte divides to form two secondary spermatocytes by meiosis I.	A primary oocyte divides by meiosis I to form one secondary oocyte and a polar body.
(v)	A secondary spermatocyte divides to form two spermatids by meiosis II.	A secondary oocyte divides by meiosis II to form ovum and a polar body.
(vi)	No polar body is formed.	Polar bodies are formed.
(vii)	Four spermatozoa are produced from one primary spermatocyte.	One ovum/egg is produced from 1 primary oocyte.

Q. 47. (a) Name the hormones secreted and write their functions: (i) by corpus luteum and placenta (any two). (ii) during follicular phase and parturition.

(b) Name the stages in a human female where: (i) Corpus luteum and placenta co-exist. (ii) Corpus luteum temporarily ceases to exist.

		Hormones Secreted	Their functions
(i)	By corpus luteum	1. Progesterone 2. Estradiol	Essential for maintaining endometrium for implantation of fertilised ovum. It also inhibits release of FSH.
	By placenta	1. Human Placental Lactogen	Stimulates the growth of the mammary glands during pregnancy.
		2. hCG (Human chorionic gonadotropin)	Maintains corpus luteum in pregnancy and stimulates release of progesterone.

(ii)	During follicular phase	1. LH 2. FSH	Stimulates follicular development as well as secretion of estrogen by growing follicles.
	During parturition	Oxytocin	Leads to contraction of smooth muscles of myometrium of the uterus during child birth.

(b) (i) During pregnancy (ii) During menstruation

Q. 48. (a) Arrange the following hormones in sequence of their secretion in a pregnant woman. (b) Mention their source and the function they perform: hCG, LH, FSH, Relaxin

Ans. (a) The sequence of secretion of hormones is: (i) FSH (ii) LH (iii) hCG (iv) Relaxin

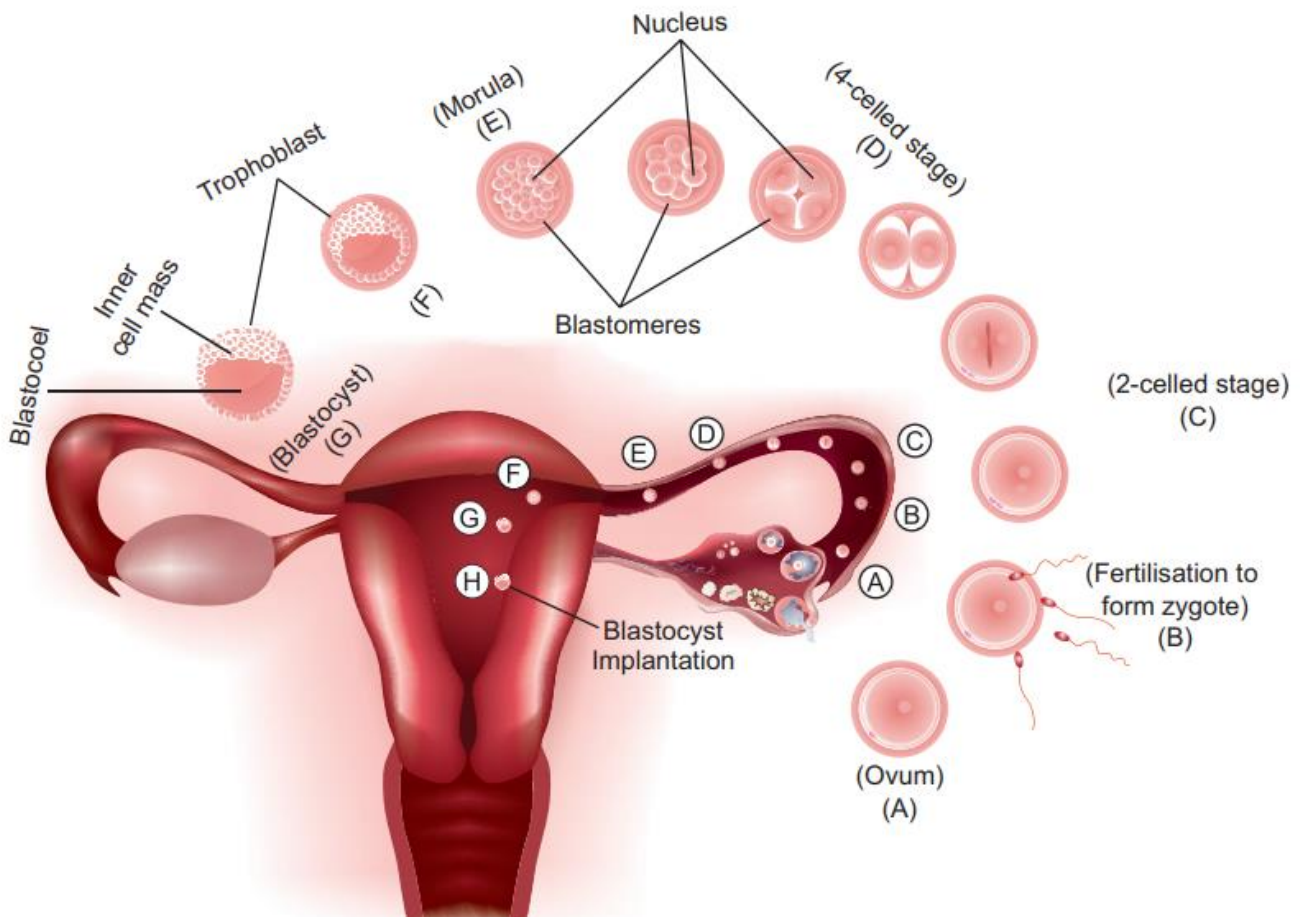
Hormone	Source	Function
(i) FSH	Anterior pituitary lobe.	Stimulates growth of ovarian follicles and maturation of primary oocytes.
(ii) LH	Anterior pituitary lobe.	Induces ovulation and maintains corpus luteum.
(iii) hCG	Chorionic cells of placenta	Maintains the corpus luteum and stimulates it to secrete progesterone.
(iv) Relaxin	Ovary	Helps during child birth by relaxing the pelvic muscles as well as muscles of the cervix.

Q. 49. Give the term/reason:

- (a) Mechanism responsible for parturition.
- (b) Role of oxytocin during expulsion of the baby out of uterus
- (c) Why does zona pellucida layer block the entry of additional sperms?
- (d) Sperm cannot reach ovum without seminal plasma.
- (e) All copulations do not lead to fertilisation and pregnancy.

Ans. (a) The complete neuro-endocrine mechanism. (b) Oxytocin acts on uterine muscle for stronger contraction. (c) To ensure the fusion of only one sperm with the ovum nucleus. (d) Seminal plasma is a liquid medium which helps the sperm to move and nourishes it. (e) All copulations do not lead to fertilization and pregnancy because fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary-isthmic junction.

Q. 50. Describe the post-zygotic events leading to implantation and placenta formation in humans. Mention any two functions of placenta.



Functions of placenta: (i) Transports substances like nutrients, O₂ and CO₂ to and from the embryo. (ii) Acts as an endocrine tissue and produces hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogens and progesterones to maintain pregnancy.