

Class: 12
Subject: Biology
Topic: Human Reproduction
No. of Questions: 25

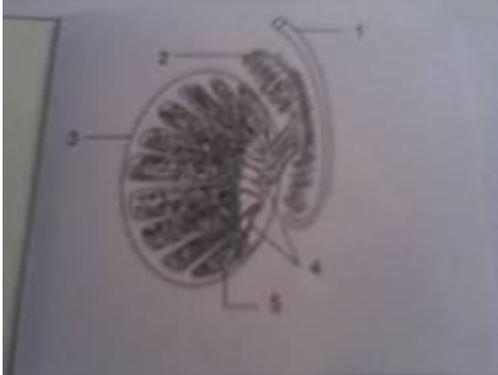
Q1. Differentiate between :

- (i) Structure of sperm and structure of ovum.
- (ii) Prostate and cowpers gland (nature of secretion).
- (iii) Implantation and gestation (definition).

Sol.

(i)	Sperm	Ovum
	1. It is the male gamete.	1. It is the female gamete.
	2. It is produced in the testes.	2. It is produced in the Ovary.
(ii)	3. It is motile, consists of head, neck, middle piece and tail.	3. Non-motile and round in structure.
	Prostate gland	Cowper's gland
	It's secretion is alkaline in nature and neutralizes acidity in semen in male urethra (due to previous urination) and female reproductive tract.	It's secretion serves as lubricant in vagina for frictionless movement of penis during copulation.
(iii)	Implantation	Gestation
	It is fixing of embryo on the wall of uterus.	It is full term of development of embryo in uterus (about 280 days).

Q2. The diagram given below is one of the system in the male human body :



- (i) Write down the name of the organ in the system.
- (ii) Label guidelines '1' to '5'.
- (iii) Write down the functions of guideline numbered 2 and 5.

Sol.

- (i)
A vertical section of a testis.
- (ii) 1 – Spermduct (Vas deferens). 2 – Epididymis.

3 – Outer wall of testis (Tunica Albuginea). 4 – Collecting ducts.

5 – Seminiferous tubules.

(iii) Function of No. 2. (Epididymis) – A tube like structure firmly attached to the testis.

The seminiferous tubules open into it through ducts. It is the chief store place of spermatozoa.

Function of No. 5. (Seminiferous tubules) – Arw coiled structure involved in the formation of spermatozoa. The seminiferous tubules form a network at the end of the testis.

Q3. Given below is the outline of the cross section of the male reproductive system :



(i) Name the hormone produced by the testis.

(ii) Why are sperms produced in large numbers ?

(iii) State the function of the seminal vesicles.

Sol. (i) Testosterone.

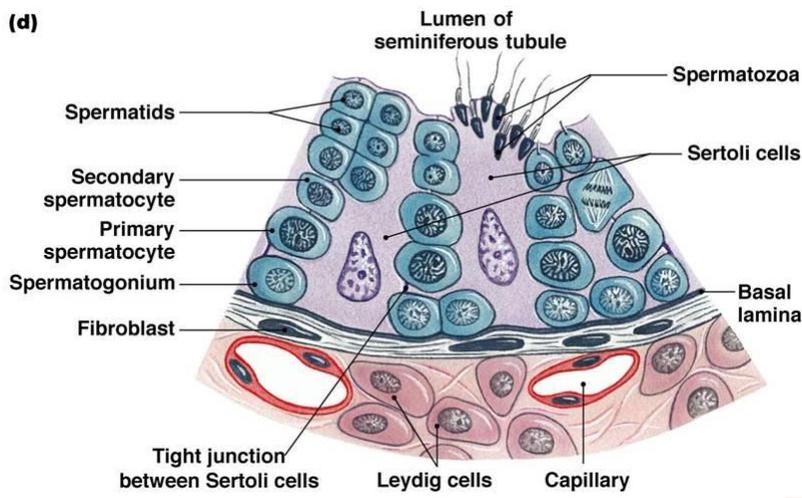
(ii) Low count of sperms causes infertility because large number of sperms go astray.

(iii) Seminal vesicles produce a secretion which serves as a medium for the movement of sperms towards the female oviduct.

Q4. Explain the structure of seminiferous tubules.

Sol. The production of sperms in the testes takes place in a highly coiled structure called the seminiferous tubules. These tubules are located in the testicular lobules. Each seminiferous tubule is lined cells respectively. Spermatogonia are male germ cells which produced primary spermatocytes by meiotic divisions. Primary spermatocytes undergo further meiotic division to form secondary spermatocytes and finally, spermatids. Spermatids later metamorphoses into male gametes called spermatozoa. Sertoli cells are known as nurse called of the testes as They provide nourishment to the germ cells. There are large polygonal cells known as interstitial cells or leydig cells just adjacent to seminiferous tubules. These cells secrete the male hormone called testosterone.

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Q5. Name the hormones involved in spermatogenesis.

Sol. Follicle- stimulating hormones (FSH) and luteinizing hormones (LH) are secreted by gonadotropin releasing hormones from the hypothalamus. These hormones are involved in the regulation of the process of spermatogenesis. FSH acts on sertoli cells, whereas LH acts on leydig cells of the testis and stimulates the process of spermatogenesis.

Q6. What is spermiogenesis and spermiation.

Sol. Spermiogenesis : it is the process of transforming spermatids into matured spermatozoa or sperms.

Spermiation: it is the process when mature spermatozoa are released from the sertoli cells into the lumen of seminiferous tubules.

Q7. After passing the epididymides through which structures do sperm cells go until exteriorization?

Sol. After leaving the epididymis in the testicle sperm cells enter the vas deferens, after that they receive secretions from the seminal vesicles and gather (from right and left sides) in the ejaculatory duct that passes inside the prostate. They also get secretions from the prostate and the bulbourethral glands and then go through the urethra, inside the penis, to the exterior.

Q8. What is the function of the secretions of the prostate, seminal vesicle and bulbourethral glands in reproduction?

Sol. These secretions along with sperm cells from the testicles form the semen. The secretions have the function of nourishing the sperm cells and serving them as a fluid medium of propagation. The basic pH of the seminal fluid also neutralizes the acid secretions of the vagina allowing the survival of sperm cells in the vaginal environment after copulation.

Q9. What are the endocrine glands that regulate sexual activity in males? How does this regulation work and what are the involved hormones?

Sol. In males the sexual activity is regulated by the endocrine glands hypophysis (pituitary), adrenals and gonads (testicles).

The FSH (follicle-stimulating hormone) secreted by the adenohypophysis acts upon the testicles stimulating the spermatogenesis. The LH (luteinizing hormone), another adenohypophyseal hormone, stimulates the production of testosterone by the testicles too. Testosterone, whose production intensifies after the beginning of puberty, acts in several organs of the body and it is responsible for the appearing of the male secondary sex characteristics (beard, body hair, deep voice, increase of the muscle and osseous mass, maturation of genitalia, etc.) Testosterone also stimulates spermatogenesis.

Q10. In which period of life does the formation of gametes begin in women?

Sol. The meiosis that forms female gametes begins in the cells of the ovarian follicles before birth. After the beginning of puberty, under hormonal stimuli, during each menstrual cycle one of the cells is released on the surface of the ovary and meiosis resumes. The meiotic process is only concluded however if fecundation happens.

Q11. What is the menstrual cycle?

Sol. The menstrual cycle is the periodic succession of interactions between hormones and the organs of the female reproductive system that, after the beginning of puberty, regulates the release of the female gametes and prepares the uterus for fecundation and pregnancy.

Q12. What are the endocrine glands involved in the menstrual cycle? What are the hormones in action?

Sol. The endocrine glands that secrete hormones involved in the menstrual cycle are the hypophysis (pituitary) and the ovaries.

The hormones from adenohypophysis are FSH (follicle-stimulating hormone) and LH (luteinizing hormone) and the hormones from the ovaries are estrogen and progesterone.

Q13. What event marks the beginning of the menstrual cycle? What is the blood concentration of FSH, LH, estrogen and progesterone in this phase of the cycle?

Sol. By convention the menstrual cycle begins at the day that menses begins. (Menses is the endometrial hemorrhage excreted through the vaginal canal.) At these days the hormones FSH, LH, estrogens and progesterone are in low concentration.

Q14. What do you understand by amniocentesis? Why is there a statutory ban on this? Give reason.

Sol. It is a procedure in which amniotic fluid is taken from amniotic sac of the foetus to diagnose various chromosomal and genetic disorders. During this test sex of the baby is also revealed. This promotes the practice of female foeticide. Hence, it is justified to ban the process to check female foeticide

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Q16. What are the anatomical relationships between the organs of the female reproductive system from the external vulva to the ovaries?

Sol. The external female genitalia is called the vulva. The vulva is the external opening of the vaginal canal, or vagina. The vagina is the copulation organ of the females and its posterior extremity communicates with the uterus through the uterine cervix. The uterus is divided into two portions: the cervix and the uterine cavity. The lateral walls of the uterine fundus communicate with the Fallopian tubes. The other extremity of each Fallopian tube ends in fimbria forming fringes in the abdominal cavity. Between the uterine tube and the ovary there is still intra-abdominal space.

Q17. What is the hormone secreted by the growing ovarian follicles? What is the action of that hormone upon the uterus?

Sol. The follicles that are growing after menses secrete estrogen. These hormones act upon the uterus stimulating the thickening of the endometrium (the internal mucosa of the uterus).

Q18. What are the common contraindications of the contraceptive pills?

Sol. There are medical reports associating the use of contraceptive pills with vomiting, nausea, vertigo, headaches, hypertension and other pathological conditions. Some research has attempted to relate the medical ingestion of estrogen and progesterone with increased propensity to cardiovascular diseases (like infarction, strokes and thrombosis) and to malignant neoplasias (cancers). Doctors must always be asked about the risks and benefits of the contraceptive pill prior to use.

Q19. How does the contraceptive diaphragm work? What are the limitations of this contraceptive method?

Sol. The contraceptive diaphragm is an artifact made of latex or plastic that when placed on the vaginal fundus covers the uterine cervix forbidding the passage of sperm cells through the cervical canal. To be more effective the diaphragm needs to be used together with spermicide. This method however does not prevent sexually transmitted diseases (STDs).

Q20. What is the normal duration of the menstrual cycle? How does the calendar contraceptive method work?

Sol. The normal duration of the menstrual cycle is 28 days but it can vary among different women or in different cycles of the same woman.

In the calendar contraceptive method the date $n-14$ (n minus 14) is taken considering n the number of days of the normal menstrual cycle of the woman (generally $n=28$). The safety margin $+3$ or -3 refers to the days around $n-14$ that intercourse should be avoided to prevent pregnancy. (This method is not exempt from failures. A doctor must always be consulted before relying on any contraceptive method.)

Q21. Secretion of testosterone by Leydig's cells is stimulated by

- (a) FSH
- (b) TSH
- (c) LH
- (d) ACTH
- (e) ICSH

Sol. e

Q22. Pregnancy test is confirmed by the presence of

- (a) Prolactin in urine
- (b) relaxin in urine
- (c) h C G in urine
- (d) FSH and LH in urine
- (e) renin and erythropoietin in urine

Sol. c

Q23. Implantation of human embryo occurs when it is a

- (a) morula
- (b) neurula
- (c) gastrula
- (d) zygote
- (e) blastocyst

Sol. e

Q24. Tyson's glands occur in male on

- (a) urethra
- (b) scrotum
- (c) prepuce
- (d) epididymis
- (e) seminal vesicle.

Sol. c

Q25. Sertoli cells are

- (a) endocrine
- (b) nutritive
- (c) protective
- (d) Secretary
- (e) all the above

Sol. b