

1. Fill in the blanks:

- (a) Humans reproduce _____
(asexually/sexually)
- (b) Humans are _____
(oviparous, viviparous, ovoviviparous)
- (c) Fertilisation is _____ in
humans (external/internal)
- (d) Male and female gametes are
_____ (diploid/haploid)
- (e) Zygote is _____
(diploid/haploid)
- (f) The process of release of ovum from a
mature follicle is called _____
- (g) Ovulation is induced by a hormone
called _____
- (h) The fusion of male and female
gametes is called _____
- (i) Fertilisation takes place in

- (j) Zygote divides to form
_____ which is implanted in
uterus.
- (k) The structure which provides vascular
connection between foetus and uterus is
called _____

1. Fill in the blanks

- (a) Humans reproduce **sexually**.
- (b) Humans are **viviparous**.
- (c) Fertilisation is **internal** in humans.
- (d) Male and female gametes are **haploid**.
- (e) Zygote is **diploid**.
- (f) The process of release of ovum from a
mature follicle is called **ovulation**.
- (g) Ovulation is induced by a hormone
called **LH (Luteinising Hormone)**.

(h) The fusion of male and female gametes is called **fertilisation**.

(i) Fertilisation takes place in **ampullary-isthmic junction of fallopian tube**.

(j) Zygote divides to form **blastocyst** which is implanted in uterus.

(k) The structure which provides vascular connection between foetus and uterus is called **placenta**.

2. Draw a labelled diagram of male reproductive system.

3. Draw a labelled diagram of female reproductive system.

4. Write two major functions each of testis and ovary.

4. Two major functions each of testis and ovary

Functions of Testis

1. Production of sperms
2. Secretion of androgens (testosterone)

Functions of Ovary

1. Production of ova
2. Secretion of estrogen and progesterone

5. Describe the structure of a seminiferous tubule.

5. Structure of Seminiferous Tubule

- Seminiferous tubules are highly coiled structures present inside testicular lobules.
- Lined internally by:
 1. Spermatogonia (male germ cells)
 2. Sertoli cells
- Spermatogonia produce sperms through meiosis.

- Sertoli cells provide nourishment.
- Outside the tubules are Leydig cells which secrete androgens.

6. What is spermatogenesis? Briefly describe the process of spermatogenesis.

Spermatogenesis is the process by which male reproductive cells (**sperm**) are formed from **spermatogonial stem cells** in the **seminiferous tubules of the testes**. It begins at puberty and continues throughout a male's reproductive life.

Process of Spermatogenesis

1. Multiplication Phase

- Diploid **spermatogonia (2n)** divide repeatedly by **mitosis**.
- Some remain as stem cells, while others develop into primary spermatocytes.

2. Growth Phase

- Spermatogonia enlarge to form **primary spermatocytes (2n)**.

3. Maturation Phase

- Each primary spermatocyte undergoes **Meiosis I** to produce **two secondary spermatocytes (n)**.
- Each secondary spermatocyte undergoes **Meiosis II** to form **two spermatids (n)**.

- Thus, one primary spermatocyte produces **four haploid spermatids**.

4. **Spermiogenesis**

- The spermatids differentiate into **mature spermatozoa (sperm)**.
 - During this stage, they develop a head, middle piece, and tail, and excess cytoplasm is removed.
- **Site:** Seminiferous tubules of the testes
 - **Starts:** At puberty
 - **Result:** One primary spermatocyte forms **four haploid sperm cells** capable of fertilization.

7. **Name the hormones involved in regulation of spermatogenesis.**

The hormones involved in the regulation of **spermatogenesis** are:

1. **Gonadotropin-Releasing Hormone (GnRH)** – Secreted by the hypothalamus; stimulates the pituitary gland to release FSH and LH.
2. **Follicle-Stimulating Hormone (FSH)** – Secreted by the anterior pituitary; acts on Sertoli cells and promotes spermatogenesis.
3. **Luteinizing Hormone (LH)** (called ICSH in males) – Secreted by the anterior pituitary; stimulates Leydig cells to produce testosterone.

4. **Testosterone** – Secreted by Leydig cells in the testes; essential for the growth, maturation, and maintenance of spermatogenesis.

→ The hormones regulating spermatogenesis are **GnRH, FSH, LH (ICSH), and testosterone**. GnRH stimulates the release of FSH and LH. FSH acts on Sertoli cells to support sperm formation, while LH stimulates Leydig cells to secrete testosterone, which is necessary for the completion and maintenance of spermatogenesis.

8. Define spermiogenesis and spermiation.

8. Define spermiogenesis and spermiation **Spermiogenesis**

Transformation of spermatids into spermatozoa.

Spermiation

Release of sperms from Sertoli cells into seminiferous tubules.

9. Draw a labelled diagram of sperm.

10. What are the major components of seminal plasma?

10. Major components of seminal plasma

- Fructose
- Calcium
- Enzymes

11. What are the major functions of male accessory ducts and glands?

11. Functions of male accessory ducts and glands

Accessory ducts

- Store sperms
- Transport sperms

Accessory glands

- Produce seminal plasma
- Nourish sperms
- Help in sperm motility and lubrication

12. What is oogenesis? Give a brief account of oogenesis.

12. Oogenesis

Definition

Process of formation of ovum in ovary.

Process

1. Oogonia multiply by mitosis during foetal life.
2. Oogonia form primary oocytes.
3. Primary oocyte undergoes meiosis I to form secondary oocyte and first polar body.
4. Secondary oocyte is released during ovulation.
5. Meiosis II completes only after fertilisation producing ovum and second polar body.

13. Draw a labelled diagram of a section through ovary.

14. Draw a labelled diagram of a Graafian follicle?

15. Name the functions of the following:

(a) Corpus luteum (b) Endometrium

(c) Acrosome (d) Sperm tail

(e) Fimbriae

15. Functions

(a) Corpus luteum

- Secretes progesterone.

(b) Endometrium

- Site of implantation.
- Nourishes embryo.

(c) Acrosome

- Releases enzymes for fertilisation.

(d) Sperm tail

- Helps in motility.

(e) Fimbriae

- Collect ovum after ovulation.

16. Identify True/False statements.

Correct each false statement to make it true.

(a) Androgens are produced by Sertoli cells. (True/False)

(b) Spermatozoa get nutrition from Sertoli cells. (True/False)

(c) Leydig cells are found in ovary. (True/False)

(d) Leydig cells synthesise androgens. (True/False)

(e) Oogenesis takes place in corpus luteum. (True/False)

(f) Menstrual cycle ceases during pregnancy. (True/False)

(g) Presence or absence of hymen is not a reliable indicator of virginity or sexual experience. (True/False)

16. True/False

(a) Androgens are produced by Sertoli cells.

— **False**

Correct: Androgens are produced by **Leydig cells**.

(b) Spermatozoa get nutrition from Sertoli cells. — **True**

(c) Leydig cells are found in ovary. — **False**

Correct: Leydig cells are found in **testis**.

(d) Leydig cells synthesise androgens. —

True

(e) Oogenesis takes place in corpus luteum.

— **False**

Correct: Oogenesis takes place in **ovary**.

(f) Menstrual cycle ceases during pregnancy.

— **True**

(g) Presence or absence of hymen is not a reliable indicator of virginity or sexual experience. — **True**

17. What is menstrual cycle? Which hormones regulate menstrual cycle?

17. Menstrual Cycle

- Cyclic changes in female reproductive system occurring every 28 days.
- Regulated by:
 1. FSH
 2. LH
 3. Estrogen
 4. Progesterone

18. What is parturition? Which hormones are involved in induction of parturition?

18. Parturition

Definition

Process of childbirth.

Hormones involved

1. Oxytocin
2. Relaxin

19. In our society the women are often blamed for giving birth to daughters. Can you explain why this is not correct?

19. Why women are not responsible for birth of daughters

- Females produce ova carrying only X chromosome.
- Males produce sperms carrying X or Y chromosome.
- XX produces female baby and XY produces male baby.
- Therefore, father determines sex of child.

20. How many eggs are released by a human ovary in a month? How many eggs do you think would have been released if the mother gave birth to identical twins? Would your answer change if the twins born were fraternal?

20. Eggs released in twins

- Normally one egg is released every month.

Identical twins

- One egg released.
- One zygote divides into two embryos.

Fraternal twins

- Two eggs released.
- Fertilised by two different sperms.

21. How many eggs do you think were released by the ovary of a female dog which gave birth to 6 puppies?

21. Eggs released in female dog giving birth to 6 puppies

- Approximately **6 eggs** were released and fertilised.

Human Reproduction Exercises

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- (a) Humans reproduce **sexually**.
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- (g) Ovulation is induced by a hormone called **LH (Luteinising Hormone)**.
- (h) The fusion of male and female gametes is called **fertilisation**.
- (i) Fertilisation takes place in **ampullary-isthmic junction of fallopian tube**.
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3. Production of sperms
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Functions of Ovary

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6. Spermatogenesis

Definition

Process of formation of sperms from spermatogonia in seminiferous tubules.

Process

1. Spermatogonia divide by mitosis.
2. Some enlarge to form primary spermatocytes.
3. Primary spermatocytes undergo meiosis I forming two secondary spermatocytes.
4. Secondary spermatocytes undergo meiosis II forming four spermatids.

5. Spermatids transform into sperms by spermiogenesis.

7. Hormones involved in regulation of spermatogenesis

1. GnRH
2. FSH
3. LH
4. Androgens (Testosterone)

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Spermiogenesis

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15. Functions

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- Site of implantation.
- Nourishes embryo.

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- Releases enzymes for fertilisation.

(d) Sperm tail

- Helps in motility.

(e) Fimbriae

- Collect ovum after ovulation.

16. True/False

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Correct: Androgens are produced by **Leydig cells**.

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(c) Leydig cells are found in ovary. — **False**

Correct: Leydig cells are found in **testis**.

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True

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Correct: Oogenesis takes place in **ovary**.

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(g) Presence or absence of hymen is not a reliable indicator of virginity or sexual experience. — **True**

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