

CHAPTER 2

Human Reproduction

CBSE · Biology · Class 12

WHAT THIS CHAPTER DOES

Boards prep that builds confidence, not anxiety.

TODAY'S MISSION

Today's Mission

WHY THIS MATTERS

The Big Picture

TOPIC

Anatomy Self-Check (Pre-Lecture)

TOPIC

A

Part A — Male Reproductive System

TOPIC

Male System: The Three Compartments

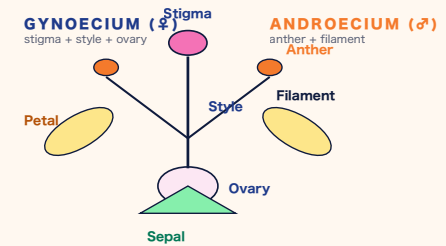
POINT 1

POINT 2

POINT 3

WORKED EXAMPLE

Inside the Seminiferous Tubule (★ Annual Diagram)



TRY IT · SOLVE BEFORE YOU PEEK

Quick Test — 30 seconds

Which cell of the testis is stimulated by LH to secrete testosterone?

SOLUTION

TOPIC

B

Part B — Female Reproductive System

TOPIC

Female System: The Pathway of Reproduction

POINT 1

POINT 2

POINT 3

TOPIC

Mammary Glands Quick Stats

TOPIC

C

Part C — Gametogenesis

WORKED EXAMPLE

Spermatogenesis — The 4-Sperm Factory

TRY IT · SOLVE BEFORE YOU PEEK

Pause — hormone control quick check

Work it out before you flip the answer.

SOLUTION

WORKED EXAMPLE

Oogenesis — The 1-Ovum + 3 Polar Bodies Story

TOPIC

Spermatogenesis vs Oogenesis — Key Contrasts

TOPIC

D

Part D — Menstrual Cycle

TOPIC

The Four Phases

POINT 1

POINT 2

POINT 3

POINT 4

TRY IT · SOLVE BEFORE YOU PEEK

Quick Test — The LH Surge

The sharp rise (surge) of which hormone directly triggers ovulation on Day 14?

SOLUTION

TOPIC

Hormone Peak Calendar (28-day cycle)

TOPIC

E

Part E — Fertilisation, Pregnancy, Parturition

WORKED EXAMPLE

Fertilisation → Blastocyst → Implantation

PYQ PATTERNS

PYQ Pattern Heatmap

MARKS DISTRIBUTION

Where the Marks Are (sub-topic weights)

TOPPER TEMPLATE · MARK-BY-MARK

Topper's 5-mark Answer — Spermatogenesis

TOPIC

Quick Test — Fertilisation Site

TOPPER TEMPLATE · MARK-BY-MARK

Describe spermatogenesis with a schematic representation.

- | | | |
|----------|----------------------------------|---|
| 1 | DEFINE + SITE
1 m | Spermatogenesis is the process by which immature germ cells (spermatogonia) produce mature spermatozoa. It occurs in the SEMINIFEROUS TUBULES of the testis from puberty onwards. |
| 2 | STAGES WITH PLOIDY
2 m | Spermatogonia ($2n$, 46) divide by mitosis and some enter meiosis as PRIMARY SPERMATOCYTES ($2n$). Meiosis-I produces 2 SECONDARY SPERMATOCYTES (n , 23). Meiosis-II produces 4 SPERMATIDS (n). Spermatids undergo SPERMIOGENESIS — they reshape into motile SPERMATOZOA (n). Net yield: one spermatogonium $\rightarrow$ 4 sperm. |
| 3 | HORMONAL CONTROL
1 m | Hypothalamus secretes GnRH $\rightarrow$ anterior pituitary releases FSH (acts on Sertoli cells, supports spermatogenesis) and LH (acts on Leydig cells $\rightarrow$ testosterone, which is essential for spermatogenesis). |
| 4 | SCHEMATIC DIAGRAM
1 m | Draw a vertical flow: Spermatogonium ($2n$) $\rightarrow$ [mitosis] $\rightarrow$ Primary spermatocyte ($2n$) $\rightarrow$ [meiosis-I] $\rightarrow$ 2 Secondary spermatocytes (n) $\rightarrow$ [meiosis-II] $\rightarrow$ 4 Spermatids (n) $\rightarrow$ [spermiogenesis] $\rightarrow$ 4 Spermatozoa. Label arrows. |

TOPPER TEMPLATE · MARK-BY-MARK

Describe the menstrual cycle with hormone levels.

1 DEFINE + LENGTH 1 m

The menstrual cycle is the cyclical reproductive cycle in human females, averaging 28 days, from menarche to menopause. Day 1 is the FIRST day of menstrual bleeding.

2 FOUR PHASES 2 m

Phase 1 — MENSTRUAL (1-5): endometrium sheds. Phase 2 — FOLLICULAR/PROLIFERATIVE (6-13): FSH stimulates a Graafian follicle; estrogen rebuilds endometrium. Phase 3 — OVULATORY (Day 14): sharp LH SURGE triggers release of the secondary oocyte. Phase 4 — LUTEAL/SECRETORY (15-28): corpus luteum secretes PROGESTERONE; endometrium becomes glandular. If no fertilisation, corpus luteum regresses → progesterone falls → menstruation.

3 HORMONE GRAPH 1 m

Draw 4-curve hormone graph across days 1-28: (i) FSH small peak day 12-13; (ii) LH SHARP SPIKE day 14; (iii) Estrogen peaks just before ovulation (day 13); (iv) Progesterone peaks day 21-22.

4 ENDOMETRIAL CORRELATE 1 m

Beneath the hormone graph, sketch the endometrium thickness: thin (1-5), thickening (6-13), thick + glandular (15-22), shed (1-5 of next cycle). Mark 'OVULATION ↓' under day 14.

TOPPER TEMPLATE · MARK-BY-MARK

Differentiate spermatogenesis and oogenesis.

1	SITE + START TIME 1 m	Spermatogenesis: in seminiferous tubules of testis; begins at PUBERTY; continuous throughout life. Oogenesis: in ovary; begins in FETAL LIFE; primary oocytes formed before birth; cyclical from puberty to menopause.
2	NUMBER OF GAMETES 1 m	Spermatogenesis: one spermatogonium → 4 functional spermatozoa. Oogenesis: one oogonium → 1 functional ovum + 2-3 polar bodies (which degenerate).
3	MEIOTIC ARRESTS 1 m	Spermatogenesis: no major arrest; meiosis I and II proceed in sequence. Oogenesis: TWO arrests — Prophase-I (fetal life → puberty, released per cycle) and Metaphase-II (at ovulation, released ONLY after sperm entry).

PYQ PATTERNS

Top PYQ patterns to drill

#1	Draw a labelled diagram of T.S. of a seminiferous tubule and label Sertoli cell, spermatogonia, Leydig cell. (3 marks)	90%
#2	Draw a labelled diagram of the human female reproductive system / sectional view of ovary showing follicles. (5 marks)	85%
#3	With the help of a schematic diagram, describe spermatogenesis OR oogenesis. (5 marks)	80%
#4	Explain the menstrual cycle with respect to the changes in hormones (FSH, LH, estrogen, progesterone) and the ovary/uterus. (5 marks)	95%
#5	Describe fertilisation and implantation / role of placenta in pregnancy. (3 marks)	75%

RECAP · MEMORISE THESE

Chapter Summary

1 Male system: testes (in scrotum) → ducts (RE-V-E-V-E-U) → urethra. Sertoli (INSIDE, FSH); Leydig (OUTSIDE, LH).

2 Female system: ovary → fimbriae → ampulla (★ fertilisation) → uterus (3 layers) → cervix → vagina.

3 Spermatogenesis: 1 spermatogonium → 4 sperm (puberty, continuous). Oogenesis: 1 oogonium → 1 ovum + polar bodies (fetal start, 2 arrests).

4 Menstrual cycle 28 days: Day 1 = bleeding; Day 14 =

5 Fertilisation in AMPULLA → zygote → morula →

6 Parturition: oxytocin positive feedback. Lactation: prolactin

WHAT'S NEXT

Next Class



Master Human Reproduction in 90 Minutes

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