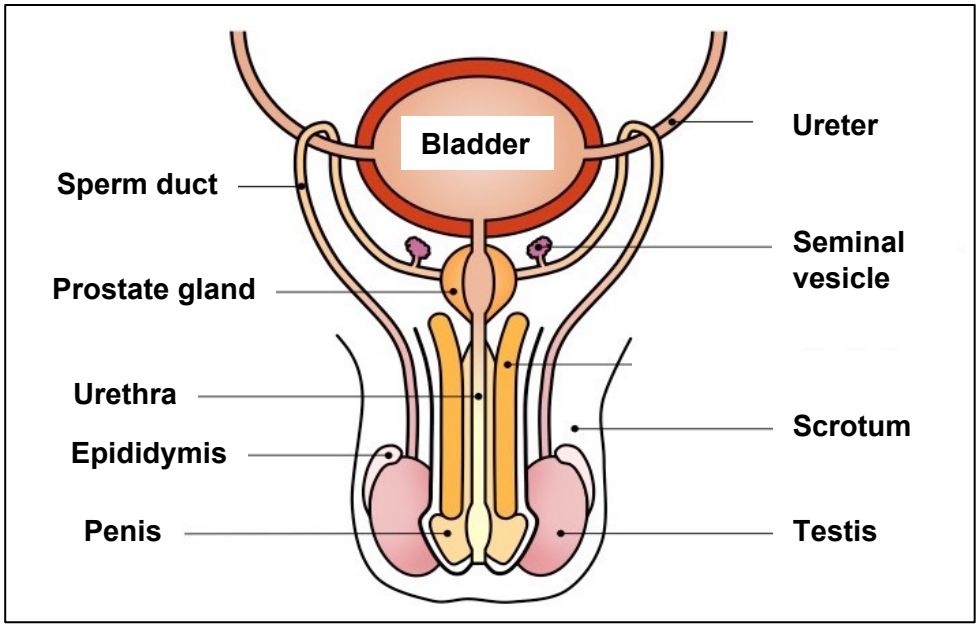
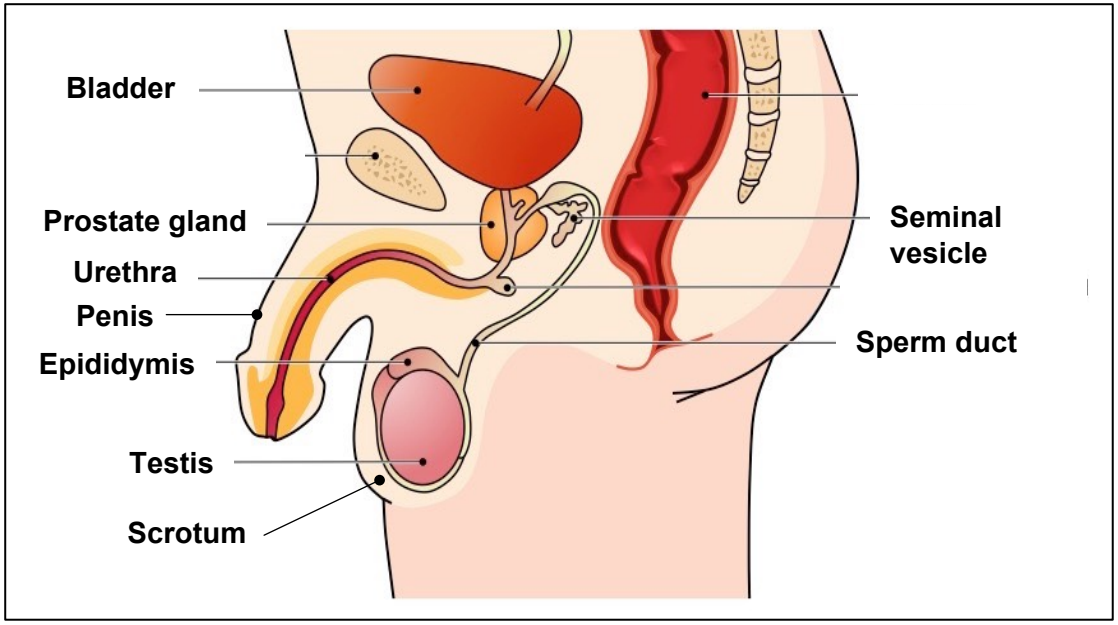
A. THE MALE REPRODUCTIVE SYSTEM

FRONT VIEW



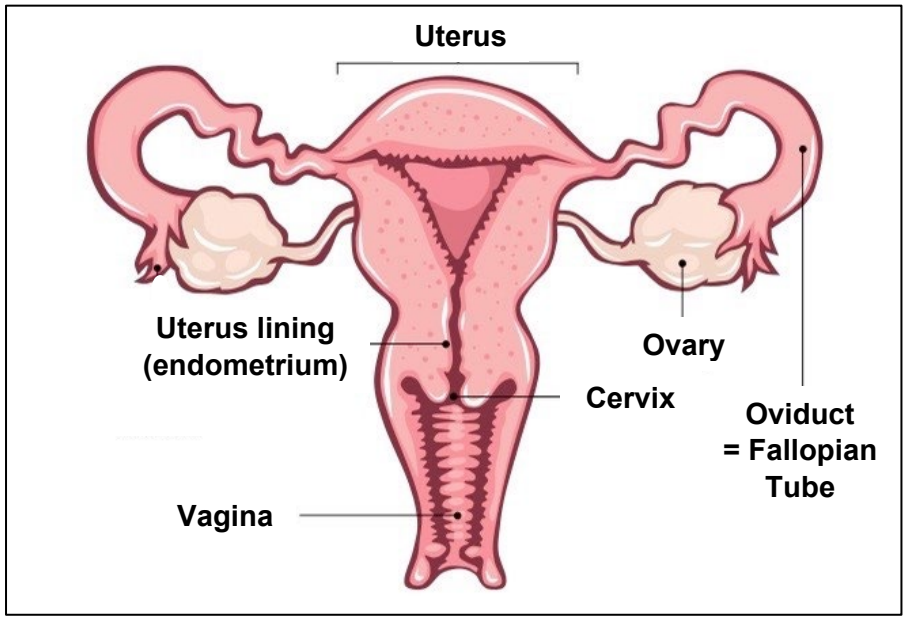
SIDE VIEW



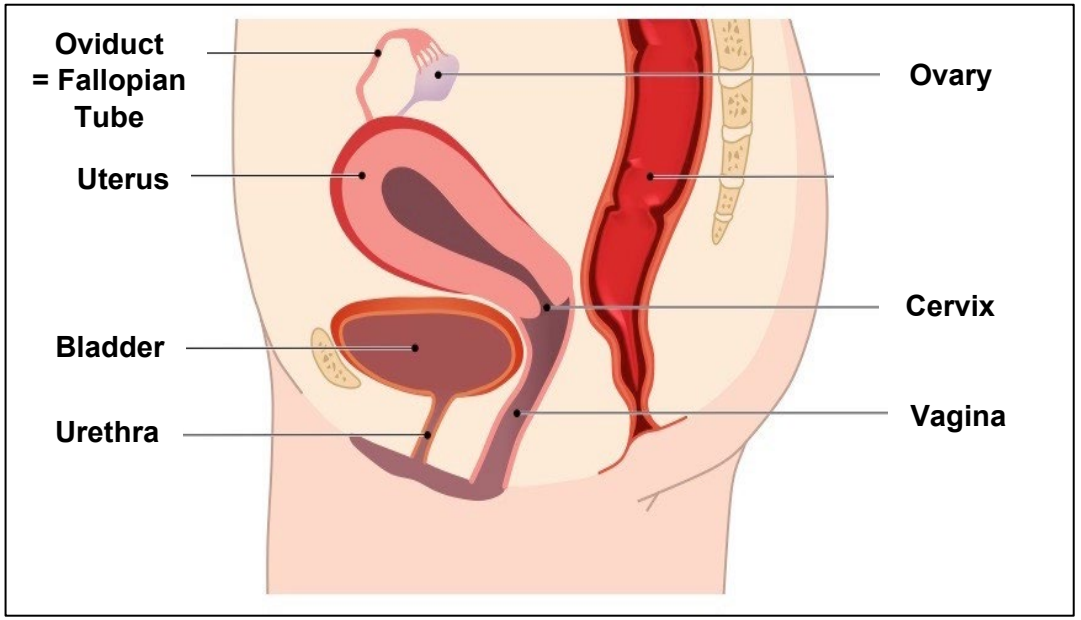
PART	ROLE
BLADDER	• Stores urine
PROSTATE GLAND	• Adds an alkali fluid to sperm at the start of ejaculation to help them swim
URETHRA	• Transfers semen during ejaculation and urine during urination out of the body
EPIDIDYMIS	• Stores sperm until ejaculation
TESTIS	• Produces sperm and testosterone
SCROTUM	• Sac that holds the testes at lower than body temperature for better sperm production
SEMINAL VESICLE	• Adds an alkali fluid to sperm at the end of ejaculation, containing proteins that makes the semen sticky
SPERM DUCT	• Transfers sperm from the testes to the urethra during ejaculation

B. THE FEMALE REPRODUCTIVE SYSTEM

FRONT VIEW

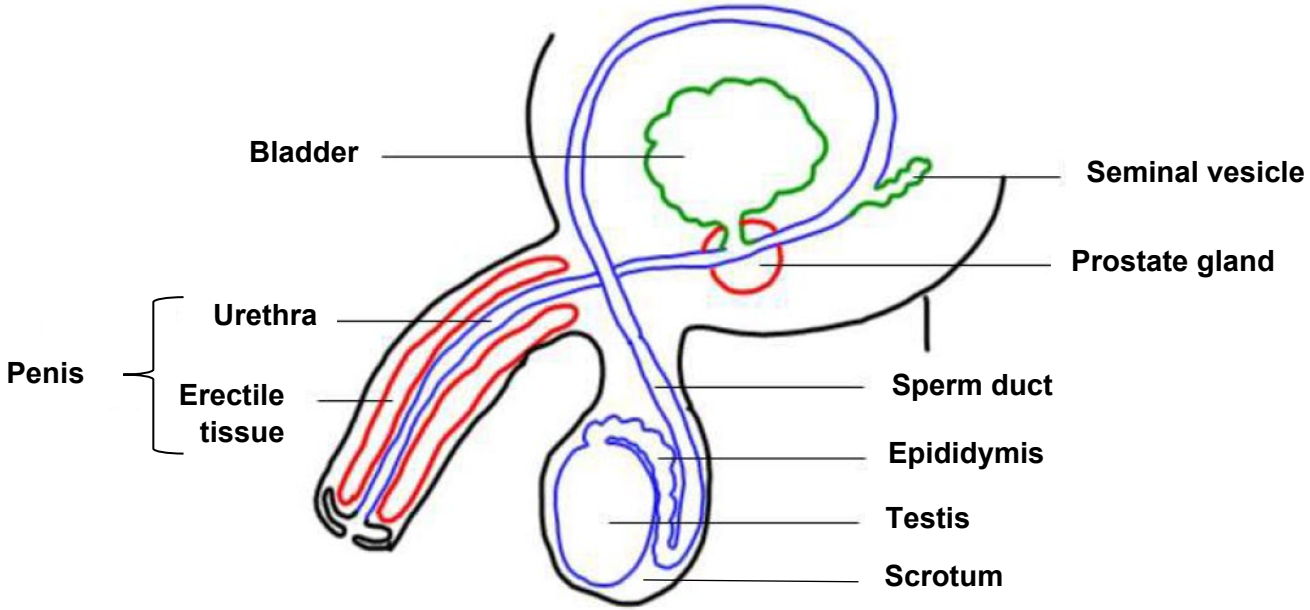


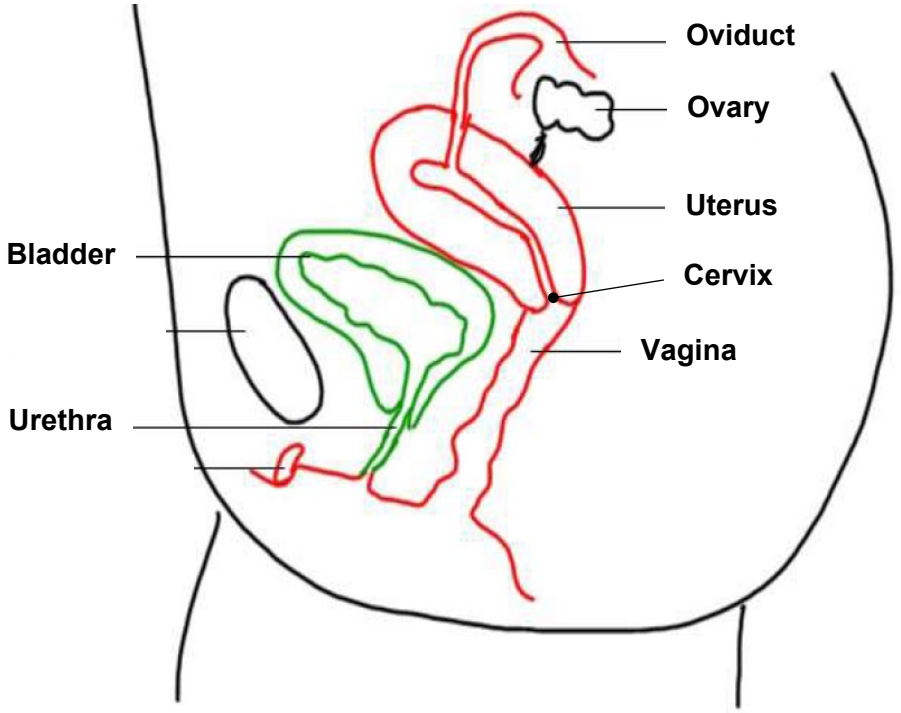
SIDE VIEW



PART	ROLE
BLADDER	• Stores urine
UTERUS	• Gives protection, food and oxygen to the fetus during pregnancy • Removes waste products for the fetus during pregnancy
UTERUS LINING	• An embryo first implants itself here
VAGINA	• Stimulates penis to ejaculate and provides a birth canal
OVARY	• Produces eggs, oestrogen and progesterone
CERVIX	• Opening to the uterus that: - protects the fetus during pregnancy - widens during childbirth to form the birth canal
OVIDUCT	• Collects eggs at ovulation, fertilization occurs here and cilia move the embryo to the uterus
URETHRA	• Transfers urine during urination out of the body

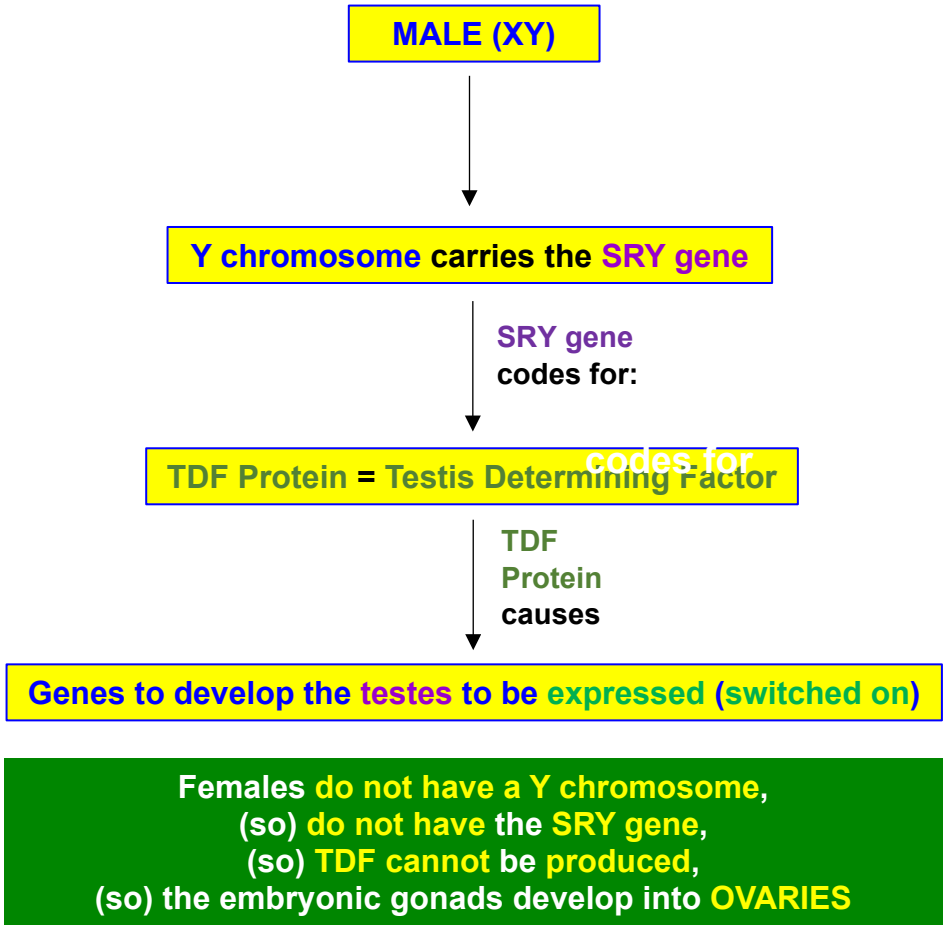
C. HOW TO DRAW AND LABEL THESE IN LONG-ANSWER QUESTIONS





D. WHAT DETERMINES THE SEX OF A CHILD?

- From IGCSE, you know that it is the **sex chromosomes**: **females** are **XX** and **males** are **XY**



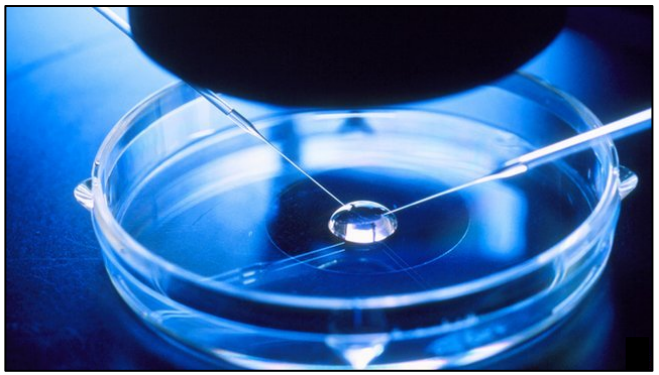
E. STEROID HORMONES

HORMONE	ROLE
TESTOSTERONE	**Before birth:** • Causes **male genitals** to develop: **penis**; **sperm duct**; **prostate gland** **During puberty** (secondary sexual characteristics): • Growth of **testes**, **penis** and **pubic hair** • Stimulates **sperm production**
OESTROGEN	**Before birth:** • Causes **female genitals** to develop **if testosterone is not present**, including: **oviduct**, **uterus** and **vagina** **During puberty** (secondary sexual characteristics): • Growth of breasts and pubic hair
PROGESTERONE	• **Maintains** the **uterus lining** during the **menstrual cycle** for **implantation** of an **embryo**. • **Inhibits FSH** and **LH** to **prevent follicles maturing** and **ovulation**.

F. IN VITRO FERTILIZATION (IVF)

1. DOWN REGULATION

- **Drug** is given in a **nasal spray** to **stop FSH and LH secretion** by the pituitary gland
- This means that **oestrogen** and **progesterone secretion** also **stops**
- This **delays** a woman's **menstrual cycle**, allowing doctors to **control the timing of ovulation** and the **number of eggs produced**



2. FSH AND LH INJECTIONS

- **FSH** and **LH** are **injected** into **muscle** and then given daily for 10 days
- **Many follicles develop** as the amount of **FSH** injected is **higher** than normal
- **Superovulation** also happens as the amount of **LH** given is **higher** than normal

3. EGG EXTRACTION AND FERTILIZATION

- **hCG** hormone is **injected** to stimulate the **follicles** to **mature**
- A **micropipette** and an **ultrasound** machine are used to **penetrate the uterus lining** and **collect the eggs** from their **follicles**
- Each egg is then **mixed** with **many sperm** cells, in **sterile** conditions. They are then incubated overnight at 37°C

4. PREGNANCY

- **One or more embryos** are **inserted** into a woman's **uterus** when they are 2 days old
- A **progesterone tablet** is placed in the vagina. This **maintains** the **thickness** of the **uterus lining**.
- If the embryos **implant** and grow, a **pregnancy** will occur.
- A **pregnancy test** is done after 2 weeks.

G. EARLY IDEAS ABOUT SEXUAL REPRODUCTION

ARISTOTLE

A **male** produces a **seed**, which forms an **egg** when it mixes with **menstrual blood**.

This **egg** then develops into a **fetus** inside the mother.

WILLIAM HARVEY

- Looked at the **uterus** of **deer** in **mating season**.
- **Deer** are **sexually active** in the **autumn** (= **seasonal breeders**).

I **expected** to see:

eggs developing into embryos immediately after mating

What I **found** was:

it took over 2 months after mating to see anything like an embryo develop

He concluded that:

- Aristotle was wrong ✓
- Offspring could not be the result of mating X

Why was Harvey unlucky here?

- There were **no effective microscopes** invented yet, which made his job of studying the following **very difficult**:

  - **gametes**
  - the **process** of **fertilization**
  - **early stages** of **embryo development**

- He chose to study **deer** – **deer embryos** stay **microscopically small** for a **very long time**!