

Human Reproduction — Assignment 2

Class 12 Biology · Higher-difficulty challenge set + integrated problems · Answer key included · Narayan Gurukul Academy

Instructions: (1) Attempt all questions; start with the topic-wise challenge set, then attempt the integrated (multi-topic) problems.
(2) Give all answers with correct SI units. $g = 10 \text{ m/s}^2$ unless stated.
(3) A final answer key is provided at the end — try the full set before checking it.

Part A — Topic-wise challenge questions

Male Reproductive System

1. Name the parts of the male reproductive system.
2. Why is the scrotum located outside the body?
3. Describe the structure of a sperm.

Spermatogenesis

1. What is the role of Sertoli cells?
2. How many sperm are formed from one primary spermatocyte?
3. Describe the process of spermatogenesis.

Female Reproductive System

1. Name the parts of the female reproductive system.
2. What is the lining of the uterus called?
3. Explain the structure of the ovary.

Oogenesis and the Menstrual Cycle

1. How many ova are formed from one oogonium?
2. Name the phases of the menstrual cycle.
3. Explain oogenesis.

Fertilization and Early Development

1. Where does fertilisation occur?
2. What is the function of the placenta?
3. Explain early embryonic development up to implantation.

Parturition and Lactation

1. Name the hormone of lactation.
2. Why is colostrum important?
3. Describe the process of parturition.

Part B — Integrated problems (multi-topic)

1. Describe the structure and functions of the human male reproductive system.
2. Describe the structure and functions of the human female reproductive system.
3. Explain spermatogenesis and oogenesis, highlighting the differences.
4. Explain the hormonal control of the menstrual cycle.
5. Describe fertilisation, implantation and the function of the placenta.
6. Explain parturition and lactation.

Answer Key

Male Reproductive System

Testes (in scrotum) produce sperm and testosterone; epididymis stores and matures sperm; vas deferens carries sperm; seminal vesicles, prostate and Cowper's glands add secretions; urethra and penis deliver semen.

Spermatogenesis

Spermatogonia → primary spermatocytes (meiosis I) → secondary spermatocytes (meiosis II) → spermatids → sperm. FSH stimulates; Sertoli cells nourish and Leydig cells secrete testosterone.

Female Reproductive System

Ovaries produce ova and hormones; fallopian tubes carry the ovum; uterus nourishes the embryo; cervix and vagina form the birth canal; external genitalia (vulva).

Oogenesis and the Menstrual Cycle

Oogonia → primary oocyte (arrested) → secondary oocyte + polar body at ovulation → ovum + polar body at fertilisation. Menstrual cycle: menstrual → follicular → ovulatory → luteal phases, controlled by FSH, LH, oestrogen and progesterone.

Fertilization and Early Development

Fertilisation at the ampullary-isthmic junction → zygote → cleavage → morula → blastocyst → implantation in the endometrium; the placenta forms from embryonic and maternal tissue.

Parturition and Lactation

Parturition is induced by oxytocin (neuroendocrine reflex). Lactation is controlled by prolactin; colostrum provides IgA antibodies.

Integrated problems

1: Male system — sperm production and delivery. 2: Female system — ova, hormones and birth canal. 3: Spermatogenesis yields 4 sperm; oogenesis yields 1 ovum + 3 polar bodies. 4: FSH → follicle; LH surge → ovulation; corpus luteum → progesterone. 5: Zygote → blastocyst → implantation; placenta nourishes. 6: Oxytocin → parturition; prolactin → milk; colostrum → immunity.