

Students Learning Outcomes

After Studying this chapter, students will be able to:

- Describe the role of hormones in both male and female sexual development.
- Describe the process of gametogenesis and fertilization.
- Identify, on diagrams of the parts of male reproductive system and describe their functions.
- Identify, on diagrams of the parts of female reproductive system and describe their functions.
- Explain AIDS as an example of sexually transmitted diseases.

Subjective Type Questions

Long Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

6.1 Formation of Gametes and Fertilization

Q.1: (a) Define sexual reproduction. Briefly explain Gonads.

Ans. All organisms have the ability to produce new individual or their kind. Sexual reproduction involves the joining (fusion) of male and female gametes.

Formation of Gametes and fertilization: Animals have special organs i.e., gonads where special cells called gametes are made. The gonads in male animals are called testes (Singular: testis) where male gametes i.e., sperms are produced. The gonads in females are called ovaries where female gametes i.e., egg cells or ova are produced.

(b) What is meant by gametogenesis? How they are formed?

Ans. The process of formation of gametes is called gametogenesis. It involves the cell division meiosis. Meiosis results in a reduction of the number of chromosomes in gametes to haploid ($1n$) as compared to the diploid ($2n$) number in other body cells.

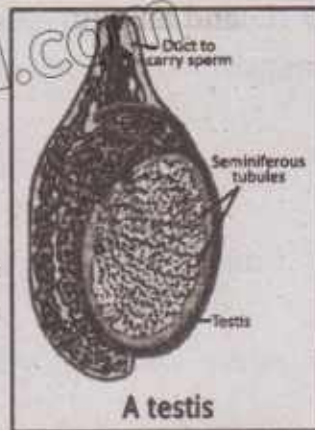
Q.2: Describe the process of spermatogenesis in detail.

Ans. Spermatogenesis: The process of formation of male gametes known as sperms is called spermatogenesis.

Site of production: Spermatogenesis takes place within the seminiferous tubules located inside the testes.

Hormonal Control: This process is regulated by two hormones.

- **Follicle Stimulating Hormone (FSH):** FSH is produced by the anterior pituitary gland and along with testosterone stimulate sperm production.
- **Testosterone:** Testosterone is produced by testes.

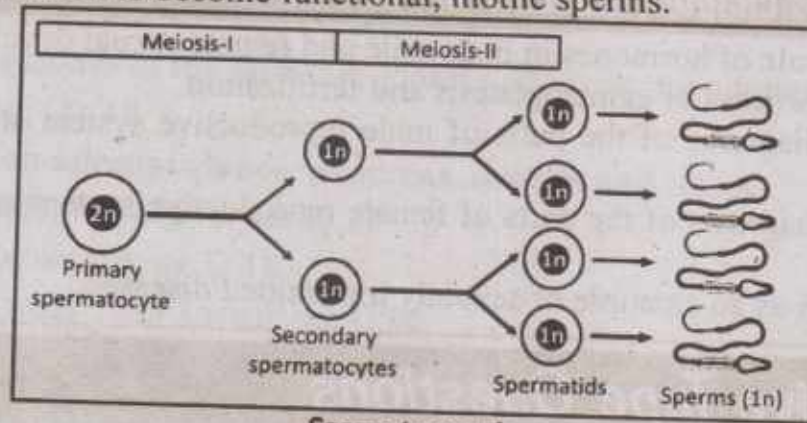


Stages of Spermatogenesis: The transformation from a diploid cell to mature sperm occurs in several distinct phases:

Primary Spermatocyte (2n): The process begins with a diploid gamete mother cell.

Each secondary spermatocyte divides again during the second meiotic division. This results in the formation of four haploid (1n) cells called spermatids.

Maturation: In the final stage, the immature, non-motile spermatids undergo structural changes and maturation to become functional, motile sperm.



Spermatogenesis

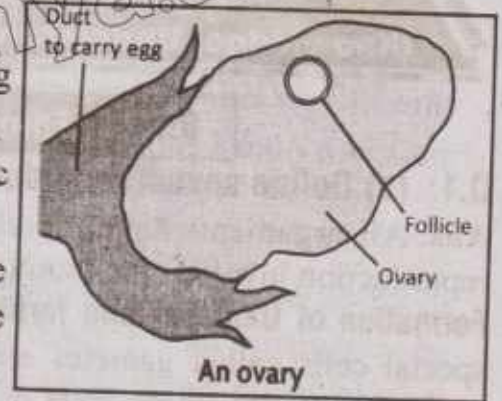
Q.3: Discuss the process of Oogenesis.

OR Write a note on formation of female gametes.

Ans. Oogenesis: The formation of female gametes (egg or ovum) is called oogenesis.

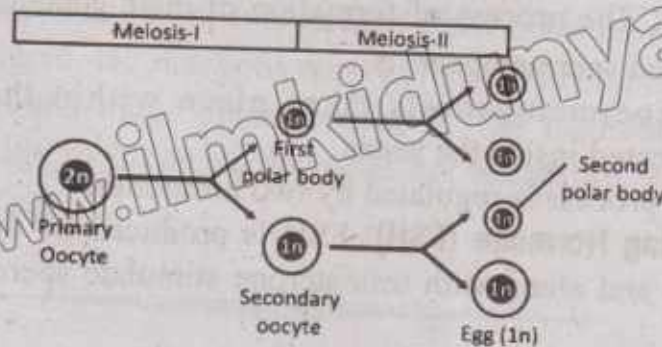
Occurrence: It occurs in the ovary in a small, fluid-filled sac called follicle.

Hormone responsible: Follicle stimulating hormone released by the anterior pituitary gland stimulates the formation of ovum in follicle.



Stages of Oogenesis:

- In follicle, there is a diploid gamete mother cell called primary oocyte.
- It divides by meiosis.
- As a result of first meiotic division, two haploid cells are produced. The larger cell is called secondary oocyte while the smaller cell is called first polar body.
- In meiosis-II, secondary oocyte produces two haploid cells i.e. a second polar body and an egg.

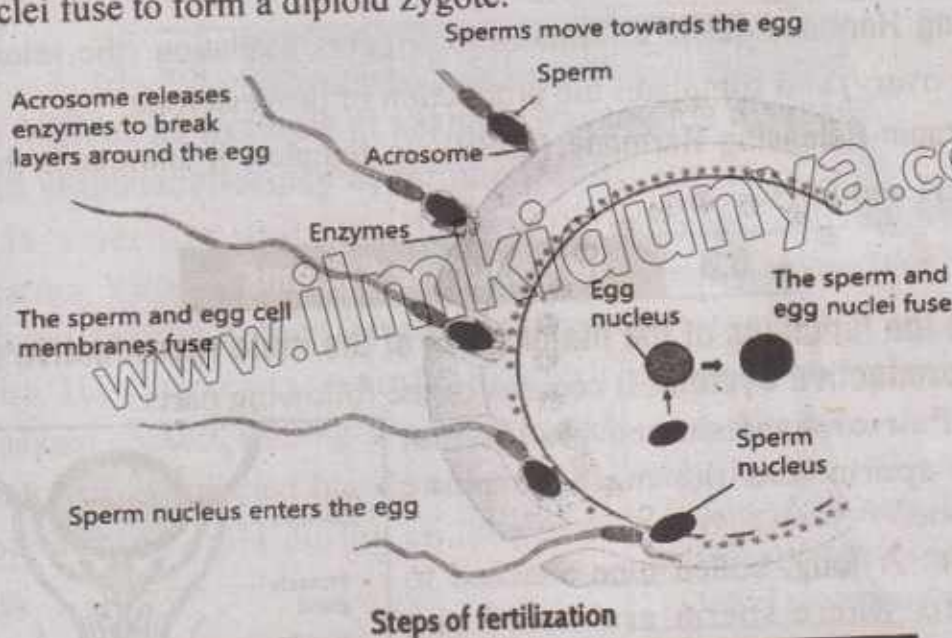


Oogenesis

Q.4: Define fertilization. Write down the steps followed by fertilization.

Ans. Fertilization: Fertilization means the fusion of male and female gametes to form a new cell called zygote. In humans, fertilization occurs inside the body of female after the release of egg cell from ovary i.e., ovulation. Fertilization occurs in the following steps:

- (i) Sperms move towards the egg due to the chemical signals released by the egg or surrounding cells.
- (ii) The acrosome, a cap-like structure on the head of the sperm, releases enzymes which digest the egg's outer layers, allowing the sperm to reach the egg cell membrane.
- (iii) The sperm and egg cell membranes fuse. This fusion triggers reactions in egg. So, the egg's outer layers become impermeable for more sperms.
- (iv) After fusion of membranes, the sperm nucleus enters the egg.
- (v) Both nuclei fuse to form a diploid zygote.



6.2

Role of Hormones in sexual development

Q.5: Describe the role of hormones in male sexual development.

Ans. Hormones in Male Sexual Development:

Testosterone: It is primarily produced by the testes. It initiates and regulates the development of male secondary sexual characteristics during puberty, such as deepening of the voice, growth of facial and body hair, and increased muscle mass. It is also essential for spermatogenesis.

Follicle-Stimulating Hormone (FSH): In males, it is produced by the anterior pituitary gland. It stimulates the testes to produce sperm.

Luteinizing Hormone (LH): It is produced by the anterior pituitary gland. It stimulates the production of testosterone by the testes.

Gonadotropin-Releasing Hormone (GnRH): It is released by hypothalamus. It stimulates the pituitary to release LH and FSH.

Q.6: Describe the role of hormones in female sexual development.

Ans. Following hormones are involved in female sexual development.

Oestrogens: It is primarily produced by the ovaries. It initiates and regulates the development of female secondary sexual characteristics during puberty, such as breast development, widening of the hips, and the onset of menstrual cycles. It also regulates the female reproductive cycle.

Progesterone: It is produced by the ovaries after ovulation. It prepares the uterus walls for implantation of fertilized egg. It maintains pregnancy by preventing contractions of the uterus.

Follicle-Stimulating Hormone (FSH): It is released from anterior pituitary gland. In females, it stimulates the growth of follicles, which contain the eggs. It also stimulates the production of oestrogen.

Luteinizing Hormone (LH): In females, it triggers ovulation (the release of an egg from the ovary) and stimulates the production of progesterone.

Gonadotropin-Releasing Hormone (GnRH): In females, it stimulates the pituitary to release LH and FSH.

6.3

Reproductive Systems

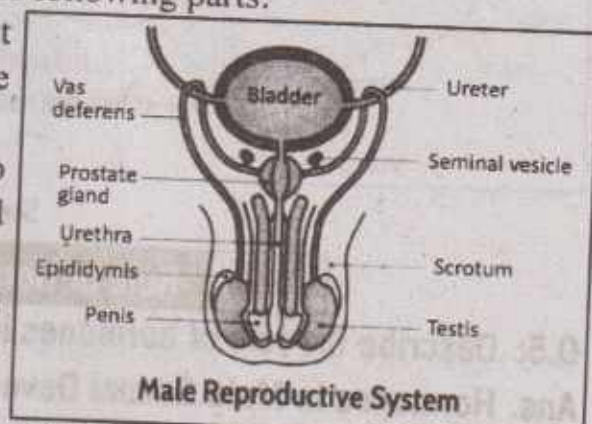
Q.7: Describe the functions of the major parts of the male reproductive system.

Ans. Male Reproductive System: It consists of the following parts:

Testes: Pair of oval-shaped glands that produce sperm and the male hormone testosterone.

Epididymis: A long, coiled tube attached to each testis where sperm are stored and matured.

Vas deferens: A muscular tube that transports mature sperm from the epididymis to the urethra.



Male Reproductive System

Seminal vesicles: Two small glands behind the bladder that produce a sugary fluid to nourish sperm.

Prostate gland: A walnut sized gland below the bladder that adds protective fluid to the semen.

Urethra: A tube inside the penis that carries semen and urine to the outside of the body.

Penis: An external organ that transfers sperm into female reproductive tract.

Q.8: Describe the functions of the major parts of the female reproductive system.

Ans. Female Reproductive System: It consists of the following main parts:

Q. How many sperms produced in one day?

Ans. The average male produces around 1,500 sperm per second - that's over 100 million per day!

1. **Ovaries:** Pair of almond-shaped glands that produce eggs (ova) and hormones like oestrogen and progesterone.

Fallopian Tubes: Two tubes that transport eggs from the ovaries to the uterus. Fertilization occurs here.

Uterus: A hollow, muscular organ where a fertilized egg implants and develops into a foetus during pregnancy.

Cervix: The lower, narrow part of the uterus.

Vagina: A muscular canal that connects the cervix to the outside.



6.4

Sexually Transmitted Diseases

Q.9: Explain AIDS as an example of sexually transmitted diseases.

Ans. Acquired Immunodeficiency Syndrome (AIDS):

AIDS is a serious and life-threatening disease caused by the Human Immunodeficiency Virus (HIV). HIV primarily attacks and weakens the body's immune system, making it difficult to fight infections and certain cancers.

Causes: The HIV spreads mainly through unprotected sexual contact, sharing of contaminated needles, transfusion of infected blood, and from an infected mother to her child during childbirth or breastfeeding.

Q. What is the reason for increasing HIV cases in Pakistan?

Ans. In Pakistan, HIV cases are increasing, particularly due to unsafe injections, unregulated blood transfusions, and lack of awareness among youth.

Signs and Symptoms: Early signs and symptoms are fever, fatigue, swollen lymph nodes, and skin rashes. As the disease progresses, individuals become vulnerable to severe infections, weight loss, chronic diarrhoea, pneumonia, and certain cancers.

Treatment: There is no cure for AIDS. Antiretroviral therapy (ART) can control the virus, strengthen the immune system, and help patients live longer, healthier lives.

Q.10: What are sexually transmitted diseases? Explain.

Ans. Sexually transmitted diseases (STDs) are the infections which are primarily transmitted through sexual contact. These diseases can be caused by bacteria, viruses, or parasites. STDs often affect the genital, urinary, and reproductive organs. Common STDs include HIV/AIDS, syphilis, herpes etc. Many STDs can be asymptomatic, meaning individuals may carry and spread the infection without showing signs.

If STDs are left untreated, they can lead to serious health complications such as infertility, organ damage, and other infections.

Objective Type Questions

Additional MCQ's

Multiple Choice Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

6.1

Formation of Gametes and Fertilization

1. In gonads which specialized cells are formed?
(a) Somatic cells (b) Sperms (c) Eggs (d) Gametes
2. In which process joining of male and female gametes takes place?
(a) Asexual reproduction (b) Sexual Reproduction
(c) Fertilization (d) Budding
3. The process of formation of gametes in animals is known as:
(a) Fertilization (b) Mitosis (c) Gametogenesis (d) Embryogenesis
4. The type of cell division responsible for reducing the number of chromosomes in gametes to haploid ($1n$) is:
(a) Mitosis (b) Binary Fission (c) Meiosis (d) Budding
5. In males, the specific organs where gametes are produced are called:
(a) Ovaries (b) Seminiferous tubules (c) Testes (d) Follicles
6. Spermatogenesis occurs in:
(a) Follicles (b) Seminiferous tubules
(c) Oocytes (d) Pituitary gland
7. Which hormone produced by the anterior pituitary gland, stimulates the production of sperms?
(a) Testosterone (b) Insulin
(c) Oestrogen (d) Follicle Stimulating Hormone (FSH)
8. How many haploid spermatids are formed from a single diploid primary spermatocyte after Meiosis-I?
(a) One (b) Two (c) Three (d) Four
9. Which of the following cell is diploid ($2n$)?
(a) Secondary spermatocyte (b) Spermatid
(c) Primary oocyte (d) Second polar body
10. The process of formation of female gametes (egg or ovum) is called:
(a) Spermatogenesis (b) Oogenesis (c) Fertilization (d) Ovulation
11. Oogenesis occurs in:
(a) Seminiferous tubules (b) Ovary (c) Bladder (d) Ureter
12. Which gland release follicle stimulating hormone?
(a) Anterior lobe of pituitary gland (b) Posterior lobe of pituitary gland
(c) Adrenal gland (d) Thyroid gland
13. Primary oocyte divides by:
(a) Mitosis (b) Meiosis (c) Budding (d) Binary fission

14. The immediate result of fusion of a male and a female gamete is:
 (a) Embryo (b) Zygote (c) Oocyte (d) Ovulation
15. In humans, where does fertilization typically occurs?
 (a) Outside the body (b) Inside the ovary
 (c) Inside body of female (d) In the acrosome
16. What guides the sperm to move towards the egg cell?
 (a) Physical touch (b) Chemical signals (c) Gravity (d) Temperature changes
17. A cap-like structure on the head of sperm is:
 (a) Ovule (b) Oocyte (c) Zygote (d) Acrosome
18. The process of releasing an egg cell from the ovary is known as:
 (a) Fertilization (b) Fusion (c) Digestion (d) Ovulation

6.2 Role of Hormones In Sexual Development

19. Which hormone is primarily responsible for the development of male secondary sexual characteristics such as deepening of the voice and facial hair?
 (a) Follicle-stimulating hormone (b) Luteinizing Hormone
 (c) Testosterone (d) Oestrogen
20. What is the specific function of Luteinizing Hormone (LH) in the male reproductive system?
 (a) Stimulates the growth of body hair (b) Stimulates the production of testosterone
 (c) Stimulates the testes (d) Initiates the deepening of voice
21. Which part of the brain releases Gonadotropin-Releasing Hormone (GnRH)?
 (a) Pons (b) Cerebellum (c) Hypothalamus (d) Thalamus
22. Oestrogen is primarily produced by:
 (a) Pituitary gland (b) Ovaries (c) Hypothalamus (d) Uterus
23. Which hormone is responsible for the development of female secondary sexual characteristics?
 (a) Testosterone (b) Oestrogen (c) Luteinizing hormone (d) Gonadotropin
24. _____ is produced by the ovaries after ovulation.
 (a) Follicle-Stimulating Hormone (b) Luteinizing Hormone
 (c) Progesterone (d) Oestrogen
25. Function of Follicle stimulating Hormone (FSH):
 (a) Maintain pregnancy (b) Stimulate the production of oestrogen
 (c) Stimulates the production of testosterone
 (d) Prepares uterus walls for implantation
26. Which hormone stimulates the pituitary to release LH and FSH in females?
 (a) Progesterone (b) Oestrogen (c) Testosterone (d) Gonadotropin

6.3 Reproductive Systems

27. How many sperms are produced by males per second?
 (a) 1000 (b) 1200 (c) 1400 (d) 1500
28. Following are the parts of male reproductive system except:
 (a) Testes (b) Penis (c) Epididymis (d) Cervix
29. A long, coiled tube attached to each testis is known as:
 (a) Vas deferens (b) Seminal vesicles (c) Epididymis (d) Urethra

30. Two small glands behind the bladder that produce a sugary fluid are:
 (a) Prostate glands (b) Testes (c) Vas deferens (d) Seminal vesicles
31. Which is an external organ that transfers sperm into female reproductive tract?
 (a) Testes (b) Penis (c) Vagina (d) Ovaries
32. Pair of almond-shaped glands that produce egg (ova) and hormones are:
 (a) Cervix (b) Uterus (c) Ovaries (d) Testes
33. Where does fertilization typically occurs in the female reproductive system?
 (a) Ovaries (b) Fallopian Tubes (c) Uterus (d) Vagina
34. Which organ is described as a hollow, muscular structure where a fertilized egg implants and develops?
 (a) Cervix (b) Fallopian tube (c) Ovary (d) Uterus
35. A muscular canal that connects the cervix to outside is:
 (a) Penis (b) Cervix (c) Epididymis (d) Vagina

6.4

Sexually Transmitted Diseases

36. What is the primary cause of spread of HIV?
 (a) Coughing (b) Sexual contact
 (c) Using public rest rooms (d) Insect bites
37. STDs can be caused by:
 (a) Viruses (b) Bacteria (c) Parasites (d) All of these
38. STDs often affect:
 (a) Genital organs (b) Urinary organs (c) Reproductive organs (d) All of these
39. What is the significant factor in the increase of HIV causes in Pakistan?
 (a) Lack of specialized hospitals (b) Genetic predispositions
 (c) Unsafe injections (d) Over-consumptions of antibiotics
40. A serious and life threatening disease caused by HIV is:
 (a) AIDS (b) Hepatitis (c) Cancer (d) Typhoid
41. HIV virus primarily attacks the:
 (a) Digestive system (b) Respiratory system
 (c) Immune system (d) Urinary system
42. All are causes of AIDS except:
 (a) Unprotected sexual contact (b) Sharing contaminated needles
 (c) Transfusion of infected blood (d) Allergens
43. The possible treatment of AIDS is:
 (a) Antibiotics (b) Vaccines (c) Medications (d) Antiretroviral therapy

Answers

- | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (b) | 3. (c) | 4. (c) | 5. (c) | 6. (b) | 7. (d) |
| 8. (b) | 9. (c) | 10. (b) | 11. (b) | 12. (a) | 13. (b) | 14. (b) |
| 15. (c) | 16. (b) | 17. (d) | 18. (d) | 19. (c) | 20. (b) | 21. (c) |
| 22. (b) | 23. (b) | 24. (c) | 25. (b) | 26. (d) | 27. (d) | 28. (d) |
| 29. (c) | 30. (d) | 31. (b) | 32. (c) | 33. (b) | 34. (d) | 35. (d) |
| 36. (b) | 37. (d) | 38. (d) | 39. (c) | 40. (a) | 41. (c) | 42. (d) |

Additional Short Questions

Short Answer Questions prepared in the light of new Examination Techniques
(Knowledge, Understanding, Application, Analytical & Conceptual)

6.1

Formation of Gametes and Fertilization

1. Differentiate between sexual and asexual reproduction.

Ans. Sexual reproduction: Sexual reproduction involves the joining (fusion) of male and female gametes.

The offspring show variation.

Asexual Reproduction: Asexual reproduction involves only one parent and no gamete fusion.

The offsprings are genetically identical to the parents.

2. Name the gonads of males and females.

Ans. The gonads in males are called testes.

The gonads in females are called ovaries.

3. Define the process of gametogenesis.

Ans. Gametogenesis: The process of formation of gametes is called gametogenesis.

4. Name the parts of testis and ovaries where the gamete formation takes place.

Ans. In testis: The process of gametes formation takes place in seminiferous tubules of testis.

In ovaries: The formation of female gametes (egg or ovum) occurs in a small, fluid-filled sac called a follicle.

5. How spermatids are formed?

Ans. In seminiferous tubules, the diploid gamete mother cells called primary spermatocytes are present. Each primary spermatocytes divides by meiosis-I and forms two haploid secondary spermatocytes. Each secondary spermatocyte divides by meiosis-II. In this way, four haploid spermatids are formed.

6. Which hormone stimulates the production of sperms?

Ans. Sperms production is stimulated by Follicle Stimulating Hormone (FSH) and testosterone.

7. What is a follicle and what is its role in oogenesis?

Ans. Follicle: A follicle is a small, fluid-filled sac located in the ovary.

Role of follicle: It is the specific site where the diploid gamete mother cell (primary oocyte) develops into an egg.

8. How does the division of primary oocyte differ from that of a primary spermatocyte?

Ans. A primary spermatocyte divides into four equal spermatids while the primary oocyte undergoes unequal division. Meiosis results in one large secondary oocyte and one small polar body.

9. What are the final products of Meiosis-II in the female reproductive system?

Ans. In meiosis-II secondary oocyte produces two haploid cells a second polar body and an egg.

10. Define fertilization.

Ans. **Fertilization:** Fertilization means the fusion of male and female gametes to form a new cell called zygote.

11. What is the function of acrosome during fertilization?

Ans. The acrosome, a cap-like structure on the head of the sperm, releases enzymes which digest the egg's outer layers, allowing the sperm to reach the egg cell membrane.

12. Write down the steps of fertilization.

Ans. **Steps of fertilizations:** Fertilization occurs in following steps:

- (i) Sperms move towards the egg.
- (ii) Acrosome releases enzymes to break layers around the egg.
- (iii) The sperm and egg cell membranes fuse.
- (iv) Sperm nucleus enters the egg.
- (v) The sperm and egg nuclei fuse.

6.2 Role of Hormones in Sexual Development

13. Discuss the role of testosterone in male sexual development.

Ans. **Role of testosterone:** Testosterone initiates and regulates the development of male secondary sexual characteristics during puberty. It is also essential for spermatogenesis.

14. Name the hormones which play their role in Male Sexual Development.

Ans. **Hormones in Male Sexual Development:**

- (i) Testosterone
- (ii) Follicle-Stimulating Hormone (FSH)
- (iii) Luteinizing Hormone (LH)
- (iv) Gonadotropin-Releasing Hormone (GnRH)

15. State the function of follicle stimulating hormone and luteinizing hormone.

Ans. **Follicle-Stimulating Hormone (FSH):** FSH stimulates the testes to produce sperm.

Luteinizing Hormone (LH): It stimulates the production of testosterone by the testes.

16. Write down the function of Gonadotropin-Releasing Hormone (GnRH) in females.

Ans. Gonadotropin-Releasing Hormone stimulates the pituitary to release LH and FSH.

6.3 Reproductive Systems

17. Name the parts of the male reproductive system.

Ans. Male reproductive system consists of following parts:

- | | | |
|-----------------------|--------------------|--------------------------|
| (i) Testes | (ii) Epididymis | (iii) Vas deferens |
| (iv) Seminal vesicles | (v) Prostate gland | (vi) Urethra (vii) Penis |

18. What do you know about Epididymis and Vas deferens?

Ans. Epididymis: It is a long coiled tube attached to each testis where sperm are stored and matured.

Vas deferens: A muscular tube that transports mature sperm from the epididymis to the urethra.

19. What is prostate gland and urethra?

Ans. Prostate gland: It is a walnut sized gland below the bladder that adds protective fluid to the semen.

Urethra: A tube inside the penis that carries semen and urine to the outside of the body.

20. Name the parts of the female reproductive system.

Ans. Female reproductive system consists of the following parts:

(i) Ovaries (ii) Fallopian tubes (iii) Uterus (iv) Cervix (v) Vagina

21. In which part of female reproductive system fertilization occurs?

Ans. Fertilization occurs in the fallopian tubes.

22. Define cervix.

Ans. Cervix is the lower narrow part of the uterus.

23. Write down the functions of ovaries and fallopian tubes.

Ans. Ovaries: Ovaries are pair of almond shaped glands that produces eggs (ova) and hormones like oestrogen and progesterone.

Fallopian tubes: These are tubes that transports egg from the ovaries to the uterus. Fertilization occurs here.

6.4

Sexually Transmitted Diseases

24. What are sexually transmitted diseases? Write down their causes and effects.

Ans. Sexually Transmitted Diseases: STDs are the infections which are primarily transmitted through sexual contact.

Causes of STDs: These diseases can be caused by bacteria, viruses or parasites.

Effects of STDs: STDs often affect the genital, urinary and reproductive organs.

25. How STDs can be asymptomatic?

Ans. STDs can be asymptomatic meaning individuals may carry and spread the infection without showing symptoms.

26. What happens if STDs are left untreated?

Ans. If STDs are left untreated, they can lead to serious health complications such as infertility, organ damage and other infections.

27. Which virus causes AIDS?

Ans. AIDS is caused by the Human Immunodeficiency Virus (HIV).

28. Describe two ways through which HIV can be transmitted?

Ans. HIV can be transmitted through unprotected sexual contact and sharing of contaminated needles.

29. Discuss the signs and symptoms of AIDS.

Ans. Signs and Symptoms of AIDS: Signs and symptoms of AIDS are fever, fatigue, swollen lymph nodes, weight loss, chronic diarrhoea, pneumonia and certain cancers.

30. How AIDS can be treated?

Ans. There is no cure for AIDS. Antiretroviral therapy (ART) can control the virus, strengthen the immune system and help patients live longer, healthier lives.

Exercise Questions (Solved)



A. Select the correct answers for the following questions.

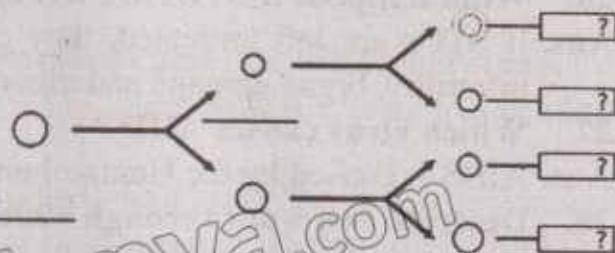
- In which part of the body oogenesis takes place?
a) Oviduct b) Ovary c) Uterus d) Fallopian tube
- Which of the following is NOT a part of the male reproductive system?
a) Testes b) Uterus c) Epididymis d) Prostate gland
- Which hormone directly triggers ovulation?
a) Oestrogen b) Progesterone
c) Luteinizing hormone (LH) d) Follicle-stimulating hormone (FSH)
- Which hormone is responsible for the development of male secondary sexual characteristics?
a) FSH b) Oestrogen c) Testosterone d) LH
- What is the function of acrosome?
a) Guides the sperm towards egg cell
b) Releases enzymes that help sperm penetrate the egg's outer layers
c) Activates the egg for fertilization
d) Helps in the fusion of sperm and egg nuclei
- What is the function of the Fallopian tubes?
a) Site of fertilization b) Storage of eggs
c) Secretion of oestrogen d) Transport of sperm to testes
- Which hormone is primarily responsible for the development of female secondary sexual characteristics?
a) Oestrogen b) Testosterone c) Progesterone d) FSH

Answers

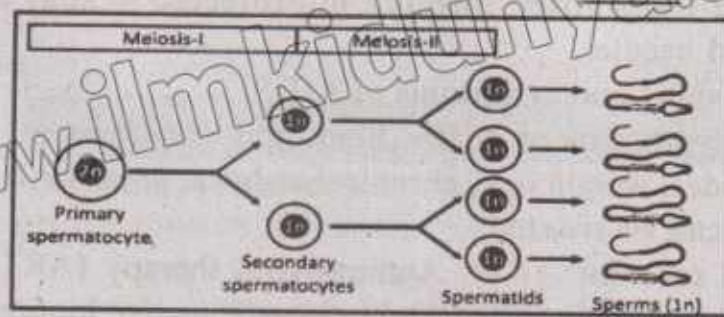
1. (b) 2. (b) 3. (c) 4. (c) 5. (b) 6. (a) 7. (a)

B. Write short answers.

- Complete the chart of spermatogenesis by mentioning the names of cells and number of chromosomes ($2n$ or $1n$).

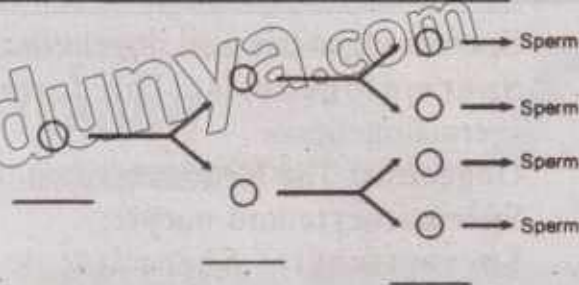


Ans.

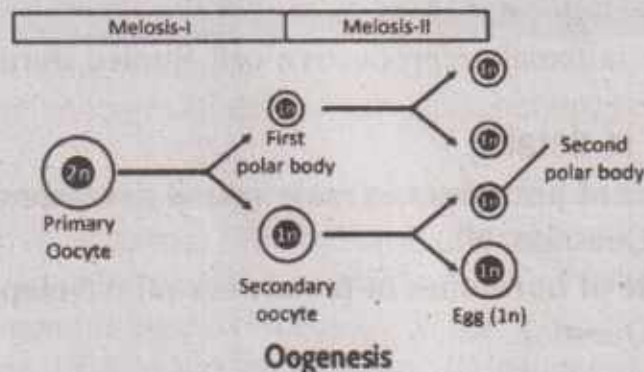


spermatogenesis

2. Complete the chart of oogenesis by mentioning the names of cells and number of chromosomes ($2n$ or $1n$).



Ans.



3. Name the parts of the testis and ovary where gamete formation takes place.

Ans. In testis: The process of gametes formation takes place in seminiferous tubules of testis.

In ovaries: The formation of female gametes (egg or ovum) occurs in a small, fluid-filled sac called a follicle.

4. What happens to the egg after it is released from the ovary?

Ans. After the egg is released from the ovary, it enters the fallopian tube, where it may be fertilized by a sperm. If it is not fertilized, the egg breaks down and is removed from the body during menstruation.

5. Compare spermatogenesis and oogenesis in terms of the number of gametes produced.

Ans. Spermatogenesis produces four functional sperms from one parent cell.

Oogonium produces only one functional ovum (egg) and three polar bodies from one parent cell.

6. Describe two major ways through which HIV can be transmitted.

Ans. HIV can be transmitted through unprotected sexual contact and sharing of contaminated needles.

7. Differentiate between;

- Oestrogen and progesterone
- Spermatogenesis and oogenesis
- Spermatocyte and oocyte

Ans. i. Oestrogen and progesterone:

Oestrogen: Oestrogen produced mainly by the follicles in the ovary.

- It regulates the development of secondary sexual characteristics during puberty.
- It regulates the female reproductive cycle.

Progesterone: It is produced mainly by the ovaries after ovulation.

- It prepares the uterus walls for implantation of fertilized egg.
- It maintains pregnancy by preventing contractions of the uterus.

ii. **Spermatogenesis and oogenesis:**

Spermatogenesis: The formation of male gametes (sperms) is called spermatogenesis.

Oogenesis: The formation of female gametes (egg or ovum) is called oogenesis.

iii. **Spermatocyte and oocyte:**

Spermatocyte: Spermatocyte is a male reproductive cell formed during spermatogenesis. It develops into sperm.

Oocyte: Oocyte is female reproductive cell formed during oogenesis. It develops into an egg.

C. Write answers in detail.

1. **Describe the role of hormones in male sexual development.**

Ans. For answer See Question. No. 5

2. **Describe the role of hormones in female sexual development.**

Ans. For answer See Question. No. 6

3. **Describe the process of spermatogenesis.**

Ans. For answer See Question. No. 2

4. **Describe the functions of the major parts of male reproductive system.**

Ans. For answer See Question. No. 7

5. **Describe the functions of the parts of female reproductive system.**

Ans. For answer See Question. No. 8

6. **Explain AIDS as an example of sexually transmitted diseases.**

Ans. For answer See Question. No. 9

D. Inquisitive Questions

1. **Why only one egg is usually produced from one primary oocyte?**

Ans. Only one cell is produced because during oogenesis the cytoplasm divides unequally, forming one large ovum and three small polar bodies.

The ovum keeps most of the cytoplasm so it has enough nutrients for early embryo development, while the polar bodies do not develop further.

2. **How does the structure of a sperm cell relate to its function?**

Ans. **Head:** Head contains the nucleus with 23 chromosomes and an acrosome that releases enzymes to help the sperm to penetrate the egg.

Middle piece: It has many mitochondria to provide energy for movement.

Tail (flagellum): It helps the sperm to swim towards the egg.

3. **What steps can individuals take to prevent HIV transmission?**

Ans. A individual should:fo

- Use safe sexual practices
- Using sterile needles, avoid sharing needles.
- Get tested and encourage partners or family members to get tested when needed.
- Follow medical advice and safety guidelines.
- Pregnant women living with HIV can take specific medication.