Class: 12th

Subject: Biology

Unit 18: Reproduction

Important MCQs:

1. Reproduction is essential for the:

(a) Growth of cells

(b) Survival of species ✅

(c) Movement of organisms

(d) Digestion of food

2. Asexual reproduction produces offspring that are:

(a) Genetically diverse

(b) Genetically identical ✅

(c) Genetically mutated

(d) Genetically recombined

3. Meiosis leads to the formation of:

(a) Diploid cells

(b) Identical cells

(c) Haploid gametes ✅

(d) Clones

4. Which of the following is NOT a method of asexual reproduction?

(a) Budding

(b) Fission

(c) Gametogenesis ✅

(d) Sporulation

5. A major disadvantage of cloning is:

(a) High adaptability

(b) Rapid aging ✅

(c) Genetic variation

(d) Disease resistance

6. In plants, layering and grafting are examples of:

(a) Sexual reproduction

(b) Natural reproduction

(c) Artificial asexual reproduction ✅

(d) Vegetative propagation

7. The diplohaplontic life cycle in plants involves:

(a) Only diploid generation

(b) Only haploid generation

(c) Alternating diploid and haploid generations ✅

(d) Triploid generation

8. If sporophyte and gametophyte generations are morphologically similar, the alternation is called:

(a) Heteromorphic

(b) Isomorphic ✅

(c) Homologous

(d) Analogous

9. Pollen tube evolution helped seed plants adapt to:

(a) Aquatic environments

(b) Hostile land environments ✅

(c) Cold climates

(d) High altitudes

10. Pollen tube functions as a:

(a) Fertilizer

(b) Hormone carrier

(c) Vehicle for male gametes ✅

(d) Seed disperser

11. Parthenocarpy results in fruit formation:

(a) After fertilization

(b) Without fertilization ✅

(c) After pollination

(d) With seed formation

12. Parthenocarpy in tomatoes and peppers is induced by:

(a) Cytokinins

(b) Gibberellins

(c) Auxins ✅

(d) Ethylene

13. Seed dormancy helps plants survive:

(a) High humidity

(b) Favorable conditions

(c) Unfavorable environmental conditions ✅

(d) Excessive light

14. During seed dormancy, the embryo:

(a) Grows rapidly

(b) Dies

(c) Limits or ceases growth ✅

(d) Converts to fruit

15. Fruit set is stimulated by:

(a) Cytokinins

(b) Auxins from pollen grain ✅

(c) Ethylene

(d) Abscisic acid

16. Fruit ripening is associated with:

(a) Climacteric respiration burst ✅

(b) Seed germination

(c) Leaf fall

(d) Flowering

17. Ethylene plays a major role in:

(a) Seed dormancy

(b) Fruit ripening ✅

(c) Pollination

(d) Fertilization

18. Photoperiodism affects all EXCEPT:

(a) Flowering

(b) Leaf fall

(c) Photosynthesis ✅

(d) Seed dormancy

19. Short-day plants are actually:

(a) Long-night plants ✅

(b) Day-neutral plants Mmhk

(c) Long-day plants

(d) Light-sensitive plants

20. Phytochrome P660 absorbs:

(a) Far-red light

(b) Blue light

(c) Red light at 660 nm ✅

(d) UV light

21. Vernalisation is the induction of flowering by:

(a) High temperature

(b) Low temperature ✅

(c) Light intensity

(d) Water availability

22. The vernalisation stimulus is received by:

(a) Leaves

(b) Shoot apex ✅

(c) Roots

(d) Stem

23. The hormone responsible for vernalisation is:

(a) Auxin

(b) Cytokinin

(c) Gibberellin ✅

(d) Ethylene

24. Vernalisation helps plants to:

(a) Increase seed size

(b) Synchronize reproduction with environment ✅

(c) Produce more leaves

(d) Increase photosynthesis

25. Asexual reproduction is less common in:

(a) Plants

(b) Animals ✅

(c) Fungi

(d) Algae

26. Parthenogenesis involves development of an egg:

(a) After fertilization

(b) Without fertilization ✅

(c) After pollination

(d) With meiosis

27. In honeybees, males develop from:

(a) Fertilized eggs

(b) Diploid eggs

(c) Unfertilized eggs ✅

(d) Cloned cells

28. Diploid parthenogenesis occurs in:

(a) Ants

(b) Aphids ✅

(c) Bees

(d) Hydra

29. Tissue culture in plants uses:

(a) Leaf cells

(b) Cambium tissue ✅

(c) Root tips

(d) Flower buds

30. In animal cloning, the nucleus is taken from:

(a) Egg cell

(b) Somatic cell ✅

(c) Sperm cell

(d) Embryo

31. Identical twins are formed by:

(a) Fertilization of two eggs

(b) Separation of blastomeres ✅

(c) Cloning

(d) Parthenogenesis

32. Fraternal twins are produced by:

(a) Asexual reproduction

(b) Sexual reproduction ✅

(c) Cloning

(d) Budding

33. Sexual reproduction involves:

(a) One parent

(b) No gametes

(c) Meiosis and fertilization ✅

(d) Identical offspring

34. External fertilization occurs in:

(a) Mammals

(b) Birds

(c) Frogs ✅

(d) Reptiles

35. Ovoviviparous animals include:

(a) Humans

(b) Duckbill platypus ✅

(c) Frogs

(d) Dogs

36. Viviparous animals develop embryo:

(a) Outside the body

(b) Inside the female body ✅

(c) In shelled eggs

(d) In water

37. Asexual reproduction lacks:

(a) Cell division

(b) Genetic variation ✅

(c) Growth

(d) Offspring

38. Meiosis is absent in:

(a) Sexual reproduction

(b) Asexual reproduction ✅

(c) Gametogenesis

(d) Fertilization

39. Hermaphrodite animals possess:

(a) Only male organs

(b) Only female organs

(c) Both male and female organs ✅

(d) No reproductive organs

40. Cross fertilization in hermaphrodites ensures:

(a) Cloning

(b) Genetic recombination ✅

(c) Identical offspring

(d) Rapid reproduction

41. The testes are located in:

(a) Abdominal cavity

(b) Scrotum ✅

(c) Pelvic cavity

(d) Ureter

42. Spermatogenesis occurs in:

(a) Vas deferens

(b) Epididymis

(c) Seminiferous tubules ✅

(d) Urethra

43. Sertoli cells provide:

(a) Testosterone

(b) Nourishment and protection to sperms ✅

(c) Estrogen

(d) LH hormone

44. Testosterone is secreted by:

(a) Sertoli cells

(b) Interstitial cells ✅

(c) Epididymis

(d) Vas deferens

45. The main duct of male reproductive tract is:

(a) Urethra

(b) Vas deferens ✅

(c) Seminiferous tubule

(d) Scrotum

46. Ovulation refers to:

(a) Fertilization of ovum

(b) Release of ovum from ovary ✅

(c) Implantation of zygote

(d) Formation of placenta

47. Fertilization in humans occurs in:

(a) Uterus

(b) Vagina

(c) Fallopian tube ✅

(d) Ovary

48. The site of implantation of zygote is:

(a) Ovary

(b) Uterus ✅

(c) Vagina

(d) Cervix

49. The placenta is formed between:

(a) Ovary and uterus

(b) Uterus and vagina

(c) Uterine and fetal tissues ✅

(d) Cervix and uterus

50. The menstrual cycle in humans lasts about:

(a) 14 days

(b) 21 days

(c) 28 days ✅

(d) 35 days

51. Follicle stimulating hormone (FSH) stimulates:

(a) Ovulation

(b) Follicle development ✅

(c) Menstruation

(d) Placenta formation

52. Estrogen hormone is secreted by:

(a) Corpus luteum

(b) Ovary under FSH stimulus ✅

(c) Pituitary gland

(d) Placenta

53. Luteinizing hormone (LH) induces:

(a) Menstruation

(b) Ovulation ✅

(c) Fertilization

(d) Implantation

54. Corpus luteum secretes:

(a) Estrogen

(b) Progesterone ✅

(c) FSH

(d) LH

55. Menstruation occurs due to:

(a) Ovulation

(b) Fertilization

(c) Breakdown of endometrium ✅

(d) Placenta formation

56. The end of menstrual cycle is called:

(a) Ovulation

(b) Menopause ✅

(c) Fertilization

(d) Implantation

57. The gestation period in humans is about:

(a) 180 days

(b) 240 days

(c) 280 days ✅

(d) 300 days

58. Amniotic fluid provides:

(a) Hormones

(b) Nutrients

(c) Protection and shock absorption ✅

(d) Oxygen

59. Hormone responsible for labour pain is:

(a) Progesterone

(b) Oxytocin ✅

(c) Estrogen

(d) FSH

60. After birth, the placenta is expelled in a process called:

(a) Ovulation

(b) Menstruation

(c) After birth ✅

(d) Implantation

61. Test tube babies are produced by:

(a) Natural fertilization

(b) In vitro fertilization ✅

(c) Cloning

(d) Parthenogenesis

62. In test tube baby technique, fertilization occurs:

(a) Inside the uterus

(b) Inside the ovary

(c) Outside the female body ✅

(d) Inside the fallopian tube

63. After fertilization in test tube baby method, the zygote is:

(a) Discarded

(b) Implanted into the uterus ✅

(c) Frozen permanently

(d) Grown in artificial womb

64. The placenta separates:

(a) Embryo from uterus

(b) Embryonic and maternal blood vessels ✅

(c) Ovary from uterus

(d) Sperm from ovum

65. Placenta helps in:

(a) Hormone production only

(b) Filtering nutrients and microorganisms ✅

(c) Ovulation

(d) Menstruation

66. Gonorrhoea is caused by:

(a) Virus

(b) Protozoa

(c) Gram-positive bacterium ✅

(d) Fungus

67. Syphilis affects all EXCEPT:

(a) Bones

(b) Heart

(c) Skin

(d) Liver ✅

68. Genital herpes is caused by:

(a) Bacteria

(b) Herpes simplex type 2 virus ✅

(c) Fungus

(d) Protozoa

69. AIDS spreads mainly through:

(a) Air

(b) Water

(c) Sexual contact ✅

(d) Food

70. STD prevention includes:

(a) Avoiding sunlight

(b) Avoiding sexual contact with infected person ✅

(c) Eating healthy food

(d) Taking antibiotics regularly

Q4: Exercise Short Questions:

1. What changes occur in ovulation and menstruation during pregnancy?

Answer:

During pregnancy, ovulation stops and the menstrual cycle is suspended. The corpus luteum continues to secrete progesterone, maintaining the uterine lining and preventing menstruation.

2. What is the difference between oogenesis and spermatogenesis in humans?

Answer:

- Oogenesis occurs in females and produces one mature ovum from each primary oocyte; it begins before birth and completes upon fertilization.
- Spermatogenesis occurs in males and continuously produces millions of sperms from spermatogonia after puberty.

3. How is a seed formed?

Answer:

A seed forms after fertilization when the zygote develops into an embryo. The ovule matures into a seed, containing the embryo, stored food, and a protective seed coat.

4. What is the importance of seed in the life cycle of a plant?

Answer:

Seeds ensure species survival by protecting the embryo, enabling dormancy during unfavorable conditions, and aiding in dispersal and germination to form new plants.

Important Short Questions:

1. What is the role of reproduction in the survival of a species?

Answer:

Reproduction ensures the continuation of a species by producing new individuals and maintaining population stability.

2. How does asexual reproduction differ from sexual reproduction?

Answer:

Asexual reproduction involves one parent and produces genetically identical offspring, while sexual reproduction involves two parents and results in genetically varied offspring due to meiosis and gene recombination.

3. What is the significance of meiosis in sexual reproduction?

Answer:

Meiosis reduces chromosome number by half and introduces genetic variation through recombination, which is vital for adaptation and species survival.

4. What is meant by alternation of generations in plants?

Answer:

It refers to the life cycle involving a diploid sporophyte and a haploid gametophyte, where meiosis occurs during spore formation (sporogenesis).

5. Why is cloning considered non-adaptive despite its advantages?

Answer:

Cloning produces genetically identical organisms, which lack variation and may be vulnerable to environmental stress and diseases, limiting long-term survival.

6. What are the two main types of reproduction in plants?

Answer:

Sexual and asexual reproduction.

7. Name two artificial methods of asexual reproduction.

Answer:

- Layering and grafting.

8. Define diplohaplontic life cycle.

Answer:

A life cycle with alternating diploid sporophyte and haploid gametophyte generations.

9. Differentiate between isomorphic and heteromorphic generations.

Answer:

Isomorphic: morphologically similar; **Heteromorphic:** morphologically different.

10. What is the function of pollen tube in seed plants?

Answer:

It transports male gametes safely to the ovule.

11. Why are seed plants more successful on land?

Answer:

Due to pollen tube evolution, seed protection, and efficient dispersal.

12. Define seed dormancy.

Answer:

A resting phase allowing the embryo to survive unfavorable conditions.

13. What triggers germination in dormant seeds?

Answer:

Favorable environmental cues like moisture and temperature.

14. What is parthenocarpy?

Answer:

Fruit development without fertilization, resulting in seedless fruits.

15. Name two fruits that show natural parthenocarpy.

Answer:

Banana and pineapple.

16. Which hormone induces artificial parthenocarpy?

Answer:

- Auxins.

17. What is fruit set?

Answer:

Retention of ovary after fertilization, leading to fruit formation.

18. What is climacteric in fruit ripening?

Answer:

A burst of respiration linked to ethylene production.

19. Define photoperiodism.

Answer:

The effect of day length on flowering and other plant responses.

20. What is vernalisation and which hormone is involved?

Answer:

Induction of flowering by low temperature; gibberellin (vernalin) is involved.

21. Name two common asexual reproduction methods in animals.

Answer:

Binary fission and budding.

22. What is parthenogenesis?

Answer:

Development of an egg without fertilization.

23. Give one example of haploid parthenogenesis.

Answer:

Male honeybees (drones) develop from unfertilized eggs.

24. What is diploid parthenogenesis?

Answer:

Egg retains diploid chromosome number and develops into a female, e.g. aphids.

25. Define cloning in animals.

Answer:

Production of genetically identical organisms from a single somatic cell.

26. What is the main advantage of cloning?

Answer:

All offspring behave similarly and have desired traits.

27. How are identical twins formed?

Answer:

By mitotic division of a single zygote into two blastomeres.

28. What is the difference between identical and fraternal twins?

Answer:

Identical twins are genetically identical; fraternal twins are genetically different.

29. What is external fertilization? Give one example.

Answer:

Fertilization outside the body, e.g. in frogs.

30. Define ovoviviparous condition.

Answer:

Internal development of embryo in shelled egg, which is laid and hatches outside, e.g. duckbill platypus.

31. Where does spermatogenesis occur in males?

Answer:

In the seminiferous tubules of the testes.

32. What is the role of Sertoli cells?

Answer:

They provide nourishment, protection, and fluid medium for developing sperms.

33. Which hormone is secreted by interstitial cells?

Answer:

- Testosterone.

34. What is ovulation?

Answer:

The release of a mature ovum from the ovary.

35. Where does fertilization occur in human females?

Answer:

In the proximal part of the fallopian tube (oviduct).

36. What is the function of the placenta?

Answer:

It facilitates exchange of oxygen, nutrients, and waste between mother and fetus.

37. Name the hormone responsible for maintaining pregnancy.

Answer:

- Progesterone.

38. What is the average duration of the menstrual cycle?

Answer:

- Approximately 28 days.

39. What triggers labour pains during birth?

Answer:

Oxytocin hormone released by the maternal pituitary gland.

40. What is meant by 'after birth'?

Answer:

The expulsion of placenta from the uterus after delivery of the baby.

41. What is meant by a test tube baby?

Answer:

A baby conceived through in vitro fertilization (outside the female body) and implanted into the uterus for normal development.

42. Why is the placenta important during pregnancy?

Answer:

It separates maternal and embryonic blood vessels and selectively filters nutrients and microorganisms.

43. Name two sexually transmitted diseases caused by bacteria.

Answer:

Gonorrhoea (Neisseria gonorrhoeae) and Syphilis (Treponema pallidum).

44. What is genital herpes and how is it transmitted?

Answer:

A viral STD caused by herpes simplex type 2, transmitted through sexual contact.

45. How can sexually transmitted diseases be prevented?

Answer:

By avoiding sexual contact with infected individuals and maintaining hygienic practices.

Q3: Exercise Long Questions:

🌟 Q1: What structures are associated with the human female reproductive system? What are their functions?

❖ **Definition:**

Test tube babies are children born through in vitro fertilization (IVF) — a biotechnological method where fertilization occurs outside the female body.

🔹 **Process:**

1. Collection of gametes: Sperm from the father and ovum from the mother are collected.

2. In vitro fertilization: Fertilization is carried out in a laboratory dish.

3. Zygote formation: The fertilized egg (zygote) begins to divide.

4. Implantation: The zygote is implanted into the mother's uterus.

5. Normal development: The placenta forms and supports the embryo until birth.

Purpose:

This technique helps couples who face physiological or anatomical issues that prevent natural fertilization or pregnancy.

Placental Role:

- Separates maternal and fetal blood vessels.
- Filters nutrients and harmful substances.
- Supports fetal development and waste removal.

🦠 Sexually Transmitted Diseases (STDs)

Definition:

STDs are infections transmitted through sexual contact. They can affect reproductive organs and other body systems.

TEST TUBE BABY

- IVF → Zygote → Implantation
- Placenta → Nutrient Exchange
- Helps infertile couples

SEXUALLY TRANSMITTED DISEASES (STDs)

- Gonorrhoea → Bacteria
- Syphilis → Spirochaete
- Herpes → Virus
- AIDS → HIV
- Prevention → Hygiene, Safe Sex

🔹 Common STDs:

1. Gonorrhoea

- **Cause:** Neisseria gonorrhoeae (bacterium)
- **Effect:** Mucous membrane infection of urinogenital tract
- **Transmission:** Sexual contact; newborns may get eye infections during birth

2. Syphilis

- **Cause:** Treponema pallidum (spirochaete bacterium)
- **Effect:** Damages reproductive organs, eyes, bones, CNS, heart, skin
- **Transmission:** Sexual contact

3. Genital Herpes

- **Cause:** Herpes simplex type 2 virus
- **Effect:** Genital sores and ulcers
- **Transmission:** Sexual contact; can infect newborn during birth

4. AIDS (Acquired Immune Deficiency Syndrome)

- **Cause:** HIV virus
- **Effect:** Weakens immune system

- **Transmission:** Sexual contact, blood transfusion, shared needles

Control Measures:

- Avoid sexual contact with infected individuals
- Maintain hygiene
- Use protection (e.g., condoms)
- Long-term medication (except AIDS, which has no complete cure yet)

🌟 Q2: What are the functions of placenta during pregnancy?

❖ **Answer:**

The placenta is a temporary organ formed between the uterine wall of the mother and the developing fetus. It plays a vital role in supporting and protecting the fetus throughout pregnancy.

🔹 **Key Functions of the Placenta:**

1. Nutrient Supply

- Transfers essential nutrients (glucose, amino acids, vitamins) from maternal blood to the fetus.

2. Gas Exchange

- Oxygen passes from mother to fetus; carbon dioxide is removed from fetal blood to maternal blood.

3. Waste Removal

- Removes fetal metabolic wastes like urea and passes them into maternal circulation for excretion.

4. Hormone Secretion

Produces hormones like:

- **Progesterone:** Maintains pregnancy
- **Human Placental Lactogen (hPL):** Stimulates mammary glands
- **Estrogen:** Supports uterine growth and blood flow

5. Immune Protection

- Acts as a selective barrier, filtering harmful substances and microorganisms while allowing antibodies to pass for fetal immunity.

6. Barrier Function

- Keeps maternal and fetal blood separate to prevent immune rejection and allows selective exchange.

🌟 Q3: Describe human menstrual cycle.

❖ Answer

The menstrual cycle is a regular, cyclic process in females that prepares the body for potential pregnancy. It typically lasts 28 days, though it can vary between individuals.

🔄 Phases of the Menstrual Cycle:

1. Menstrual Phase (Day 1–5)

- The endometrium (uterine lining) breaks down and is shed.
- Blood and tissue are discharged through the vagina.
- Caused by the degeneration of corpus luteum and drop in progesterone levels.

2. Follicular Phase (Day 1–13)

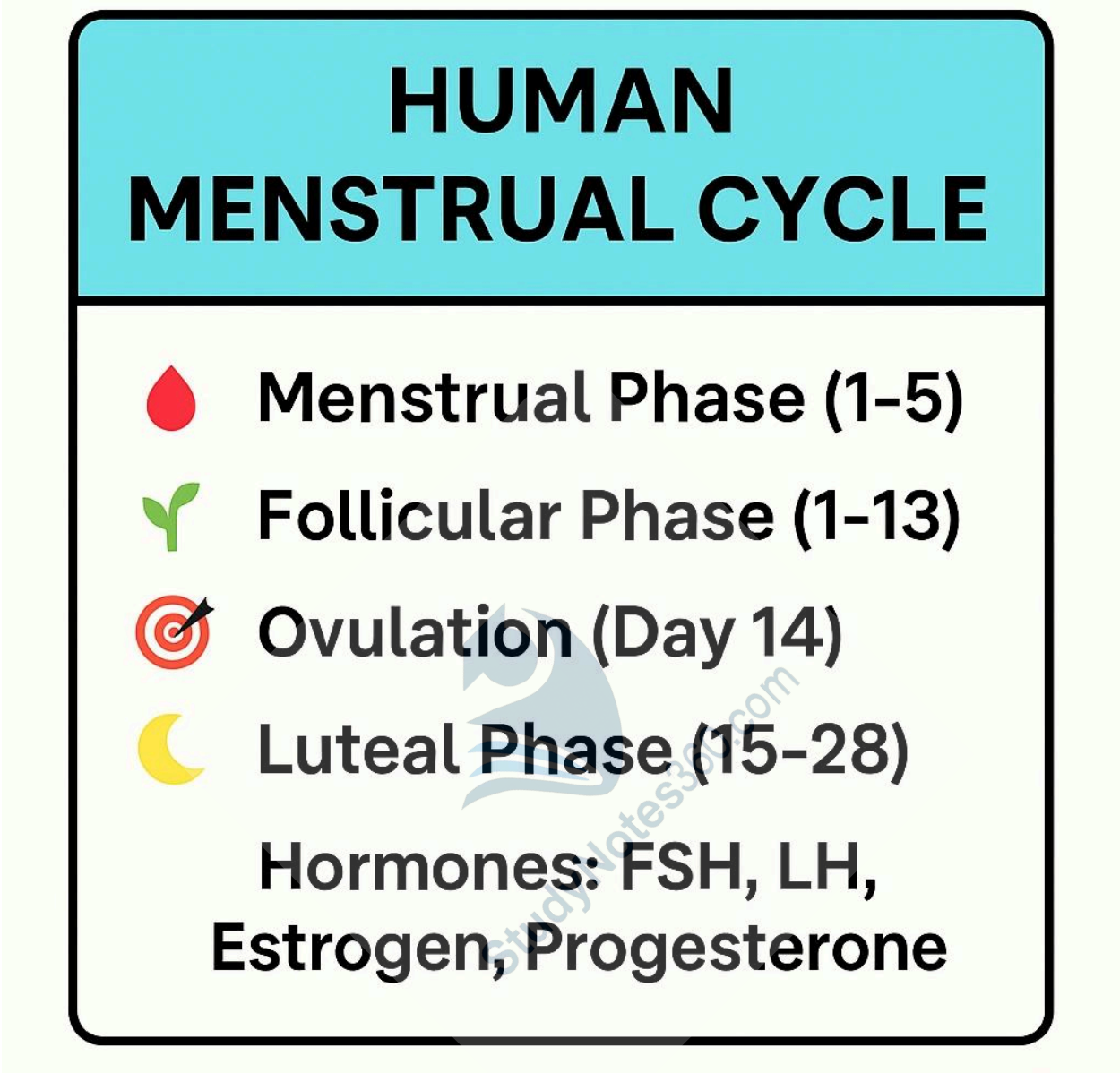
- FSH (Follicle Stimulating Hormone) from the pituitary stimulates growth of ovarian follicles.
- One follicle matures and secretes estrogen, which rebuilds the endometrium.

3. Ovulation (Day 14)

- Surge in LH (Luteinizing Hormone) triggers release of a mature ovum from the ovary.
- This is the most fertile period.

4. Luteal Phase (Day 15–28)

- The ruptured follicle becomes corpus luteum, which secretes progesterone.
- Progesterone thickens the endometrium for implantation.
- If fertilization does not occur, corpus luteum degenerates, hormone levels drop, and menstruation begins again.



✦ Key Hormones Involved:

- **FSH:** Stimulates follicle development
- **Estrogen:** Rebuilds uterine lining
- **LH:** Triggers ovulation
- **Progesterone:** Maintains endometrium for implantation

✍️ **Q4. Write notes on the following:**

(a) Parthenogenesis

(b) Herpes Genitalia

(c) Asexual reproduction

(d) Seedless fruits

❖ **Answer:**

(a) Parthenogenesis

Definition:

Parthenogenesis is a form of asexual reproduction in which an egg develops into an organism without fertilization.

Types:

- **Haploid Parthenogenesis:** Egg remains haploid and develops into male offspring (e.g. drones in honeybees).
- Diploid **Parthenogenesis:** Egg retains diploid number due to modified meiosis and develops into female offspring (e.g. aphids).

Examples:

- Ants, bees, wasps, aphids.

Importance:

- Accelerates reproductive rate
- Useful in species with limited mating opportunities

(b) Herpes Genitalia

Definition:

Herpes Genitalia is a sexually transmitted disease (STD) caused by Herpes Simplex Virus Type 2.

Symptoms:

- Genital sores
- Painful ulcers
- Itching and discomfort

Transmission:

- Through sexual contact
- From infected mother to baby during birth

Complications:

- Can damage eyes and central nervous system of newborns
- No permanent cure; managed with antiviral medication

(c) Asexual Reproduction

Definition:

Asexual reproduction is a mode of reproduction involving only one parent, producing genetically identical offspring.

Methods in Animals:

- Binary fission (protozoa)
- Budding (Hydra)
- Parthenogenesis
- Cloning
- Tissue culturing
- Identical twins (mitotic division)

Advantages:

- Rapid multiplication
- No need for mating
- Useful in stable environments

Limitations:

- No genetic variation
- Less adaptability to environmental changes

(d) Seedless Fruits

Definition:

Seedless fruits are formed without fertilization, a process called parthenocarpy.

Natural Examples:

- Banana, pineapple, some oranges and grapes.

Artificial Induction:

- By applying auxins to ovaries
- Used commercially in tomatoes, peppers

Importance:

- Preferred for consumption
- Useful in agriculture and food industry

Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.

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Purpose: To contribute to education by offering insightful, valuable content that enhances learning and understanding.