UNIQUE STUDY POINT

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Class: X	**Subject:** Science	**Session:** 2025-26
Chapter: 07 - How do Organisms Reproduce?	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q1. In Leishmania, binary fission occurs in:

(a) Any plane

(b) Definite orientation

(c) Multiple planes

(d) No specific direction

Q2. The advantage of tissue culture technique is:

(a) Time consuming

(b) Disease-free plants in large numbers

(c) Requires large space

(d) Slow growth rate

Q3. The motile germ cell in sexual reproduction is called:

(a) Female gamete

(b) Egg cell

(c) Male gamete

(d) Ovule

Q4. The tube that grows from pollen grain travels through:

(a) Anther to stigma

(b) Style to ovary

(c) Ovary to style

(d) Stigma to anther

Q5. How many chromosomes does a germ cell contain compared to body cells?

(a) Equal number

(b) Double number

(c) Half number
(d) Four times

Q6. The process by which a seed develops into seedling is:
(a) Pollination
(b) Fertilization
(c) Germination
(d) Reproduction

Q7. Testosterone hormone is secreted by:
(a) Ovaries
(b) Testes
(c) Prostate gland
(d) Uterus

Q8. Which flower part contains the female gamete?
(a) Anther
(b) Pollen grain
(c) Ovule
(d) Filament

Q9. The embryo gets nutrition from mother's blood through:
(a) Uterus
(b) Placenta
(c) Ovary
(d) Oviduct

Q10. Which contraceptive method creates mechanical barrier?
(a) Oral pills
(b) Condom
(c) Surgical method
(d) All of these

SECTION B - Short Answer Questions (2 marks each)

Q11. Why is reproduction not essential to maintain life of an individual organism but important for species?

Q12. What is the function of placenta in human reproduction?

Q13. How does fragmentation differ from regeneration?

Q14. Name two changes seen specifically in boys during puberty.

SECTION C - Short Answer Questions (3 marks each)

Q15. Explain spore formation in Rhizopus. Why are spores advantageous for the organism?

Q16. Describe the process from pollination to fertilization in flowering plants.

Q17. What is meiosis? Why is it important in sexual reproduction?

SECTION D - Long Answer Question (5 marks)

Q18. Explain different methods of contraception in detail. Why is family planning important?

SECTION E - Case Study Based Questions (4 marks each)

Q19. Case Study 1:

A farmer wanted to grow a new variety of rose plant. He took cuttings from a prize-winning rose plant and planted them in his garden. Soon, all these cuttings developed into identical rose plants with the same flower color, size, and fragrance as the parent plant. This method allowed him to maintain the exact characteristics he desired.

Based on this case study, answer the following:

(a) What method of reproduction did the farmer use? (1 mark)

(b) Why are all new plants identical to the parent plant? (1 mark)

(c) What is one advantage of this method over seed production? (1 mark)

(d) Give one more example of a plant that can be propagated this way. (1 mark)

Q20. Case Study 2:

During a biology practical, students observed Amoeba under a microscope. They noticed that the nucleus of Amoeba elongated and got constricted in the middle. Gradually, the cell divided into two equal halves, each containing a copy of the genetic material. The teacher explained that this ensures both daughter cells have the same information as the parent cell.

Based on this case study, answer the following:

(a) What type of reproduction is taking place? (1 mark)

(b) Why must DNA be copied before cell division? (1 mark)

(c) Are the two daughter cells identical? Explain. (1 mark)

(d) What happens if DNA copying has major errors? (1 mark)

DETAILED ANSWER KEY - PAPER 03

SECTION A - Answers to MCQs

Answer 1: (b) Definite orientation

In organisms like Leishmania which have a whip-like structure, binary fission occurs in a definite orientation in relation to these structures.

Answer 2: (b) Disease-free plants in large numbers

Tissue culture allows growing many plants from one parent in disease-free conditions, making it highly advantageous for ornamental plants.

Answer 3: (c) Male gamete

The motile germ cell is conventionally called the male gamete, while the larger germ cell containing food stores is the female gamete.

Answer 4: (b) Style to ovary

After pollen lands on stigma, a tube grows out of the pollen grain and travels through the style to reach the ovary where the female germ cells are located.

Answer 5: (c) Half number

Germ cells have half the number of chromosomes and half the amount of DNA compared to non-reproductive body cells, achieved through meiosis.

Answer 6: (c) Germination

Germination is the process by which the embryo in the seed develops into a seedling under appropriate conditions.

Answer 7: (b) Testes

Testosterone hormone is secreted by the testes, which regulates sperm formation and brings about changes in appearance during puberty in boys.

Answer 8: (c) Ovule

The ovule contains the female gamete (egg cell) which fuses with the male germ cell during fertilization.

Answer 9: (b) Placenta

The embryo gets nutrition from the mother's blood with the help of placenta, a special disc-shaped tissue.

Answer 10: (b) Condom

Condoms create a mechanical barrier to prevent sperm from reaching the egg, and also protect from sexually transmitted diseases.

SECTION B - Answers to Short Answer Questions

Answer 11:

Reproduction is not necessary to maintain the life of an individual organism, unlike essential life processes such as nutrition, respiration, or excretion. However, it is crucial for species because:

• It creates new individuals ensuring the species continues to exist

• Large numbers of organisms belonging to a species bring them to our notice
• Without reproduction, a species would become extinct after the death of existing individuals

Answer 12:

Functions of Placenta:
• It is a disc embedded in the uterine wall connecting mother and embryo
• Provides large surface area through villi for exchange of materials
• Transfers glucose and oxygen from mother's blood to embryo
• Removes waste substances from embryo to mother's blood

Answer 13:

Fragmentation: Simple breaking up of organism into smaller pieces which grow into new individuals. Example: Spirogyra breaks into fragments upon maturation.

Regeneration: Ability to develop complete organism from broken body parts using specialized cells. Example: Planaria and Hydra can regenerate from cut pieces. Regeneration is not the normal reproductive method for most organisms.

Answer 14:

Changes specific to boys during puberty:
• New thick hair growth on the face (beard and mustache)
• Voice begins to crack and becomes deeper
• Penis occasionally becomes enlarged and erect

SECTION C - Answers to Short Answer Questions

Answer 15:

Spore Formation in Rhizopus:
• Thread-like structures called hyphae are not reproductive parts
• Tiny blob-on-a-stick structures are sporangia, which are involved in reproduction
• Sporangia contain cells or spores
• Spores can develop into new Rhizopus individuals

Advantages of Spores:
• Spores are covered by thick walls that protect them
• They can survive harsh conditions
• When they come into contact with moist surface, they begin to grow
• This allows organism to survive unfavorable conditions and spread to new areas

Answer 16:

From Pollination to Fertilization:

1. Pollination:
• Pollen grains are transferred from anther to stigma
• Can be self-pollination or cross-pollination
• Agents: wind, water, or animals

2. Pollen Tube Growth:
• After pollen lands on suitable stigma, it has to reach female germ cells in ovary
• A tube grows out of the pollen grain
• This pollen tube travels through the style
• It reaches the ovary containing ovules

3. Fertilization:
• Male germ cell produced by pollen grain travels through pollen tube
• It fuses with female gamete (egg cell) present in the ovule
• This fusion of germ cells gives us the zygote

Answer 17:

Meiosis: It is a special process of cell division in which germ cells are produced with half the number of chromosomes and half the amount of DNA compared to non-reproductive body cells.

Importance in Sexual Reproduction:
• Sexual reproduction combines DNA from two individuals
• If each parent contributed full DNA, offspring would have double the DNA
• This would mess up cellular control
• Meiosis ensures each germ cell has half the chromosomes
• When two germ cells combine during fertilization, normal chromosome number is restored in the new individual
• This maintains genetic stability across generations

SECTION D - Answer to Long Answer Question

Answer 18:

Methods of Contraception:

1. Mechanical Barrier Methods:
• **Condoms:** Covering for penis or similar covering in vagina
• Prevents sperm from reaching egg
• Also protects from sexually transmitted diseases

2. Chemical/Hormonal Methods:
• **Oral pills:** Drugs taken orally
• Change hormonal balance so eggs are not released
• Fertilization cannot occur
• May cause side-effects due to hormonal changes

3. Intrauterine Devices:
• **Copper-T or Loop:** Placed in uterus
• Prevents pregnancy
• Can cause side effects due to uterine irritation

4. Surgical Methods:
• **In males (Vasectomy):** Blocking vas deferens prevents sperm transfer
• **In females (Tubectomy):** Blocking fallopian tubes prevents egg from reaching uterus
• Fertilization cannot take place
• Safe in long run but surgery can cause complications if not done properly

Importance of Family Planning:
• Allows spacing between children for mother's health
• Prevents unwanted pregnancies
• Ensures readiness of body and mind for parenthood
• Helps in managing population size
• Improves quality of life for families
• Reduces health risks for mother and children

SECTION E - Answers to Case Study Based Questions

Answer 19:

(a) Method used:
Vegetative propagation (asexual reproduction through cuttings)

(b) Why plants are identical:
All new plants are genetically similar to the parent plant because they are produced from a single individual through asexual reproduction, with no mixing of genetic material from two parents.

(c) Advantage over seed production:
Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds. It also ensures all plants have exact characteristics of the parent.

(d) Another example:
Sugarcane, grapes, jasmine, or banana (any one)

Answer 20:

(a) Type of reproduction:
Binary fission (asexual reproduction)

(b) Why DNA must be copied:
DNA in the cell nucleus is the information source for making proteins and maintaining body design. If DNA is not copied, one daughter cell would not have any genetic information and would not be able to function and survive.

(c) Are daughter cells identical?
The two cells are similar but may not be absolutely identical. DNA copying has some variations each time, so DNA copies are similar but may not be identical to the original. However, the cells are similar enough to function normally.

(d) What if DNA copying has major errors?
If variations are very drastic, the new DNA copy cannot work with the cellular apparatus it inherits. Such a newborn cell will simply die.
