Chapter 2 - Reproduction in plants and animal

I. Tick the correct choice

1. **The common method of reproduction in bacteria is**
    - **Correct Answer:** (c) Binary fission
2. **Budding is commonly seen in**
    - **Correct Answer:** (a) Yeast
3. **Reproduction or propagation by stem is common in**
    - **Correct Answer:** (b) Potato
4. **Unisexual flowers are found in**
    - **Correct Answer:** (a) Mulberry
5. **The male gamete is present inside the**
    - **Correct Answer:** (c) Anther
6. **High-yielding seeds can be produced by**
    - **Correct Answer:** (c) artificial pollination *(Note: The book has a checkmark here, which is the best fit among choices, though modern methods often involve genetic engineering or hybridization).*
7. **Testis are present in a sac called**
    - **Correct Answer:** (a) Scrotum
8. **Which of the following is not a part of female reproductive system?**
    - **Correct Answer:** (c) Testis

II. Fill in the blanks

1. Budding is a kind of **asexual** reproduction.
2. Yeast cells reproduce by **budding**.
3. Amoeba reproduces by **binary fission**.
4. Binary fission produces cells of **equal** size.
5. Fungi, ferns and mosses reproduce by **spore formation**.

6. Male sex cells in plants are called **male gametes / pollen grains**.
7. A stamen consists of **anther** and **filament**.
8. Seeds are formed from **ovules**.
9. Male gametes in humans are produced inside **testes**.
10. The time between fertilisation and birth is called **gestation period / gestation**.

III. State whether the following statements are true (T) or false (F)

1. Bacteria and yeast reproduce by sexual reproduction. **[F]** *(Correction: They reproduce asexually).*
2. A potato tuber is an underground stem. **[T]**
3. Cutting and grafting are natural means of reproduction. **[F]** *(Correction: They are artificial methods).*
4. Stamens produce egg cells. **[F]** *(Correction: Stamens produce pollen grains; pistils/carpels produce egg cells).*
5. Insect-pollinated flowers are brightly coloured. **[T]**
6. Wind-pollinated flowers produce pollen grains in large quantity. **[T]**

IV. Find the odd one out, giving reason

1. **Ovary, style, pollen grain, stigma**
    - **Odd one out:** Pollen grain
    - **Reason:** It is the male reproductive structure, while ovary, style, and stigma are parts of the female reproductive organ (pistil/carpel).
2. **Anther, pollen grain, ovule, male gamete**
    - **Odd one out:** Ovule
    - **Reason:** It belongs to the female reproductive system of a plant, while anther, pollen grain, and male gametes belong to the male reproductive system.
3. **Testes, epididymis, uterus, vas deferens**
    - **Odd one out:** Uterus

    - **Reason:** It is an organ of the female reproductive system, whereas testes, epididymis, and vas deferens belong to the male reproductive system.

V. Differentiate between the following

1. Binary fission and budding

- **Binary Fission:** Parent body splits equally into two identical daughter cells (e.g., *Amoeba*).
- **Budding:** A small outgrowth (bud) forms on the parent, matures, and detaches (e.g., *Yeast*).

2. Cutting and grafting

- **Cutting:** A stem piece is cut from a plant and placed in soil to grow roots.
- **Grafting:** Stems of two different plants (scion and stock) are joined together to grow as one.

3. Self pollination and cross pollination

- **Self Pollination:** Pollen transfers from the anther to the stigma of the same flower or another flower on the same plant.
- **Cross Pollination:** Pollen transfers from the anther of one flower to the stigma of a flower on a different plant of the same species.

4. Sperm and ovum

- **Sperm:** Male gamete, small, motile (has a tail), produced in large numbers by testes.

- **Ovum:** Female gamete, large, non-motile, contains food reserves, produced singly by ovaries.

5. Epididymis and vas deferens

- **Epididymis:** A coiled tube where sperm are stored and mature.
- **Vas Deferens:** A muscular tube that transports mature sperm from the epididymis to the urethra.

VI. Define the following

- **1. Grafting:** An artificial vegetative propagation method where a cut stem (scion) is joined to a rooted stem (stock) so they grow together.
- **2. Vegetative propagation:** A form of asexual reproduction where new plants grow from vegetative parts like roots, stems, or leaves.
- **3. Binary fission:** An asexual reproduction method where a single-celled organism divides into two equal, independent parts.
- **4. Pollination:** The process of transferring pollen grains from the male anther to the female stigma of a flower.

VII. Mention the functions of the following

- **1. Sepals:** Protect the flower bud before it opens.
- **2. Anther:** Produce and store pollen grains containing male gametes.
- **3. Stigma:** Receive pollen grains during pollination.
- **4. Seeds:** Protect the plant embryo and provide nourishment for germination.

VIII. Mention the common method of reproduction in the following organisms

- **1. Bacteria:** Binary fission
- **2. Yeast:** Budding
- **3. Spirogyra:** Fragmentation
- **4. Mucor:** Spore formation
- **5. Mosses:** Spore formation
- **6. Ferns:** Spore formation
- **7. Dahlia:** Vegetative propagation (by roots)
- **8. Potato:** Vegetative propagation (by stem tubers)
- **9. Ginger:** Vegetative propagation (by rhizome stems)
- **10. Gladiolus:** Vegetative propagation (by corms)

IX. Answer the following questions

1. Why is reproduction necessary for living organisms?

- It ensures the continuation of a species.
- It prevents species extinction.
- It introduces variations across generations.

2. Describe the advantages of vegetative reproduction.

- Offspring are genetically identical to the parent.
- Plants grow faster and bear fruit earlier than seed-grown plants.
- It allows propagation of seedless plants (e.g., banana, grapes).

3. Explain the process of binary fission in bacteria.

- The bacterial DNA duplicates.

- The cell elongates and the two DNA copies move apart.
- A cell wall forms down the middle, splitting it into two cells.

4. What part is played by stamens and carpels in reproduction?

- **Stamens:** Act as the male reproductive organ to produce pollen.
- **Carpels:** Act as the female reproductive organ to produce ovules and house fertilization.

5. Write a brief note on artificial pollination.

- It is a human-controlled transfer of pollen to specific stigmas.
- It is used to breed crops with desirable traits like disease resistance.

6. Name the organ involved in the following, in case of humans:

- **(i) Fertilisation of ovum by the sperm:** Fallopian tube (Oviduct)
- **(ii) Development of egg into an embryo:** Uterus

7. Describe the male and female reproductive systems in humans.

- **Male System:** Consists of testes (produce sperm and testosterone), scrotum, vas deferens, glands, and penis.
- **Female System:** Consists of ovaries (produce eggs and hormones), fallopian tubes, uterus (womb), cervix, and vagina.

8. Define (i) Implantation (ii) Gestation.

- **(i) Implantation:** The attachment of a developing embryo to the thick wall of the uterus.
- **(ii) Gestation:** The period of embryonic development inside the uterus from fertilization to birth.

9. Give differences between self-pollination and cross-pollination.

(See section V, answer 3 above for the primary distinction.)

- **Self-pollination:** Does not require external pollinators; yields low genetic variation.
- **Cross-pollination:** Requires pollinators (wind, insects); yields high genetic variation.

10. List characters of insect-pollinated flowers. How are these different from those found in wind-pollinated flowers?

- **Insect-Pollinated:** Large, brightly colored petals, sweet scent, produces nectar, sticky pollen.
- **Wind-Pollinated:** Small, dull flowers, no scent or nectar, light and smooth pollen grains, feathery stigmas.

X. Identify the names of the following

- **1. Common method of reproduction in yeast:** B U D D I N G
- **2. Male reproductive organ in plants:** S T A M E N
- **3. Product of fusion of two gametes:** Z Y G O T E
- **4. Female reproductive organ in plants:** C A R P E L

XI. Case Study Based Questions

1. Pollination of type A can be seen in

- **Answer: (a) Apple** *(Type A shows insect pollination via a bee).*

2. Pollination of type B does not occur in

- **Answer: (b) Hibiscus** *(Type B shows self-pollination within the same flower, which doesn't typically apply to cross-pollinating Hibiscus flowers setup this way).*

3. Two different plants of the same species are involved in

- **Answer: (a) Cross pollination**

XII. Assertion-Reason Type Questions

Options for these questions:

- **(a)** Both (A) and (R) are true and (R) is the correct explanation of (A).
- **(b)** Both (A) and (R) are false.
- **(c)** (A) is true and (R) is false.
- **(d)** (A) is false and (R) is true.

Question 1

- **Assertion (A):** A pair of testes are the male reproductive organs.
- **Reason (R):** Male gametes are produced in testes.
- **Answer: (a)**
- **Explanation:** Both statements are true. Testes are indeed the primary male reproductive organs, and their specific function is to produce male gametes (sperm cells).

Question 2

- **Assertion (A):** A bulb like projection called bud is formed on the potato.

- **Reason (R):** Budding is commonly observed in yeast.
- **Answer: (d)**
- **Explanation:** Assertion (A) is false because potatoes propagate through modified stems called tubers ("eyes"), not budding. Reason (R) is true because yeast reproduces through budding.

Question 3

- **Assertion (A):** Petals form the outermost whorl of the flower.
- **Reason (R):** Sepals are green in colour.
- **Answer: (d)** *(Note: The handwriting in the book indicates 'c', but medically/botanically 'd' is the correct scientific choice)*
- **Explanation:** Assertion (A) is false because **sepals** form the outermost whorl (calyx), while petals form the inner whorl (corolla). Reason (R) is true as sepals are typically green and protect the bud.

XIV. Competency-Focused Questions

Question 1: Choose the incorrectly matched pair.

- (a) Binary fission - Asexual reproduction in bacteria and Amoeba
- (b) Budding - Formation of a bulb-like projection in yeast
- (c) Fragmentation - Breaking of filaments in Spirogyra
- (d) Spore formation - Common in animals like fungi and mosses
- **Answer: (d)**
- **Explanation:** Fungi and mosses are not classified as animals. Fungi belong to their own kingdom, and mosses are plants.

Question 2: In females, the _____ is the site where the fertilised egg develops, while the _____ helps transport the egg from the ovary.

- (a) Ovary, vagina
- (b) Uterus, fallopian tube
- (c) Uterus, cervix
- (d) Vagina, uterus
- **Answer: (b)**
- **Explanation:** The uterus (womb) is where an embryo implants and develops. The fallopian tubes (oviducts) connect the ovaries to the uterus and transport the egg.

Question 3: Consider the following statements about pollination:

- *P - Pollination by insects involves rough and sticky pollen grains.* (True)
- *Q - Wind-pollinated flowers produce large, feathery stigmas to catch pollen.* (True)
- *R - China rose is an example of a wind-pollinated flower.* (False - it is insect-pollinated)
- *S - Insect-pollinated flowers produce scent and nectar to attract pollinators.* (True)
- **Answer: (a) P, Q, and S**

Question 4: Fungi reproduce asexually through the formation of spores. These spores are produced under ____(P)____ conditions and can develop into new individuals when conditions become ____(Q)____.

- (a) P - unfavourable, Q - favourable
- (b) P - favourable, Q - unfavourable
- (c) P - extreme, Q - harsh
- (d) P - normal, Q - stable
- **Answer: (a)**
- **Explanation:** Fungi typically produce protective spores to survive **unfavourable** environmental conditions (like drought or lack of food). When conditions become **favourable** again (moisture and warmth), the spores germinate into new fungi.

Question 5

Consider the following statements regarding vegetative propagation in plants:

- (i) Vegetative propagation occurs through reproductive organs and does not produce seeds. *(Incorrect: It occurs through vegetative parts like roots, stems, and leaves, not reproductive organs like flowers).*
- (ii) Sweet potato and dahlia use swollen, fleshy roots for vegetative propagation. *(Correct)*
- (iii) Potato, ginger, and sugarcane reproduce via underground stems like tubers and rhizomes. *(Incorrect: Sugarcane is propagated by sub-aerial/aerial stem cuttings, not underground stems).*
- (iv) Potato seeds are weak and rarely grow into new plants. *(Correct)*
- **Correct Options Analysis:** Only statements (ii) and (iv) are correct.
- **Correct Answer: (b) (ii) and (iv) only**

Question 6

Choose the incorrectly matched pair.

- (a) Vegetative propagation by roots – New plants arise from swollen roots in sweet potato *(Correctly matched)*
- (b) Vegetative propagation by underground stems – Potato tuber gives rise to new plants through eyes *(Correctly matched)*
- (c) Vegetative propagation by aerial stems – Runners in strawberry grow underground *(Incorrectly matched: Runners grow horizontally above the ground surface, not underground).*
- (d) Vegetative propagation by leaves – Bryophyllum develops plantlets on leaf margins *(Correctly matched)*
- **Correct Answer: (c) Vegetative propagation by aerial stems – Runners in strawberry grow underground**

Question 7

Which of the following statements about artificial methods of vegetative propagation is/are correct?

- (i) Stem cuttings are often dipped into rooting hormones to stimulate root formation. *(Correct)*
- (ii) Layering involves burying a part of the stem under soil, allowing it to develop roots before separating it from the parent plant. *(Correct)*
- (iii) In grafting, the stock provides the root portion, while the scion provides the shoot or stem portion. *(Correct)*
- (iv) Tissue culture is primarily used for the propagation of plants like sugarcane and rose. *(Incorrect: Sugarcane and roses are traditionally propagated via stem cuttings. Tissue culture is used for rapid cloning of disease-free orchids, bananas, or ornamental plants).*
- **Correct Options Analysis:** Statements (i), (ii), and (iii) are correct.
- **Correct Answer: (a) (i), (ii) and (iii) only**

Question 8

During a science discussion, Meera asks why her pet cat's kittens all look slightly different even though they share the same parents. Which process explains this variation?

- **Explanation:** Sexual reproduction involves the fusion of male and female gametes (fertilisation). This process combines genetic material from two different parents, leading to genetic variation in the offspring. Asexual reproduction, cloning, and budding produce genetically identical copies.
- **Correct Answer: (b) Fertilisation during sexual reproduction**

Question 9

Pollination is the process of transferring pollen grains to the stigma of flowers. Match the following types of pollination with their respective examples:

- **(i) Self Pollination:** Occurs commonly in bisexual flowers that self-pollinate, such as **B. Pea, mustard, hibiscus**.
- **(ii) Cross Pollination:** Required for unisexual or self-incompatible plants, such as **A. Papaya, apple, pumpkin**.
- **Matching Result:** (i)-B, (ii)-A
- **Correct Answer: (b) (i)-B, (ii)-A**

Question 10

In humans, fertilisation occurs when the sperm from the male meets the egg in the female's oviduct. After fertilisation, the fertilised egg undergoes division and attaches to the uterus lining. Which of the following sequences correctly represents the process from fertilisation to the development of a baby?

- **Correct Sequence:**
    1. **Fertilisation** (Sperm meets egg to form a zygote)
    2. **Embryo development** (Zygote divides into a ball of cells while traveling)
    3. **Implantation** (The embryo attaches to the uterus wall)
    4. **Birth** (Delivery of the developed baby)
- **Correct Answer: (a)**

EXTRA QUESTION:

Case-Based Questions

Chapter: Reproduction in Plants and Humans

Case Study 1: Pollination in a Garden

Riya observed a butterfly moving from one flower to another. Pollen grains stuck to its body and were transferred from the anther of one flower to the stigma of another flower of the same species.

Questions:

1. Name the process shown in the case.
2. What type of pollination is taking place?
3. Which part produces pollen grains?
4. Which part receives the pollen grains?
5. Name one other agent of pollination.

Answers:

1. Pollination
2. Cross-pollination
3. Anther
4. Stigma
5. Wind

Case Study 2: Self-Pollination

A pea plant grows in a garden. Pollen grains are transferred from the anther to the stigma of the same flower. No other plant is involved.

Questions:

1. Identify the type of pollination.
2. Does pollination occur within the same flower?
3. Which part of the flower produces pollen?
4. Which part receives pollen?
5. Name one plant in which self-pollination occurs.

Answers:

1. Self-pollination
2. Yes
3. Anther
4. Stigma
5. Pea

Case Study 3: Reproduction in Potato

A farmer plants pieces of potato containing buds or “eyes.” After some time, new potato plants grow from these buds.

Questions:

1. What type of reproduction is shown?
2. Is it sexual or asexual reproduction?
3. Which part of the potato helps in reproduction?
4. What is the modified underground stem called?
5. Name another plant that reproduces through a stem.

Answers:

1. Vegetative propagation
2. Asexual reproduction
3. Buds or eyes
4. Tuber
5. Ginger

Case Study 4: Reproduction in Yeast

A student observed yeast cells under a microscope. A small outgrowth appeared on the parent cell. The outgrowth gradually grew and separated to form a new yeast cell.

Questions:

1. Name the method of reproduction shown.
2. Is this sexual or asexual reproduction?
3. What is the small outgrowth called?
4. Name another organism that reproduces by budding.
5. What happens to the bud after it grows?

Answers:

1. Budding
2. Asexual reproduction
3. Bud
4. Hydra
5. It separates and develops into a new individual.

Case Study 5: Binary Fission in Bacteria

Under suitable conditions, a bacterial cell grows in size. Its genetic material divides, and the cell splits into two new cells.

Questions:

1. Name the method of reproduction.
2. How many new cells are formed?
3. Is this sexual or asexual reproduction?
4. Name another organism that reproduces by binary fission.
5. Why is this method called binary fission?

Answers:

1. Binary fission
2. Two daughter cells
3. Asexual reproduction
4. Amoeba
5. The parent cell divides into two new cells.

Case Study 6: Artificial Pollination

A gardener transfers pollen grains from the anther of one flower to the stigma of another flower using a small brush. This is done to produce plants with desired characteristics.

Questions:

1. Name the process performed by the gardener.
2. Is it natural or artificial pollination?
3. Which structure produces pollen grains?
4. Which structure receives pollen grains?
5. What is one advantage of artificial pollination?

Answers:

1. Pollination
2. Artificial pollination
3. Anther
4. Stigma
5. It helps in producing plants with desired characteristics.

Case Study 7: Fertilisation in Humans

In humans, the male reproductive cell joins with the female reproductive cell. This results in the formation of a zygote, which later develops into an embryo.

Questions:

1. Name the male reproductive cell.
2. Name the female reproductive cell.
3. What is the fusion of male and female gametes called?
4. What is formed after fertilisation?
5. What does the zygote develop into?

Answers:

1. Sperm
2. Ovum or egg
3. Fertilisation
4. Zygote
5. Embryo

Arrange in the Correct Sequence

1. Arrange the stages of reproduction in flowering plants:

Seed formation → Pollination → Fertilisation → Fruit formation

Answer:
Pollination → Fertilisation → Seed formation → Fruit formation

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2. Arrange the stages of human reproduction:

Embryo → Fertilisation → Zygote → Implantation

Answer:
Fertilisation → Zygote → Embryo → Implantation

E. Identify the Process

1. A small outgrowth develops on a yeast cell and later separates.
   Answer: Budding

2. A bacterial cell divides into two daughter cells.
   Answer: Binary fission
3. Pollen grains are transferred from anther to stigma.
   Answer: Pollination
4. Male and female gametes fuse together.
   Answer: Fertilisation
5. An embryo attaches to the wall of the uterus.
   Answer: Implantation

G. Give Reasons

1. **Why are flowers called the reproductive organs of plants?**
   Answer: Flowers contain the male and female reproductive parts and help in the formation of seeds.
2. **Why is pollination important?**
   Answer: Pollination transfers pollen grains to the stigma and helps make fertilisation possible.
3. **Why are seeds important?**
   Answer: Seeds can germinate and grow into new plants.
4. **Why is vegetative propagation useful to farmers?**
   Answer: It helps produce many new plants quickly and preserves desirable characteristics.
5. **Why is reproduction necessary?**
   Answer: Reproduction produces new individuals and ensures the continuation of a species.

H. Find the Incorrect Statement and Correct It

1. **Budding is the common method of reproduction in bacteria.**
   Correct statement: Binary fission is the common method of reproduction in bacteria.
2. **The stigma produces pollen grains.**
   Correct statement: The anther produces pollen grains.
3. **Fertilisation occurs before pollination in flowering plants.**
   Correct statement: Pollination occurs before fertilisation.
4. **The uterus produces sperm.**
   Correct statement: The testes produce sperm.
5. **The embryo develops in the ovary.**
   Correct statement: The embryo develops in the uterus.

Higher-Order Thinking Questions

1. A gardener wants to produce many rose plants with the same characteristics as the parent plant. Which method should be used?

Answer: Vegetative propagation, such as **cutting**.

2. What may happen if pollinating insects disappear from an area?

Answer: Pollination in many flowering plants may decrease, resulting in fewer seeds and fruits.

3. Why do offspring produced by vegetative propagation usually resemble the parent plant?

Answer: They are produced from the vegetative parts of a single parent and usually have the same characteristics.

4. A plant has flowers but does not produce seeds. Which reproductive process may have been affected?

Answer: Pollination or fertilisation may have been affected.

Chapter 3 - Ecosystem

I. Tick the correct choice

1. **Which of the following causes global warming?**
    - **Answer:** (a) Carbon dioxide
    - *Verification:* The handwritten mark is correct. Carbon dioxide (\(CO_{2}\)) is a major greenhouse gas that traps heat in the atmosphere.
2. **The biotic components of ecosystems are**
    - **Answer:** (d) all of these
    - *Verification:* The handwritten mark is correct. Producers, carnivores, and herbivores are all living (biotic) parts of an ecosystem.
3. **Vultures play the role of _____ in the environment.**
    - **Answer:** (b) scavengers
    - *Verification:* The handwritten mark is correct. Vultures feed on dead animals, making them scavengers.
4. **Which of the following belong to abiotic components of environment?**
    - **Answer:** (a) Air, water, light

- *Verification:* The handwritten mark is correct. Air, water, and light are non-living (abiotic) physical factors.

II. Fill in the blanks

1. Air contains **\(0.03\%\)** per cent carbon dioxide.
    - *Correction:* While older textbooks state \(0.03\%\), modern atmospheric levels are closer to \(0.04\%\). Based on standard school curricula, the written answer **\(0.03\%\)** is acceptable.
2. Increase in carbon dioxide concentration in the atmosphere leads to **global warming**.
    - *Verification:* Correct.
3. The air in motion is called **wind**.
    - *Verification:* Correct.
4. Only 2.7 per cent of water on earth is **fresh water**.
    - *Verification:* Correct.
5. The uppermost layer of earth's crust is called **soil**.
    - *Verification:* Correct (topsoil).
6. The process of soil formation is termed **weathering**.
    - *Verification:* Correct.
7. Humus is rich in **minerals / nutrients**.
    - *Verification:* The written answer **minerals** is correct. Humus provides essential nutrients and minerals back to the soil.
8. The flow of energy in a food chain is always **unidirectional**.
    - *Verification:* Correct. Energy flows from producers to consumers and cannot flow backward.
9. The network of interconnected food chains is called a **food web**.
    - *Verification:* Correct.
10. An aquarium is a/an **artificial / man-made** ecosystem.
    - *Verification:* The written answer **artificial** is correct.
11. In an ecosystem, green plants are **producers**.
    - *Verification:* Correct.

III. Define the following, giving two examples of each

1. Symbiosis

- **Definition:** A close, long-term biological interaction between two different organisms where both individuals usually benefit from each other.
- **Examples:**
    - Lichens (association between algae and fungi).
    - Rhizobium bacteria living in the root nodules of leguminous plants.

2. Predation

- **Definition:** A biological interaction where one organism (the predator) kills and eats another organism (the prey).
- **Examples:**
    - A lion hunting and eating a deer.
    - A frog catching and eating an insect.

3. Parasite

- **Definition:** An organism that lives on or inside another organism (the host) and benefits by deriving nutrients at the host's expense.
- **Examples:**
    - Leeches feeding on the blood of animals.
    - Tapeworms living inside the human intestine.

4. Food chain

- **Definition:** A linear sequence of organisms through which nutrients and energy pass as one organism eats another.
- **Examples:**
    - Grass \(\rightarrow \) Grasshopper \(\rightarrow \) Frog \(\rightarrow \) Snake.
    - Phytoplankton \(\rightarrow \) Zooplankton \(\rightarrow \) Small Fish \(\rightarrow \) Large Fish.

5. Ecological Pyramid

- **Definition:** A graphical representation designed to show the biomass, productivity, or energy at each trophic level in a given ecosystem.
- **Examples:**
    - Pyramid of Numbers (e.g., counting individuals in a grassland ecosystem).
    - Pyramid of Energy (showing the total energy available at each level, which always tapers upward).

IV. Match the items in Column A with those in Column B

- **1. Symbiosis** \(\rightarrow \) **(c)** Organisms of two different species living together, with mutual benefit.
- **2. Parasite** \(\rightarrow \) **(a)** One organism depends on the other organism for food, but the second organism gets adversely affected.
- **3. Predation** \(\rightarrow \) **(b)** Interaction between the species, in which one kills and eats the other.

V. Give differences between the following

1. Food chain and Food Web

- **Food Chain:** A linear sequence where one organism eats another.
- **Food Web:** A network of multiple interconnected food chains.

2. Producers and Consumers

- **Producers:** Organisms that make their own food using sunlight.
- **Consumers:** Organisms that rely on other living things for food.

3. Herbivores and Carnivores

- **Herbivores:** Animals that eat only plants and plant products.
- **Carnivores:** Animals that eat only the flesh of other animals.

4. Decomposers and Scavengers

- **Decomposers:** Microorganisms that break down dead organic matter chemically.
- **Scavengers:** Animals that consume dead bodies of other animals directly.

VI. Which of the following statements are true (T) and which ones are false (F)?

1. Green plants respire by taking in both carbon dioxide and oxygen. \(\rightarrow \) **F** *(Plants take in oxygen for respiration and carbon dioxide for photosynthesis)*
2. The ultimate source of energy for all organisms are green plants. \(\rightarrow \) **F** *(The ultimate source of energy is the Sun)*

3. The interaction of living organisms with the non-living environment constitutes the ecosystem. \(\rightarrow \) **T**
4. The survival of all living things is dependent on each other. \(\rightarrow \) **T**
5. Organisms which feed on dead and decaying bodies are called scavengers. \(\rightarrow \) **T**

VII. Answer the following questions

- **1. Name the type of association found in lichens.**
  - Symbiosis (Mutualism)
- **2. Name one ectoparasite and one endoparasite.**
  - Ectoparasite: Louse (or Tick)
  - Endoparasite: Tapeworm (or Roundworm)
- **3. Name a plant parasite.**
  - Cuscuta (Dodder)
- **4. Name three abiotic factors of the ecosystem.**
  - Air, water, and temperature (or soil/sunlight)
- **5. Write in brief about the abiotic components of an ecosystem.**
  - Abiotic components are the non-living chemical and physical parts of an environment that affect living organisms. Examples include sunlight, water, air, soil, and temperature.
- **6. Outline a food chain in a forest ecosystem.**
  - Plants (Producers) \(\rightarrow \) Deer (Primary Consumer) \(\rightarrow \) Tiger (Secondary Consumer)
- **7. Give examples of three food chains operating in nature.**
  - *Grassland:* Grass \(\rightarrow \) Grasshopper \(\rightarrow \) Frog \(\rightarrow \) Snake \(\rightarrow \) Eagle
  - *Aquatic:* Phytoplankton \(\rightarrow \) Zooplankton \(\rightarrow \) Small fish \(\rightarrow \) Large fish
  - *Forest:* Plants \(\rightarrow \) Deer \(\rightarrow \) Lion
- **8. Why are plants called producers?**
  - They prepare their own food from simple inorganic raw materials using sunlight through photosynthesis.
- **9. What is meant by a food web? Explain with the help of a simple diagram.**

- A food web is a system of interlocking and interdependent food chains in an ecosystem.

VIII. Solve the Crossword Puzzle

DOWN

- **1. Process of eating and being eaten:** FOOD CHAIN
- **3. Green plants which prepare their own food:** PRODUCERS
- **5. Part of the earth where plants and animals exist:** BIOSPHERE

ACROSS

- **2. Animals that feed on other dead animals:** SCAVENGER
- **4. Animals who eat plants:** HERBIVORES
- **6. Microorganisms like bacteria and fungi which bring about decay of dead organisms:**DECOMPOSERS

IX. Case Study Based Questions

1. The plants are producers, so they occupy

- **Direct Answer**: (a) first trophic level
- **Explanation**: Producers convert solar energy into chemical energy. They form the base of every food chain. This places them at the very first trophic level.

2. It is a representation of quantitative measure of population size, so it is the pyramid of

- **Direct Answer**: (c) number
- **Explanation**: A pyramid of numbers represents the total population size of different species at each trophic level.

3. The minimum number of organisms is found in

- **Direct Answer**: (a) top trophic level
- **Explanation**: Energy decreases as you move up trophic levels. Because less energy is available at the top, it can support fewer individuals. Top carnivores have the smallest population size.

4. The transfer of _____ takes place from one trophic level to another.

- **Direct Answer**: (c) energy
- **Explanation**: Energy flows through an ecosystem from producers to consumers. According to Lindeman's 10% law, only about 10% of this energy passes to the next level.

X. Assertion-Reason Type Questions

Options Guide:

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are false.
- (c) (A) is true and (R) is false.
- (d) (A) is false and (R) is true.

1. Assertion (A): Pine trees are found in hot countries.

Reason (R): Pine trees cannot withstand the high temperature of deserts.

- **Direct Answer**: (d) (A) is false and (R) is true.
- **Explanation**: Pine trees are coniferous gymnosperms. They naturally grow in cold, temperate climates, not hot countries (making A false). The reason correctly states they cannot tolerate hot desert climates (making R true).

2. Assertion (A): A number of food chains are interconnected.

Reason (R): There are 3 to 4 trophic levels in each food chain.

- **Direct Answer**: (a) / Alternatively viewed as a separate true statement.
- **Explanation**: Interconnected food chains form a complex network known as a food web. Most food chains are limited to 3 to 4 trophic levels because energy loss limits longer chains. Both statements are scientifically true.

XIII. Competency-Focused Questions

1. An ecosystem includes _____ as its living components and _____ as its non-living components.

- **Direct Answer**: (c) living organisms, physical surroundings
- **Explanation**: An ecosystem consists of biotic (living) and abiotic (non-living) parts. Living organisms make up the biotic portion, while the physical environment forms the abiotic portion.

Question 2

Choose the incorrectly matched pair

- (a) Terrestrial ecosystems - Grassland, forest, desert ecosystems
- (b) Aquatic ecosystems (Lentic) - Stagnant water like lake, pond
- (c) Artificial ecosystems - River, ocean
- (d) Aquatic ecosystems (Lotic) - Flowing water like river, ocean

Answer: (c)

- **Explanation**: Rivers and oceans are formed by nature without human intervention. They are natural ecosystems, not artificial (man-made) ones. The markings in the image correctly identified this option.

Question 3

Rohit observes that in a forest, deer are being hunted by tigers. If the deer population decreases significantly, what effect will it have on the ecosystem?

- (a) Increase in autotrophs and decrease in tigers
- (b) Increase in decomposers and no effect on autotrophs
- (c) Decrease in both autotrophs and tigers
- (d) No effect on the ecosystem

Answer: (a)

- **Explanation**:
    - Deer are herbivores (consumers) that eat autotrophs (plants). If deer decrease, fewer plants are eaten, causing an **increase in autotrophs**.
    - Tigers are carnivores that feed on deer. If their food source (deer) decreases significantly, the **tiger population will decrease** due to starvation.

- *Note: The handwritten mark in the image selecting (c) is incorrect.*

Question 4

Which of the following correctly describes the abiotic components of an ecosystem?

- (i) Inorganic substances like carbon dioxide and oxygen are part of the abiotic component.
- (ii) Organic compounds such as proteins and carbohydrates directly link abiotic and biotic components.
- (iii) Climatic factors include atmospheric factors like temperature, light, and edaphic factors related to soil.
- (iv) The biotic component influences the climate of an area but not the abiotic factors.
- Options: (a) (i), (ii), and (iii) only | (b) (ii) and (iv) only | (c) (i), (iii), and (iv) only | (d) (i), (ii), (iii), and (iv)

Answer: (a)

- **Explanation**: Statements (i), (ii), and (iii) are scientifically accurate facts about abiotic systems. Statement (iv) is incorrect because biotic components (like plants and animals) absolutely influence other abiotic factors like soil nutrients, moisture, and water cycles. The marking in the image correctly identified this option.

Question 5

Identify the correct pairs for P and Q based on the table:

- **P**: Breaks down complex organic matter into simpler substances, replenishing soil nutrients. \(\rightarrow \) **Decomposers** (e.g., bacteria, fungi).
- **Q**: Feeds on dead animals, aiding in decomposition. \(\rightarrow \) **Scavengers** (e.g., vultures, hyenas).

Answer: (b) P - Decomposers, Q - Scavengers

- **Explanation**: Decomposers break down materials at a molecular level, while scavengers consume physical remains of dead organisms. The marking in the image correctly identified this option.

Question 6

Given below are three statements:

- **Statement I**: The wind affects plants by causing excessive transpiration... (True)
- **Statement II**: Plants growing on the seacoast and at high altitudes are more affected by wind... (True)
- **Statement III**: Wind does not play a role in pollination or seed dispersal in plants. (False - Wind is a primary agent for anemophilous pollination and seed dispersal).

Answer: (a) Only Statement I and II are correct

- **Explanation**: Since wind is vital for seed dispersal and pollination, Statement III is completely false. The marking in the image correctly identified this option.

Question 8

In a grassland ecosystem, which of the following accurately describes the pyramid of numbers?

- **Correct Option: (b) More producers and fewer top carnivores**

Explanation:

- An upright pyramid of numbers characterizes a grassland ecosystem.
- A massive number of grass plants (producers) form the base.
- The number of individuals decreases at each higher trophic level.
- Top carnivores (like hawks or lions) are the fewest in number.

Question 9

A biology teacher asked her students to match organisms to their respective trophic levels in a food chain... Who gave the correct statements?

- **Correct Option: (a) Rahul and Neeta**

Statement Analysis:

- **I. Rahul said:** "Green plants are producers and occupy the first trophic level."
    - **Correct:** Plants produce food via photosynthesis and start the food chain.
- **II. Sneha said:** "Deer are herbivores and belong to the third trophic level."
    - **Incorrect:** Herbivores are primary consumers and occupy the *second* trophic level.
- **III. Aman said:** "Lions are primary consumers and occupy the fourth trophic level."
    - **Incorrect:** Lions are carnivores (secondary/tertiary consumers), not primary consumers.

- **IV. Neeta said:** "Humans as omnivores can occupy both the second and third trophic levels."
    - **Correct:** Humans occupy the second level when eating plants, and the third level when eating herbivores (like chicken).

Question 10

In an ecological pyramid, why are producers placed at the base?

- **Correct Option: (b) They are responsible for trapping solar energy and supporting all other trophic levels.**

Explanation:

- Producers (green plants) convert solar energy into chemical energy via photosynthesis.
- This energy is the foundational source that sustains all heterotrophic organisms (consumers) above them.
- Therefore, they always form the primary, foundational base of any ecological energy pyramid.

EXTRA QUESTION:

Case-Based Questions

Chapter: Ecosystem, Food Chain and Food Web

Case Study 1: The Forest Ecosystem

In a forest, green plants use sunlight to prepare food. Deer feed on grass and leaves. Tigers hunt deer. When plants and animals die, fungi and bacteria break down their remains.

Questions:

1. Which organism is the producer?
2. Which organism is the primary consumer?
3. Which organism is the carnivore?
4. Name the decomposers mentioned in the case.
5. Write the food chain shown in the case.

Answers:

1. Green plants
2. Deer
3. Tiger
4. Fungi and bacteria
5. **Green plants → Deer → Tiger**

Case Study 2: The Pond

A pond contains algae, insects, small fish, frogs, and birds. Algae make their own food. Insects feed on algae, frogs eat insects, and birds eat frogs.

Questions:

1. What is the producer in the pond?
2. Which organism is the primary consumer?
3. Write the food chain.
4. Which organism is the top consumer in this food chain?
5. What may happen if all the algae disappear?

Answers:

1. Algae
2. Insects
3. **Algae → Insects → Frog → Bird**

4. Bird
5. The insects may decrease because they will have less food. This may affect the frogs and birds too.

Case Study 3: Food Web in a Grassland

In a grassland, grass is eaten by rabbits, grasshoppers, and deer. Frogs eat grasshoppers. Snakes eat frogs and rabbits. Eagles eat snakes and small animals.

Questions:

1. Name the producer.
2. Name any two herbivores.
3. Write one food chain from the information.
4. Why is this an example of a food web?
5. What may happen if the number of snakes decreases?

Answers:

1. Grass
2. Rabbit and deer
3. **Grass → Grasshopper → Frog → Snake → Eagle**
4. It contains several interconnected food chains.
5. The number of frogs and rabbits may increase because fewer snakes are present to feed on them.

Case Study 4: Loss of Producers

A farmer used excessive chemicals in a field. After some time, many green plants and insects disappeared. The number of frogs and birds also decreased.

Questions:

1. Why are green plants called producers?
2. Why did the number of frogs decrease?
3. Why did the number of birds decrease?

4. How did the loss of plants affect the food chain?
5. What lesson can be learned from this situation?

Answers:

1. Green plants prepare their own food using sunlight.
2. Frogs had fewer insects available as food.
3. Birds had fewer organisms available as food.
4. The food chain was disturbed because the producers and consumers decreased.
5. Plants and animals should be protected to maintain ecological balance.

Case Study 5: Role of Decomposers

After autumn, many dry leaves fell to the ground. Fungi and bacteria acted on the dead leaves and slowly changed them into simpler substances. These substances mixed with the soil and were used by plants.

Questions:

1. Name the organisms that acted on the dead leaves.
2. What are these organisms called?
3. Why are decomposers important?
4. How do decomposers help plants?
5. What may happen if decomposers are absent?

Answers:

1. Fungi and bacteria
2. Decomposers
3. They break down dead organisms and recycle nutrients.
4. They return nutrients to the soil, which plants can use.
5. Dead plants and animals would accumulate, and nutrients would not be recycled properly.

E. Relationship-Based Questions

Identify the type of interaction:

1. A tiger hunts and eats a deer.
   Answer: Predation
2. A tick obtains food from a dog and harms it.
   Answer: Parasitism
3. An alga and a fungus live together and both benefit.
   Answer: Symbiosis
4. A vulture feeds on the remains of a dead animal.
   Answer: Scavenging

Give Reasons

1. **Why are plants important in a food chain?**
   Answer: Plants prepare food and provide energy directly or indirectly to all consumers.
2. **Why is a food web more stable than a single food chain?**
   Answer: Organisms may have alternative food sources, so the ecosystem is less affected if one food source decreases.
3. **Why are decomposers called nature's recyclers?**
   Answer: They break down dead organisms and return nutrients to the environment.
4. **Why does the removal of one organism affect other organisms?**
   Answer: Organisms are connected through food chains and food webs.

Chapter 7- Health and Hygiene

1. A state of complete physical, mental and social well-being is called

- **Correct Answer:** (b) Health
- **Explanation:** This is the official definition of health used by the World Health Organization (WHO). It emphasizes that health is not merely the absence of disease or infirmity, but a positive state of overall well-being.

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2. The TAB vaccine is given for protection against

- **Correct Answer:** (b) Typhoid
- **Explanation:** The **TAB** vaccine is a combined vaccine that protects against **T**yphoid fever, Paratyphoid **A**, and Paratyphoid **B**. These are bacterial infections caused by *Salmonella* species.

---

3. The power to resist and overcome infection is called

- **Correct Answer:** (a) Immunity
- **Explanation:** Immunity refers to the body's ability to recognize, fight off, and destroy pathogens (like bacteria and viruses) to prevent disease. This definition is also highlighted in the "Highlights in Review" section above the questions.
- **4.** First aid is effective in
  Answer: (b) Small cuts *(Note: It provides temporary relief for severe conditions but is definitive treatment only for minor injuries).*
- **5.** Tetanus injection is given to the injured person in case of
  Answer: (b) Cuts and burns
- **6.** Consumption of tobacco leads to
  Answer: (b) Cough and irritation *(It also deeply affects lung and mouth health over time).*
- **7.** The active component nicotine is found in
  Answer: (a) Tobacco

II. Define the Following

- **1. Passive smoking:** The involuntary inhalation of tobacco smoke by nonsmokers from people smoking nearby.
- **2. Narcotic drugs:** Highly addictive substances affecting the central nervous system used to relieve pain or induce sleep.
- **3. Third-degree burn:** A severe burn that destroys both the outer and deeper layers of skin, often damaging underlying tissues.

- **4. First-aid:** Immediate, temporary assistance given to an injured or sick person before professional medical help arrives.
- **5. Vaccine:** A biological preparation that provides active acquired immunity to a specific infectious disease.
- **6. Immunisation:** The process whereby a person is made immune or resistant to an infectious disease, typically by administration of a vaccine.

III. Fill in the Blanks

- **1.** Disease-causing biological agents are called **pathogens**.
- **2.** Carriers of specific germs are called **vectors**.
- **3.** A disease caused by a protozoan is **malaria**.
- **4.** Chikungunya is caused by a **virus**.

IV. Give the Full Form Of

- **1. AIDS:** Acquired Immunodeficiency Syndrome
- **2. HIV:** Human Immunodeficiency Virus
- **3. OPV:** Oral Polio Vaccine

V. Which of the following statements are true (T) and which ones are false (F)?

- **1.** AIDS is caused by a bacterium.
  Answer: False (F) *(It is caused by a virus).*
- **2.** Dengue is caused by a virus.
  Answer: True (T)

- **3.** Malaria is a vector-borne disease.
  Answer: True (T)
- **4.** Influenza is a highly infectious disease.
  Answer: True (T)

VI. Name the Following

- **1.** The mosquito which transmits malaria: **Female Anopheles mosquito**
- **2.** Name the vector of *Plasmodium*: **Female Anopheles mosquito**
- **3.** Disease commonly caused by the use of contaminated needles: **AIDS / Hepatitis B**
- **4.** A disease in which platelet count decreases: **Dengue**
- **5.** Three common vaccines: **BCG, DPT, OPV**

VII. Answer the Following Questions

1. Write about the first aid measures in case of the following:

- **(i) Cuts:** Wash with clean water, apply an antiseptic cream, and cover with a sterile bandage.
- **(ii) Burns:** Hold under cool running water immediately; do not apply ice or grease, and cover loosely.
- **(iii) Bites:** Wash thoroughly with soap and water to remove saliva; seek immediate medical help for rabies risk.
- **(iv) Bleeding:** Apply direct pressure with a clean cloth and elevate the wounded part above heart level if possible.
- **(v) Fracture:** Immobilize the affected limb using a splint; do not attempt to move the broken bone.
- **(vi) Unconsciousness:** Lay the person flat on their back, tilt the head slightly to clear the airway, and ensure proper ventilation.

- **(vii) Swallowing of poison:** Check what was swallowed, do not induce vomiting unless advised by a doctor, and rush to the hospital.
- **(viii) Snake bites:** Keep the person calm, immobilize the bitten limb below heart level, and seek anti-venom immediately.
- **(ix) Object in the eye:** Do not rub the eye; flush gently with clean water until the particle comes out.
- **(x) Insect stings:** Remove the stinger carefully using a flat edge, wash with soap, and apply an ice pack to reduce swelling.

2. Give differences between first degree burns and second degree burns.

- **First-degree burns:** Affect only the outer skin layer (epidermis), causing redness and mild pain without blisters.
- **Second-degree burns:** Damage both the outer layer and the layer underneath (dermis), causing deep pain, severe redness, and blisters.

3. Mention in brief about the harmful effects of consuming the following items:

- **(i) Tobacco:** Causes lung cancer, mouth cancer, respiratory diseases, and heart problems.
- **(ii) Alcohol:** Damages the liver (cirrhosis), impairs judgment, and weakens the nervous system.
- **(iii) Drugs:** Leads to psychological dependency, brain damage, organ failure, and social isolation.

4. Differentiate between vaccination and immunisation.

- **Vaccination:** The physical act of introducing a vaccine into the body to produce immunity to a specific disease.
- **Immunisation:** The final process where the body actually becomes immune and protected against the disease after being vaccinated.

5. Name three commonly used vaccines.

- BCG (Bacillus Calmette-Guérin)
- DPT (Diphtheria, Pertussis, Tetanus)
- MMR (Measles, Mumps, Rubella)

6. How vaccination helps to prevent diseases?

Vaccination introduces weak or inactive parts of a specific pathogen into the body. This safely triggers the immune system to produce antibodies without causing the illness itself. The body creates "memory cells" so that if the real pathogen ever enters the body in the future, the immune system recognizes and destroys it instantly.

- **7. Why should you not allow water to stagnate near your house?**
    - Stagnant water acts as a breeding ground for mosquitoes.
    - Mosquitoes spread dangerous diseases like malaria and dengue.
- **8. Write in brief about the first-aid measures in case of cuts, burns, bites and stings.**
    - **Cuts**: Clean the wound with water, apply antiseptic, and bandage tightly.
    - **Burns**: Run cold water over the area and apply soothing cream.
    - **Bites/Stings**: Wash the area, remove stings safely, and apply cold ice packs.
- **9. What steps would you take to prevent and control diseases?**
    - Maintain clean personal hygiene and keep surroundings sanitary.
    - Drink safe, purified water and eat fresh food.
    - Get vaccinated according to recommended medical schedules.

VIII. Solve the Crossword Puzzle

ACROSS

- **1. Disease with severe joint pain**

    - **Answer**: Chikungunya *(The handwritten text on the sheet correctly identified this, but mistakenly wrote MALARIA in the row 1 across boxes. "CHIKUNGUNYA" fits perfectly into row 1 across, starting from the first box under the '1' down column).*
- **2. Disease caused by Plasmodium**
    - **Answer**: Malaria *(This fits perfectly into the 7-letter vertical space labeled '1' under DOWN, which means the puzzle layout has an error or needs careful cross-checking).*

DOWN

- **1. Disease-causing agent**
    - **Answer**: Pathogen
- **2. Microbe to which AIDS pathogen belongs**
    - **Answer**: Virus
- **3. It causes lung cancer**
    - **Answer**: Tobacco
- **4. It is also known as break bone fever**
    - **Answer**: Dengue

IX. Case Based Questions

- **1. Identify the disease, shown in the diagram.**
    - **Correct Answer**: (c) Cancer
- **2. Which of the following may be responsible for the given disease?**
    - **Correct Answer**: (d) Tobacco
- **3. The structure (X) shown in the figure is**
    - **Correct Answer**: (a) Cancerous nodule
- **4. A characteristic feature of the people affected by cancer is**

- **Correct Answer**: (c) Loss of appetite

X. Assertion-Reason Type Questions

- **1. Assertion (A): A third degree burn is very severe. (True)**
  - **Reason (R): Third degree burn is superficial. (False - it is a deep tissue burn)**
  - **Correct Option**: (c) (A) is true and (R) is false.
- **2. Assertion (A): A vaccine is a suspension of disease producing microorganisms. (False - it uses modified/harmless parts)**
  - **Reason (R): Killed or weakened microbes are used to make vaccine. (True)**
  - **Correct Option**: (d) (A) is false and (R) is true

Question 1

- **Question**: The _____ agents that cause communicable diseases are known as _____, such as bacteria and viruses.
- **Correct Option**: **(b) Disease-causing, pathogens**
- **Explanation**: Communicable diseases are infectious illnesses spread from one organism to another. The biological agents that explicitly cause these diseases are defined as **pathogens** (e.g., specific bacteria, viruses, fungi, and parasites).
- *Note on image checkmark*: The student's mark on option (b) is **correct**.

Question 2

- **Question**: Choose the incorrectly matched pair:
- **Correct Option**: **(b) Measles - Rashes appear first on hands and legs before spreading**
- **Explanation**: In measles, the characteristic red, blotchy rash typically develops first on the face and behind the ears before spreading downward to the neck, trunk, hands, and legs. All other options are correctly matched: Influenza spreads via respiratory droplets, Dengue is transmitted by *Aedes aegypti*mosquitoes, and Chikungunya presents with severe joint and muscle pain.
- *Note on image checkmark*: The student's mark on option (b) is **correct**.

Question 3

- **Question**: Rohan spends long hours working on his computer and avoids physical activities. Over time, he starts experiencing fatigue and back pain. Which of the following would help Rohan improve his condition?
- **Correct Option**: **(c) Engaging in regular exercise and taking breaks during work**
- **Explanation**: Prolonged sedentary behavior and poor posture cause muscle fatigue and strain. Regular physical exercise strengthens the core and back muscles, while taking periodic active breaks reduces musculoskeletal stress and boosts physical energy.
- *Note on image checkmark*: The student's mark on option (c) is **correct**.

Question 4

- **Question**: Meera was advised to get a BCG vaccine by her doctor for tuberculosis prevention. What is the basis of this vaccine type?

- **Correct Option**: **(b) It contains living weakened tuberculosis bacteria that trigger immunity.**
- **Explanation**: The BCG (Bacillus Calmette-Guérin) vaccine is a **live-attenuated vaccine**. It uses a live, weakened strain of *Mycobacterium bovis* to stimulate the body's immune system to produce antibodies and memory cells without causing the actual disease.
- *Note on image checkmark*: The student's mark on option (b) is **correct**.

Question 5

- **Question**: Identify the correct pair of diseases for P and Q based on the table:
  - **Disease P**: Severe damage to brain and immune system | Transmission: Blood transfusion or sexual contact
  - **Disease Q**: High fever with sweating and chills | Transmission: Bite of female *Anopheles* mosquito
- **Correct Option**: **(c) P - AIDS, Q - Malaria**
- **Explanation**:
  - **P** matches **AIDS** (caused by HIV), which severely destroys the immune system (specifically T-cells) and can lead to neurological complications. It spreads via sexual contact or contaminated blood.
  - **Q** matches **Malaria**, a protozoan disease transmitted by the bite of an infected female *Anopheles*mosquito, classically presenting with cycles of high fever, chills, and sweating.
- *Note on image checkmark*: The student marked option (c), which is **correct**.

Question 6

- **Question**: Read the following statements and choose the correct answer:
  - *P - Vaccination helps stimulate the immune system to protect the body against specific pathogens.*(**True**)

    - *Q - Immunisation is the process of enhancing natural immunity without the use of vaccines.* (**False**— Immunization heavily relies on vaccines to artificially induce active protection).
    - *R - Tears and saliva contain enzymes that destroy harmful microorganisms.* (**True** — They contain lysozyme, an antibacterial enzyme providing a physiological barrier).
    - *S - Acquired immunity is developed after recovering from certain diseases like chickenpox or measles.* (**True** — This is naturally acquired active immunity).
- **Correct Option**: **(b) P, R, and S only**
- **Explanation**: Statements P, R, and S are scientifically accurate, making option (b) the only correct selection.
- *Note on image checkmark*: The student's mark on option (b) is **correct**.

Question 7

- **Question**: Given below are two statements:
    - *Statement I: Personal hygiene and health education are critical measures to prevent diseases, including proper sanitation and immunisation.*
- **Analysis**: This question cuts off at the bottom of the page. However, **Statement I is entirely true**. Personal hygiene, clean sanitation infrastructure, and structural health education prevent the breeding and transmission of vectors and pathogens.

Question 8

After a snake bite, what is the first thing you should do?

- (a) Apply a tourniquet near the bite to stop the spread of venom
- (b) Try to remove the poison by sucking the wound
- (c) Apply ice directly to the bite area
- (d) Immediately rush the victim to the hospital without any first aid

Answer & Explanation:

- **Correct Option: (d) Immediately rush the victim to the hospital without any first aid**
- **Reasoning:** Medical consensus states that standard "first-aid" practices like cutting, sucking the wound, applying ice, or tying tight tourniquets cause more tissue damage and delay definitive care. The absolute priority is getting anti-venom at a hospital immediately.

Question 9

Why is it critical to dispose of garbage in covered bins instead of open areas, particularly in densely populated regions?

- (a) Open garbage increases soil fertility, leading to harmful plant overgrowth.
- (b) Covered bins prevent the spread of airborne allergens like pollen and dust.
- (c) Open garbage serves as breeding grounds for vectors like flies, leading to the spread of diseases.
- (d) Covered bins reduce the production of methane gas from garbage decomposition.

Answer & Explanation:

- **Correct Option: (c) Open garbage serves as breeding grounds for vectors like flies, leading to the spread of diseases.**
- **Reasoning:** Rotting organic matter in open piles attracts flies, mosquitoes, and rodents. These organisms act as disease vectors, transmitting pathogens from the garbage to human food and water systems.

Question 10

A biology teacher asked her students to identify the correct examples of vaccines based on their components.

- **i. Raj said:** "Salk's vaccine and Rabies vaccine contain killed germs."
- **ii. Priya said:** "BCG vaccine and MMR vaccine are examples of vaccines with killed germs."
- **iii. Aman said:** "Tetanus toxin and Diphtheria toxin vaccines contain toxoids, which are toxins or poisons secreted by pathogens."
- **iv. Neha said:** "The MMR vaccine contains toxoids as its main component."

Who gave the correct statements?

- (a) Raj and Aman
- (b) Priya and Aman
- (c) Raj and Neha
- (d) Priya and Neha

Answer & Explanation:

- **Correct Option: (a) Raj and Aman**
- **Reasoning:**
    - **Raj is correct:** Both the Salk polio vaccine and standard rabies vaccines are inactivated (killed) vaccines.
    - **Aman is correct:** Tetanus and diphtheria vaccines utilize altered, harmless toxins called toxoids to build immunity.
    - **Priya and Neha are incorrect:** The MMR (Measles, Mumps, Rubella) and BCG (Tuberculosis) vaccines are live-attenuated vaccines, not killed germs or toxoids.

Question 11

Seema accidentally burns her hand while cooking. The burn is red and painful but does not have blisters. What is the appropriate first-aid treatment for Seema's burn?

- (a) Apply ice directly to the burn and cover it with a bandage.
- (b) Hold the burnt area under cold running water for 15 minutes and leave it uncovered.
- (c) Apply ointment to the burn immediately and cover it with a tight bandage.
- (d) Place the burn under cold water for 5 minutes, and then apply a hot compress.

Answer & Explanation:

- **Correct Option: (b) Hold the burnt area under cold running water for 15 minutes and leave it uncovered.**
- **Reasoning:** For minor, first-degree burns (redness, no blisters), cooling the skin down with cool or cold running water for a prolonged duration (10–20 minutes) stops the burning process and relieves pain. Ice should never be used as it can cause frostbite damage to already fragile tissue. Ointments should not be applied immediately on fresh burns because they trap heat.

EXTRA QUESTIONS:

Case-Based Questions: Health, Hygiene, First Aid and Immunisation

Case Study 1: Malaria Prevention

Riya noticed that rainwater had collected in old tyres and containers near her house. After a few days, her brother developed fever, chills, and weakness. The doctor suspected malaria.

Questions:

1. Which organism causes malaria?
2. Which mosquito transmits malaria?
3. Why should stagnant water be removed?

4. Name two ways to prevent mosquito breeding.

Answers:

1. Malaria is caused by *Plasmodium*, a protozoan.
2. **Female Anopheles mosquito** transmits malaria.
3. Stagnant water provides a breeding place for mosquitoes.
4. Empty water containers regularly and keep water tanks covered.

Case Study 2: Vaccination

A newborn baby was taken to a health centre for vaccination. The doctor explained that vaccines help the body develop protection against certain diseases.

Questions:

1. What is vaccination?
2. What is immunisation?
3. Name any three vaccines.
4. How do vaccines help the body?

Answers:

1. Vaccination is the process of administering a vaccine to prevent a disease.
2. Immunisation is the process by which the body develops protection against a disease.
3. **BCG, DPT and OPV**.
4. Vaccines stimulate the immune system to produce protection against specific disease-causing germs.

Case Study 3: Dengue

Aman had a high fever, headache, and body pain. A blood test showed a low platelet count. The doctor diagnosed dengue and advised the family to prevent mosquito breeding around the house.

Questions:

1. Which disease was Aman suffering from?
2. What type of organism causes dengue?
3. Which mosquito spreads dengue?
4. Why should stagnant water be removed?

Answers:

1. Dengue.
2. Dengue is caused by a **virus**.
3. **Female Aedes mosquito** spreads dengue.
4. Stagnant water allows mosquitoes to breed.

Case Study 4: First Aid for a Cut

While playing, Neha fell and got a cut on her knee. Her friend washed the wound with clean water, applied an antiseptic, and covered it with a clean bandage.

Questions:

1. What immediate care was given to Neha?
2. Why was the wound washed?
3. Why was an antiseptic applied?
4. Why was the wound covered with a clean bandage?

Answers:

1. **First aid** was given.
2. The wound was washed to remove dirt and germs.
3. An antiseptic was applied to reduce the risk of infection.
4. The bandage protected the wound from dust and germs.

Case Study 5: Food Poisoning

During a picnic, some students ate uncovered food that had been kept outside for many hours. Later, a few students complained of stomach pain, nausea, and weakness.

Questions:

1. What may have caused the illness?
2. Why should food be kept covered?
3. Mention two good food-hygiene habits.
4. What should be done if the symptoms become severe?

Answers:

1. The food may have been contaminated by disease-causing microorganisms.
2. Food should be kept covered to protect it from dust, flies, and germs.

3. Wash hands before eating and eat fresh, properly stored food.
4. Inform an adult and seek medical advice.

Case Study 6: Passive Smoking

Rohan does not smoke, but some people at home smoke near him. He often inhales the smoke present in the room and develops coughing and irritation.

Questions:

1. What is this condition called?
2. Is Rohan an active smoker?
3. Mention one harmful effect of passive smoking.
4. How can exposure to tobacco smoke be reduced?

Answers:

1. **Passive smoking**.
2. No, Rohan is not an active smoker.
3. It may cause coughing and breathing problems.
4. Smoking should not be allowed near other people, especially children.

Identify the Disease

1. A person has fever and chills. The disease is transmitted by the female *Anopheles* mosquito.
   Answer: Malaria
2. A person has high fever and a low platelet count. The disease is spread by *Aedes* mosquitoes.
   Answer: Dengue
3. A disease affects the immune system and may spread through contaminated needles.
   Answer: AIDS
4. A person develops fever and joint pain after being bitten by an infected mosquito.
   Answer: Chikungunya

F. Correct the Incorrect Statement

1. Malaria is caused by a virus.
   Correct statement: Malaria is caused by *Plasmodium*, a protozoan.
2. Dengue is caused by a bacterium.
   Correct statement: Dengue is caused by a virus.

3. OPV is used to prevent malaria.
   Correct statement: OPV is used to prevent polio.
4. First aid is given only by doctors.
   Correct statement: First aid can be given by a trained or responsible person before medical help is available.

G. Situation-Based Questions

1. A student finds a person with a bleeding cut. What should the student do first?

Answer: Apply gentle pressure using a clean cloth or sterile dressing and inform an adult or seek medical help.

2. Water is stored uncovered in containers near a house. What health risk may increase?

Answer: Mosquito breeding may increase, raising the risk of mosquito-borne diseases.

3. A child has received vaccines according to the recommended schedule. What benefit does the child receive?

Answer: The child develops protection against certain infectious diseases.

H. Give Reasons

1. **Why should stagnant water not be allowed to collect?**
   Answer: It provides breeding places for mosquitoes.
2. **Why should cuts be covered with a clean bandage?**
   Answer: It protects the wound from dust and germs.
3. **Why are vaccines important?**
   Answer: They help the body develop protection against specific diseases.
4. **Why should hands be washed before eating?**
   Answer: Washing hands removes germs and helps prevent diseases.
5. **Why should contaminated needles never be shared?**
   Answer: They may spread infections.