UNIQUE STUDY POINT

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Class: VI	**Subject:** Science	**Session:** 2025-26
Chapter: 10 - Living Creatures: Exploring their Characteristics	**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. Which characteristic helps us differentiate a car from a living being?

(a) Movement

(b) Growth

(c) Shape

(d) Color

Q2. Sweat consists of:

(a) Only water

(b) Only salts

(c) Water and salts

(d) Only waste products

Q3. The silk moth passes through how many life stages?

(a) Two

(b) Three

(c) Four

(d) Five

Q4. Seeds of Calendula and Zinnia require:

(a) Light to germinate

(b) Darkness to germinate

(c) Both light and darkness

(d) Neither light nor darkness

Q5. The number of breaths taken per minute increases after:

(a) Sleeping

(b) Resting
(c) Running
(d) Reading

Q6. Adult mosquitoes may survive for:
(a) 1-2 days
(b) 5-7 days
(c) 10-15 days
(d) 20-25 days

Q7. A seed is categorized as:
(a) Living
(b) Non-living
(c) Dead
(d) None of the above

Q8. In an experiment, if excess water is added to soil:
(a) Seeds germinate faster
(b) Seeds get more nutrients
(c) Air is not available to seeds
(d) Seed coat becomes harder

Q9. Which stage in frog development has both tail and legs?
(a) Early tadpole
(b) Late tadpole
(c) Froglet
(d) Adult frog

Q10. How do roots get air for respiration?
(a) From atmosphere directly
(b) From spaces between soil particles
(c) From water in soil
(d) They do not need air

SECTION B - Short Answer Questions (2 marks each)

Q11. What is respiration? How do plants respire?

Q12. Explain with an example how plants respond to touch.

Q13. What is the advantage of having a tail in the tadpole stage?

Q14. Why is it important to keep surroundings clean to prevent mosquito breeding?

SECTION C - Short Answer Questions (3 marks each)

Q15. Compare the life cycles of a mosquito and a frog. Mention three similarities and two differences.

Q16. Explain why a plant placed near a window grows towards the window. What would happen if you rotate the plant?

Q17. What is the role of water in seed germination? Describe with reference to seed coat and embryo development.

SECTION D - Long Answer Question (5 marks)

Q18. List and explain all the essential characteristics that distinguish living beings from non-living things. Give at least one example for each characteristic.

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

Q19. Case Study 1:

A student conducted an experiment with three pots containing bean seeds. In Pot X, seeds were planted in dry soil and kept in sunlight. In Pot Y, seeds were planted in moist soil but kept in complete darkness. In Pot Z, seeds were planted in waterlogged soil (excess water) and kept in sunlight. After 10 days, the student made observations.

Based on the above information, answer the following questions:

(a) In which pot will seeds germinate successfully? Why? (2 marks)

(b) What will be the observation in Pot X? (1 mark)

(c) Why will seeds in Pot Z not germinate? (1 mark)

Q20. Case Study 2:

Jagadish Chandra Bose was an Indian scientist who conducted pioneering experiments with plants. He invented a special machine that could measure how plants grow and respond to different stimuli. His work showed that plants are not inactive but can sense their environment and respond to it. He studied how plants react to light, heat, electricity, and gravity.

Based on the above information, answer the following questions:

(a) What machine did Jagadish Chandra Bose invent? (1 mark)

(b) What was the purpose of this machine? (1 mark)

(c) Name two stimuli that Jagadish Chandra Bose studied in plants. (1 mark)

(d) How did his work change our understanding of plants? (1 mark)

DETAILED ANSWER KEY - PAPER 04

SECTION A - Answers to MCQs

Ans 1. (b) Growth

Explanation: A car does not grow, while living beings show growth. Although a car can move, growth is a more definitive characteristic that differentiates living from non-living.

Ans 2. (c) Water and salts

Explanation: Sweat consists of water and salts removed by the body as waste products through the process of excretion.

Ans 3. (c) Four

Explanation: The silk moth passes through four life stages: egg, larva, pupa, and adult - similar to the mosquito.

Ans 4. (b) Darkness to germinate

Explanation: Seeds of Calendula and Zinnia need darkness to germinate and should be covered with sufficient soil.

Ans 5. (c) Running

Explanation: The number of breaths increases after physical activity like running because the body needs more oxygen.

Ans 6. (c) 10-15 days

Explanation: Adult mosquitoes may survive for 10 to 15 days or longer depending on environmental conditions.

Ans 7. (a) Living

Explanation: A seed is living as it has the potential to germinate and grow into a plant under suitable conditions.

Ans 8. (c) Air is not available to seeds

Explanation: When excess water is added, it fills all spaces between soil particles, preventing air from reaching the seeds.

Ans 9. (b) Late tadpole

Explanation: The late tadpole stage (Stage IIB) is characterized by the presence of both tail and legs.

Ans 10. (b) From spaces between soil particles

Explanation: Roots get air for respiration from the air present in spaces between soil particles.

SECTION B - Answers to Short Answer Questions

Ans 11.

Respiration: Respiration is a life process in which living beings take in oxygen and release carbon dioxide to obtain energy from food. Breathing is a part of respiration.

How plants respire:

- Plants have tiny pores called stomata on the surface of their leaves.
- These stomata help plants in taking air in and out.
- Through stomata, plants take in oxygen and release carbon dioxide.
- Roots also respire using air from spaces between soil particles.

Ans 12.

How plants respond to touch - Example of Touch-me-not plant:

- Touch-me-not plant (also called Mimosa, chhui-mui, or lajjalu) shows a clear response to touch stimulus.
- When we touch the leaves of this plant, they immediately fold inward.
- The leaves of the plant close up in response to the touch stimulus.
- This is a protective mechanism to defend against herbivores or harsh weather.
- After some time, the leaves open up again when the stimulus is removed.

Ans 13.

Advantage of tail in tadpole stage:

- During the tadpole stage, the organism lives completely in water.
- The tail acts as a swimming organ that helps tadpoles move efficiently in water.
- It helps them search for food (algae and microorganisms) in the water.
- It also helps them escape from predators.
- As tadpoles develop into froglets and prepare to live on land, the tail is gradually absorbed since it is no longer needed.

Ans 14.

Importance of keeping surroundings clean:

- Mosquitoes breed in stagnant water found in unclean surroundings.
- Female mosquitoes lay eggs in puddles, open containers, discarded items holding water, etc.
- Clean surroundings reduce the number of places where water can stagnate.
- This prevents mosquito breeding and reduces their population.
- Fewer mosquitoes mean reduced transmission of diseases like malaria, dengue, and chikungunya.
- Therefore, cleanliness is essential for public health and disease prevention.

SECTION C - Answers to Short Answer Questions

Ans 15.

Comparison of life cycles of mosquito and frog:

THREE SIMILARITIES:

1. **Number of stages:** Both mosquito and frog undergo four stages in their life cycle.
2. **Eggs laid in water:** Both organisms lay their eggs in or near water bodies.
3. **Significant body changes:** Both undergo dramatic changes in body shape and structure during their life cycle. The larva/tadpole looks very different from the adult form.

TWO DIFFERENCES:

Aspect	Mosquito	Frog
Habitat of adult	Adult mosquitoes live on land/in air only	Adult frogs are amphibians - live both in water and on land

Stage names	Egg → Larva → Pupa → Adult	Egg (Spawn) → Tadpole → Froglet → Adult

Ans 16.

Why plant grows towards window:

- A plant placed near a window grows towards the window because of a phenomenon called phototropism.
- Phototropism is the growth response of plants towards light.
- Shoots of plants show positive phototropism - they grow towards the source of light.
- Light is necessary for photosynthesis, the process by which plants make their food.
- Therefore, shoots naturally grow in the direction where they can receive maximum sunlight.

What happens if we rotate the plant:

- If we rotate the plant so that it faces away from the window, an interesting thing happens.
- The shoot will gradually bend and start growing towards the window again.
- This shows that the plant's response to light is not fixed but continuous.
- The plant will always try to orient itself towards the light source for optimal photosynthesis.
- This bending movement may take a few days to become visible.

Ans 17.

Role of water in seed germination:

1. Effect on Seed Coat:

- The seed coat is the hard outer covering that protects the embryo.
- Water softens the seed coat, making it easier to break.
- As the seed absorbs water, it swells up.
- This swelling creates pressure that helps rupture the seed coat.
- Once the seed coat breaks, the embryo can emerge and start growing.

2. Effect on Embryo Development:

- Water activates enzymes present in the seed.
- These enzymes break down the stored food (starch, proteins, fats) in the seed.
- The broken-down food provides energy and nutrients for the embryo to grow.
- Water enables all the chemical reactions necessary for the embryo to develop.
- The embryo uses this energy to grow its first root (radicle) and shoot (plumule).

Conclusion: Without adequate water, the seed coat remains hard, enzymes are not activated, and the embryo cannot get the energy it needs to grow. Therefore, water is absolutely essential for seed germination.

SECTION D - Answer to Long Answer Question

Ans 18.

Essential characteristics that distinguish living beings from non-living things:

1. MOVEMENT:

- All living beings show some form of movement.
- Animals move from one place to another.

- Plants show movement of parts like opening/closing of flowers, folding of leaves.
- **Example:** A cat running, touch-me-not plant folding its leaves when touched.
- Non-living things like cars can move but they do not show this as a life characteristic.

2. GROWTH:

- All living beings grow and increase in size over time.
- Growth occurs from inside the organism.
- It is irreversible and involves increase in cell number and size.
- **Example:** A child growing into an adult, a small plant growing into a large tree.
- Non-living things do not show growth.

3. NUTRITION:

- All living beings need food (nutrition) for energy and growth.
- Animals take in food from outside.
- Plants make their own food through photosynthesis.
- **Example:** Humans eating food, plants making food using sunlight, water, and carbon dioxide.
- Non-living things do not need food.

4. RESPIRATION:

- All living beings respire to obtain energy from food.
- Respiration involves taking in oxygen and releasing carbon dioxide.
- Breathing is a part of respiration.
- **Example:** Humans breathing through nose and lungs, plants respiring through stomata.
- Non-living things do not respire.

5. EXCRETION:

- All living beings remove waste products from their body.
- This process is called excretion.
- Waste products are harmful if accumulated in the body.
- **Example:** Humans excrete through sweat and urine, plants excrete through water droplets on leaves.
- Non-living things do not excrete.

6. RESPONSE TO STIMULI:

- All living beings respond to changes in their environment.
- A stimulus is anything that prompts a living being to respond.
- This helps living beings survive in changing conditions.
- **Example:** We pull our hand away from a hot object, plants fold leaves after sunset.
- Non-living things do not respond to stimuli.

7. REPRODUCTION:

- All living beings reproduce to produce new ones of their own kind.
- Reproduction is necessary for the continuity of life.
- It ensures species do not become extinct.
- **Example:** Dogs giving birth to puppies, plants producing seeds that grow into new plants.
- Non-living things cannot reproduce.

8. LIFE SPAN AND DEATH:

- All living beings have a definite life span.
- Eventually, all living beings die.
- Death is the permanent end of all life processes.
- **Example:** Plants die after producing seeds, animals die when they become old.

CONCLUSION: These characteristics must be present TOGETHER to identify something as living. The

presence of just one or two characteristics (like movement in a car) does not make something living. All these features working together distinguish living beings from non-living things.

SECTION E - Answers to Case Study Based Questions

Ans 19.

(a) Pot where seeds germinate successfully: Seeds will germinate successfully in **Pot Y** only.

Reason:

- Pot Y provides moist soil (water) and has air available in spaces between soil particles.
- Even though it is kept in complete darkness, most seeds do not require light for germination.
- Water and air are the two most essential conditions for seed germination, both of which are available in Pot Y.
- Therefore, seeds in Pot Y will germinate successfully.

(2 marks)

(b) Observation in Pot X: In Pot X, seeds will NOT germinate. The seeds will remain dormant (inactive) even after 10 days because they are not receiving water, which is essential for germination. (1 mark)

(c) Why seeds in Pot Z will not germinate: Seeds in Pot Z will not germinate because the waterlogged soil (excess water) fills all the spaces between soil particles. This prevents air from reaching the seeds. Seeds need air for respiration during germination, and without air, they cannot germinate and may eventually rot. (1 mark)

Ans 20.

(a) Machine invented by Jagadish Chandra Bose: Jagadish Chandra Bose invented a machine called the **crescograph**. (1 mark)

(b) Purpose of the crescograph: The crescograph was designed to record and measure how plants grow and respond to different stimuli like light, heat, electricity, and gravity. It could magnify and record even very small growth movements in plants. (1 mark)

(c) Two stimuli studied in plants: Two stimuli that Jagadish Chandra Bose studied in plants are:

1. Light
2. Heat

(Other acceptable answers: Electricity, Gravity) (1 mark)

(d) How his work changed our understanding of plants: Before Jagadish Chandra Bose's work, people believed that plants were inactive and insensitive organisms. His experiments proved that plants can sense their environment and respond to various stimuli. This changed our understanding by showing that plants are living beings with complex response systems, not just passive organisms. His work established that plants have sensitivity and can actively interact with their environment. (1 mark)
