

THE INVISIBLE LIVING WORLD: BEYOND OUR NAKED EYE
Class 08 - Science (Curiosity)

Time Allowed: 1 hour and 57 minutes

Maximum Marks: 140

1. Which process allows a single cell to transform into a multicellular organism? [1]
 - a) Cell division
 - b) Metamorphosis
 - c) Photosynthesis
 - d) Cell fusion
2. What is the function of the gas produced during yeast activity in dough? [1]
 - a) Makes it sour
 - b) Makes dough rise
 - c) Prevents spoilage
 - d) Adds protein
3. What distinguishes plant cells from animal cells? [1]
 - a) Animal cells perform photosynthesis
 - b) Plant cells have a cell wall
 - c) Plant cells lack a cell wall
 - d) Animal cells have chloroplasts
4. Which of the following statements best explains why curd forms faster in summer than in winter? [1]
 - a) Warmth in summer speeds up bacterial growth
 - b) Lactobacillus dies in winter
 - c) Curd requires sunlight to form
 - d) More milk is available in summer
5. Rhizobium bacteria live in the root nodules of which plants? [1]
 - a) Wheat and rice
 - b) Beans and peas
 - c) Mango and banana
 - d) Apple and orange
6. What forms when a group of similar cells come together? [1]
 - a) Cell
 - b) An organ
 - c) Organ system
 - d) Tissue
7. Which component is not required for yeast fermentation to occur? [1]
 - a) Warmth
 - b) Sunlight
 - c) Water
 - d) Sugar
8. What specific feature allows nerve cells to carry messages? [1]
 - a) Rectangular shape
 - b) Presence of chlorophyll
 - c) Elongated and branched structure
 - d) Thin and flat shape
9. What is the role of yeast in making dough rise? [1]
 - a) Yeast decreases the temperature, enabling dough rising
 - b) Yeast hardens the dough
 - c) Yeast grows and releases carbon dioxide that makes the dough soft and fluffy

- d) Yeast adds nutrients to the dough

 10. What is used in bread-making to make it soft and fluffy? [1]
 - a) Yeast
 - b) Sugar
 - c) Salt
 - d) Vinegar
 11. What historical tool helped in the discovery of cells? [1]
 - a) Microscope
 - b) Magnifying glass
 - c) Telescope
 - d) Stethoscope
 12. Which of the following lacks a well-defined nucleus? [1]
 - a) Algae
 - b) Plant cell
 - c) Bacterial cell
 - d) Fungi
 13. How do cells in multicellular organisms increase the chance of survival? [1]
 - a) By growing larger individually
 - b) By dividing rapidly
 - c) By competing with each other
 - d) By carrying out specialized functions and cooperating
 14. Which feature distinguishes bacteria from yeast, protozoa, algae, fungi, plants, and animals? [1]
 - a) Presence of chloroplasts
 - b) Nucleoid
 - c) Cell wall
 - d) Well-defined nucleus
 15. How does Spirulina support environmental sustainability? [1]
 - a) Produces alcohol
 - b) Breaks down waste in landfills
 - c) Fixes nitrogen in roots
 - d) Produces oxygen, needs less space
 16. **Assertion (A):** Plant and animal cells differ in shape and structure. [1]
Reason (R): The unique structure of cells is related to their specific functions within an organism.
 - a) Both A and R are true and R is the correct explanation of A.
 - b) Both A and R are true but R is not the correct explanation of A.
 - c) A is true but R is false.
 - d) A is false but R is true.
 17. **Assertion (A):** Algae and fungi are always unicellular microorganisms. [1]
Reason (R): Algae and fungi can be multicellular and form colonies.
 - a) Both A and R are true and R is the correct explanation of A.
 - b) Both A and R are true but R is not the correct explanation of A.
 - c) A is true but R is false.
 - d) A is false but R is true.
 18. **Assertion (A):** The division and growth of cells are essential for multicellular organisms. [1]
Reason (R): Multicellular organisms arise from a single cell that divides multiple times.
 - a) Both A and R are true and R is the correct explanation of A.
 - b) Both A and R are true but R is not the correct explanation of A.
 - c) A is true but R is false.
 - d) A is false but R is true.
 19. **Assertion (A):** Yeast is used to make bread and cake because it releases carbon dioxide. [1]

Reason (R): Yeast produces alcohol when it ferments sugar.

- | | |
|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
| c) A is true but R is false. | d) A is false but R is true. |

20. **Assertion (A):** Microorganisms can be observed in pond water but not in soil. [1]

Reason (R): Both pond water and soil suspension contain microorganisms.

- | | |
|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
| c) A is true but R is false. | d) A is false but R is true. |

21. Identify the types of microorganisms that contribute to manure formation from plant waste. [1]

22. Why are some microorganisms invisible to the naked eye? [1]

23. Summarise the sequence of organisation from a cell to a complete organism. [1]

24. What is the basic unit of life and who first used this term? [1]

25. What is the importance of the nucleus in a cell? [1]

26. What is the function of the cell membrane in a cell? [1]

27. Why are human beings considered multicellular organisms? [1]

28. What are the conditions under which yeast grows well, and how do these conditions affect its function in bread making? [1]

29. What are the three main parts of a cell? [1]

30. What types of microorganisms help in cleaning the environment, and how do they achieve it? [1]

31. Who was the first scientist to use the term 'cell' in science, and what did he observe? [2]

32. Describe the hierarchical organisation of a living organism's body, highlighting each level's role in the structure. [2]

33. Illustrate the relationship between tissues and organs and how they contribute to the organisation of a living organism. [2]

34. Describe the structure of an animal cell as observed under a microscope. [2]

35. What is the significance of the egg in the formation of multicellular organisms? [2]

36. In what ways do microorganisms differ from plant and animal cells? [2]

37. Define microorganisms and state their significance in the environment. [2]

38. What are the functions of the cell membrane in living organisms? [2]

39. Discuss the role of plastids in plant cells and their variations. [2]

40. Discuss the importance of the nucleus in regulating cellular functions. [2]

41. What is a microscope and how is it used to observe microorganisms? [2]

42. What distinguishes the vacuoles of plant cells from those in animal cells? [2]

43. How does a foldscope differ from a traditional microscope? [3]

44. Explain the difference between the nucleus of a bacterial cell and that of a plant cell. [3]

45. What type of organisms are bacteria and Amoeba? [3]

46. Describe the role of a microscope in studying microorganisms. [3]

47. Describe the formation of a multicellular organism from an egg cell. [3]

48. What are cells, and why are they considered the basic unit of life? [3]

49. List two structures that are unique to plant cells but absent in animal cells. [3]

50. Explain why the study of cells is essential for understanding the diversity of life forms. [3]

51. **Read the following text carefully and answer the questions that follow:** [4]

The body of living organisms is organised into different levels. The basic unit is the cell, which combines to form tissues. Tissues form organs, organs work together as organ systems, and all organ systems form a complete organism. This organisation helps explain how simple cells form complex beings. Life begins with a single cell-the egg-which divides repeatedly to form multicellular organisms such as plants, animals, and humans.

Questions:

- Write the correct sequence of levels of organization in living organisms. (1)
- Why is the cell called the basic unit of life? (1)
- How does the organisation of cells into tissues and organs help multicellular organisms survive? (2)

OR

Compare unicellular and multicellular organisms in terms of organisation. (2)

52. **Read the following text carefully and answer the questions that follow:** [4]

All living organisms are made up of cells, the basic unit of life. Multicellular organisms, like plants and animals, consist of many cells that perform specialised functions and cooperate for survival. Unicellular organisms, such as bacteria and protozoa, survive using just one cell. While fungi have a cell wall but lack chloroplasts, bacteria lack a true nucleus. Cells differ in shape, size, and structure, and advanced microscopes help study their components in detail.

Questions:

- Which structure is absent in bacterial cells? Explain your answer. (1)
- Why are cells considered the basic unit of life? (1)
- How do unicellular organisms differ from multicellular organisms in survival? (2)

OR

Differentiate between bacterial and fungal cells. (2)

53. **Read the following text carefully and answer the questions that follow:** [4]

Microorganisms are everywhere-in soil, water, air, food, and even our bodies. They help recycle waste by decomposing plants, animals, and organic matter into nutrient-rich manure, cleaning the environment. Some microbes also produce biogas, while others like yeast and Lactobacillus are vital in baking and curd formation. Nitrogen-fixing bacteria enrich soil, and microalgae produce oxygen, biofuels, and food supplements. Thus, microbes play a vital role in health, environment, and daily life.

Questions:

- Name the microorganism that helps in curd formation. How does it help? (1)
- How do microorganisms help clean the environment? (1)
- Why do gardeners collect dry leaves and plant waste in pits? (2)

OR

Compare the role of yeast and Lactobacillus in food preparation. (2)

54. **State whether the given statement is True or False:** [5]

- Rhizobium bacteria in root nodules of legumes can fix atmospheric nitrogen into a form usable by plants. [1]

- (b) Chloroplasts are responsible for storing waste in plant cells. [1]
- (c) Dried leaves added to compost help balance the carbon and nitrogen ratio needed for effective decomposition. [1]
- (d) The nucleoid is a membrane-bound structure found only in plant cells. [1]
- (e) Bread becomes softer and fluffier because yeast releases carbon dioxide gas during dough fermentation. [1]
55. Discuss the process of fermentation, detailing how microorganisms contribute to food production. [5]
56. What stages follow the cell in the construction of a living organism? [5]
57. Analyze the importance of microorganisms in waste decomposition and how this process affects the environment. [5]
58. How does the diversity of microorganisms support their role in ecological balance and environmental management? [5]
59. Explain why the study of cell differences in plants and animals is significant for understanding organism functions. [5]
60. Illustrate how microorganisms contribute to maintaining oxygen balance in aquatic ecosystems. [5]
61. Explain the significance of microorganisms in soil nutrient cycling. [5]
62. **Fill in the blanks:** [10]
- (a) The process of converting sugar into alcohol using microorganisms is called _____. [1]
- (b) _____ is the part of the cell that controls all its activities. [1]
- (c) Different tissues are organised to form an _____. [1]
- (d) The jelly-like substance inside a cell where life processes occur is the _____. [1]
- (e) Dried leaves in compost pits provide _____ to balance the nitrogen-rich food waste. [1]
- (f) A group of similar cells forms a type of _____. [1]
- (g) In an experiment with bread slices, the one near the sink is more likely to grow mould because of higher _____ and temperature. [1]
- (h) In bread making, yeast helps make the dough rise by producing _____. [1]
- (i) Yeast belongs to a group of microorganisms called _____. [1]
- (j) Microorganisms such as Rhizobium help in _____ fixation in leguminous plants. [1]

Solution
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1. **(a)** Cell division

Explanation:

Cell division leads to multicellular formation.

2.

(b) Makes dough rise

Explanation:

The gas produced during yeast activity is carbon dioxide. It gets trapped in the dough, forming bubbles that make the dough expand and become soft, light, and fluffy.

3.

(b) Plant cells have a cell wall

Explanation:

Plant cells are unique in having a cell wall for protection and structure.

4. **(a)** Warmth in summer speeds up bacterial growth

Explanation:

Curd forms faster in summer because Lactobacillus bacteria grow and multiply more quickly in warm conditions. Higher temperature speeds up their activity, which helps in faster conversion of milk into curd.

5.

(b) Beans and peas

Explanation:

Rhizobium bacteria live in the root nodules of leguminous plants like beans and peas. They help in fixing nitrogen from the air into the soil, which improves soil fertility and supports plant growth.

6.

(d) Tissue

Explanation:

When similar cells come together, they form a type of tissue.

7.

(b) Sunlight

Explanation:

Yeast fermentation does not require sunlight. It needs sugar, water, and warm conditions to break down sugar and release carbon dioxide, which helps in processes like bread-making.

8.

(c) Elongated and branched structure

Explanation:

Nerve cells have an elongated and branched structure to transmit messages efficiently.

9.

(c) Yeast grows and releases carbon dioxide that makes the dough soft and fluffy

Explanation:

Yeasts grow well in warm conditions releasing carbon dioxide that forms bubbles making the dough rise.

10. **(a) Yeast**
Explanation:
Yeast is used in bread-making because it carries out fermentation. It produces carbon dioxide gas, which forms bubbles in the dough and makes the bread soft, porous, and fluffy.
11. **(a) Microscope**
Explanation:
Microscope allowed the visualization of small structures like cells.
12. **(c) Bacterial cell**
Explanation:
A bacterial cell is a prokaryotic cell, which means it does not have a well-defined nucleus. Instead, its genetic material is freely present in the cytoplasm.
13. **(d) By carrying out specialized functions and cooperating**
Explanation:
Cells specialize in tasks and work together to improve survival.
14. **(b) Nucleoid**
Explanation:
Bacteria have a nucleoid instead of a well-defined nucleus.
15. **(d) Produces oxygen, needs less space**
Explanation:
Spirulina supports environmental sustainability because it grows in very little space and produces oxygen through photosynthesis. It is also a highly nutritious food source, making it efficient for sustainable use.
16. **(a) Both A and R are true and R is the correct explanation of A.**
Explanation:
Cell structure is adapted to fulfill specific physiological roles, influencing cell shape and form.
17. **(d) A is false but R is true.**
Explanation:
Some algae and fungi are multicellular.
18. **(a) Both A and R are true and R is the correct explanation of A.**
Explanation:
Both A and R are true and R is the correct explanation of A.
19. **(b) Both A and R are true but R is not the correct explanation of A.**
Explanation:
Both A and R are true but R is not the correct explanation of A.
20. **(d) A is false but R is true.**
Explanation:
Microorganisms are present in both pond water and soil.

21. Fungi and bacteria are the main types of microorganisms that act on plant waste, breaking it down into simpler, nutrient-rich manure.
22. They are extremely small - single-celled and fall below the resolution limit of human vision. Microscopes are needed to magnify them for observation.
23. The sequence of organisation is: Cell → Tissue → Organ → Organ system → Organism.
24. The basic unit of life is the cell. The term 'cell' was first used by Robert Hooke when he observed the structure of a cork slice under a microscope.
25. The nucleus controls all activities within the cell, regulates its growth, and plays a vital role in cell reproduction.
26. The cell membrane encloses the cell's cytoplasm and nucleus, separating it from other cells. It is porous, allowing essential materials to enter and waste materials to exit the cell.
27. Human beings are composed of many cells working together, making them multicellular organisms.
28. Yeast grows well in warm conditions. During fermentation, yeast respires, producing carbon dioxide, which forms bubbles and makes dough soft and fluffy. This reaction is essential for bread making.
29. The three main parts of a cell are the cell membrane, cytoplasm, and nucleus.
30. Some bacteria and fungi decompose plant and animal waste into simpler substances, recycling nutrients, and aiding environmental cleanup.
31. Robert Hooke was the first scientist to use the term 'cell.' He observed small, empty spaces in a slice of cork under a microscope, drawing them to resemble a honeycomb and naming each compartment a cell.
32. The hierarchical organization in a living organism's body starts with the cell, which is the basic unit of life. A collection of similar cells forms a tissue, designed to perform a specific function. Different tissues come together to form an organ, such as the heart or lungs, each performing distinct roles. Subsequently, a set of organs work synergistically within an organ system to accomplish major body functions like digestion or respiration. All these organ systems integrate to form a complete organism, such as a human, plant, or animal, capable of various complex life processes.
33. Tissues are aggregates of similar cells that are organized to carry out a particular function. Multiple tissues collaborate to form organs, such as the heart or kidneys, each fulfilling distinct physiological roles. For instance, heart muscles (cardiac tissue) are specialized to pump blood. Hence, tissues and organs harmoniously work together to support the body's structure and the organism's survival, exemplifying a beautifully coordinated biological hierarchy.
34. Under a microscope, an animal cell is identified by having a cell membrane, cytoplasm, and nucleus. The cell membrane encloses the entire cell, the cytoplasm contains essential nutrients and conducts cellular activities, and the nucleus manages cell functions and growth.
35. The egg, also known as a fertilized ovum, is pivotal for the formation of multicellular organisms. It possesses the extraordinary ability to divide and differentiate repeatedly. This process gives rise to an entire organism composed of many specialized cells, each performing unique roles. The egg marks the beginning of life, transforming a singular cell into a complex organism capable of sustained life functions.
36. Microorganisms can be unicellular or multicellular but are much smaller and simpler than plant and animal cells. Unlike plant cells with chloroplasts, some microorganisms may lack such organelles. Microbes possess diverse metabolic paths and structural adaptations specific to their environments.
37. Microorganisms are living organisms composed of just one or a few cells, invisible to the unaided eye. They exist in air, water, soil, and within our bodies. They are crucial in processes like decomposing organic matter, nutrient recycling, and sustaining life forms.
38. The cell membrane is a porous structure that encloses the cytoplasm and the nucleus, allowing for the entry of essential materials while expelling waste. It provides separation between cells, maintaining the integrity and functionality of the cell's internal environment.
39. Plastids, like chloroplasts, play vital roles in plant cells. Chloroplasts contain chlorophyll for photosynthesis, crucial for energy production. Other plastids in non-green parts assist in storing essential substances, contributing to the plant's overall functionality and survival.
40. The nucleus orchestrates cellular operations by regulating gene expression, facilitating growth, and managing cellular reproduction and metabolism. Its role as the control center enables cells to react

effectively to environmental and biochemical signals.

41. A microscope is a device that uses lenses to magnify small objects, allowing us to observe microorganisms. By placing a sample on a slide, users can examine it at high magnifications, making these invisible creatures visible and identifiable.
42. Plant cells possess large vacuoles that aid in storing substances, waste removal, and maintaining cell structure. In contrast, animal cells typically have small vacuoles, mainly for storing water-soluble substances. They are less functional for structural support in animal cells.
43. A foldscope, unlike traditional laboratory microscopes, is a low-cost and portable paper microscope designed to democratize access to the microscopic world. While it doesn't provide the same resolution or detail as high-powered microscopes, a foldscope offers enough magnification to make microorganisms visible and suitable for educational purposes, especially in resource-limited settings.
44. In bacterial cells, the nucleus is not well-defined, lacking a nuclear membrane and existing as a nucleoid. In contrast, plant cells have a well-defined nucleus enclosed by a nuclear membrane. The structured nucleus supports complex processes like division, growth, and storage of genetic information in plant cells.
45. Bacteria and Amoeba are examples of unicellular microorganisms. Each consists of a single cell that functions autonomously, performing all necessary tasks for survival and reproduction. Despite being unicellular, these organisms exhibit complex behavior and adaptations that allow them to thrive in a variety of environments.
46. A microscope is crucial for studying microorganisms, as it provides the magnification needed to view these tiny life forms that are invisible to the unaided eye. By enlarging them 100 to 400 times, microscopes reveal the intricate details and structures of both unicellular and multicellular microorganisms, allowing scientists to study their forms and functions. Innovations like foldscopes make the microscopic world accessible to a broader audience.
47. In living organisms, development begins with a single fertilized egg cell. This cell undergoes repeated division, producing many new cells. These cells gradually specialize to perform different functions and organize into tissues. Tissues then combine to form organs, and organs work together as organ systems. Through this process, a simple cell develops into a complex, fully functional multicellular organism capable of survival, growth, and reproduction in its environment.
48. Cells are the basic structural and functional units of all living organisms. Each cell contains specialized components, such as the nucleus, cytoplasm, and organelles, that carry out essential processes like respiration, growth, and reproduction. By coordinating these activities, cells ensure survival and proper functioning of the organism. Their ability to divide and produce new cells also supports continuity of life, making them indispensable for biological growth, development, and overall existence.
49. Plant cells have a cell wall and chloroplasts, which are absent in animal cells. The cell wall gives shape and structural support, while chloroplasts help in photosynthesis. During photosynthesis, plants use sunlight to prepare food and produce energy, making them capable of making their own food, unlike animals.
50. Studying cells helps us understand the basic processes that define life. By examining their structures and functions, scientists discover how different species adapt to their environments. It also explains how cells interact to form tissues, organs, and systems. Variations across species highlight evolutionary changes, while observations of cellular responses reveal how organisms survive challenges. Thus, cell study provides crucial insights into growth, reproduction, adaptation, and the continuity of life itself.
51. a. Cell → Tissue → Organ → Organ system → Organism
b. The cell is the smallest structural and functional unit of life. Just like bricks form a wall, cells form tissues, organs, and eventually complete organisms. Without cells, no living being can exist.
c. In multicellular organisms, cells group into tissues that perform specific functions. These tissues combine to form organs, and organs work together in organ systems. This division of labour ensures survival, as each system-like digestion or circulation-performs vital tasks for the organism.

OR

Unicellular organisms, like amoeba, perform all life functions within a single cell. In contrast, multicellular organisms, such as plants and animals, have many cells organised into tissues, organs,

and systems. This organisation allows them to perform complex functions efficiently, unlike unicellular organisms.

52. a. A well-defined nucleus is absent in bacterial cells. Instead, bacteria have a nucleoid, which is an irregular region where their genetic material is located, but it is not enclosed by a nuclear membrane like in eukaryotic cells.
- b. Cells are the smallest building blocks of all living organisms. They perform essential life functions like respiration, growth, and reproduction. Whether in unicellular or multicellular organisms, survival always depends on the functioning of cells.
- c. Unicellular organisms, like bacteria and protozoa, carry out all life processes within a single cell, ensuring their survival independently. In contrast, multicellular organisms, such as plants and animals, have specialised cells that perform different functions and work together. This cooperation increases efficiency and supports the organism's growth, survival, and reproduction.

OR

Bacteria lack a well-defined nucleus and nuclear membrane; instead, they contain a nucleoid. Fungi, on the other hand, have a true nucleus and cell wall but lack chloroplasts, so they cannot perform photosynthesis. Thus, bacterial cells are prokaryotic, while fungal cells are eukaryotic, showing clear differences in structure and function.

53. a. Lactobacillus helps in curd formation. It converts the lactose in milk into lactic acid, which thickens the milk and gives curd its sour taste.
- b. Microorganisms like bacteria and fungi decompose dead plants, animals, and organic waste into simpler, nutrient-rich substances. This natural recycling returns nutrients to the soil, helps plants grow, and prevents waste accumulation, keeping the environment clean and balanced.
- c. Gardeners use pits to allow microorganisms, like fungi and bacteria, to decompose leaves and plant waste. Over time, this process produces nutrient-rich manure that improves soil fertility. This natural recycling reduces waste and supports sustainable farming, showing how microbes help both environment and agriculture.

OR

Yeast, a fungus, ferments sugars in flour, releasing carbon dioxide that makes dough rise and fluffy, used in bread and cakes. Lactobacillus, a bacterium, ferments lactose in milk, producing lactic acid that turns milk into curd. Both microbes aid food preparation but act on different substrates with different end products.

54. State whether the given statement is True or False:

- (a) **(a)** True

Explanation:

Rhizobium bacteria live in the root nodules of leguminous plants and convert atmospheric nitrogen into a usable form for plants. This process is called nitrogen fixation.

- (b) **(b)** False

Explanation:

False

- (c) **(a)** True

Explanation:

Dried leaves are rich in carbon and help balance the carbon-to-nitrogen ratio in compost. This balance supports efficient decomposition by microorganisms.

- (d) **(b)** False

Explanation:

The nucleoid is not membrane-bound and is found in prokaryotic cells like bacteria, not only in plant cells. It contains the genetic material (DNA) freely in the cytoplasm.

- (e) **(a)** True

Explanation:

Yeast releases carbon dioxide gas during fermentation in the dough. This gas forms bubbles, making the dough rise and become soft and fluffy.

55. Fermentation is a biological process where microorganisms like yeast and bacteria convert sugars into alcohol, gases, or acids. This transformation happens in an anaerobic environment and is pivotal in food and beverage production. Yeast, for example, ferments sugars in dough to produce carbon dioxide and alcohol, causing bread to rise. Similarly, Lactobacillus bacteria ferment lactose in milk to create lactic acid, resulting in products like yogurt and cheese. Fermentation enhances food preservation, improves flavors, and enriches nutritional profiles by producing vitamins and peptides. This microbial action also contributes to making beverages like beer and wine, illustrating the importance of fermentation in diverse culinary and industrial practices.
56. After identifying the cell as the basic unit of life, the subsequent stages in the formation of a living organism are following:
- Tissue: where similar cells form tissues.
 - Organ: distinct tissues combine to form organs.
 - Organ System: these organs work in harmony to establish organ systems.
 - Organism: The culmination of all organ systems results in a complete living being.
- This structured pathway highlights the complexity emerging from a single cell to form entire plants and animals.
57. Microorganisms are indispensable in waste decomposition, breaking down organic material into simpler substances. This process, known as biodegradation, is critical for reducing waste accumulation in the environment. As microorganisms decompose waste, nutrients are recycled back into the soil, promoting plant growth. This nutrient cycling reduces the need for chemical fertilizers and minimizes landfill overcrowding, ameliorating soil, air, and water quality, and reducing greenhouse gas emissions. Furthermore, by breaking down hazardous waste, microorganisms can mitigate pollution and enhance ecological health. Their role extends to industries, where bioremediation uses microbes to clean contaminated sites, illustrating their broader environmental impact. Hence, microbial activity is essential for ecological balance and sustainability.
58. Microorganism diversity is fundamental in maintaining ecological balance and guiding environmental management. This diversity allows different microorganisms to occupy various ecological niches, contributing to nutrient cycling, waste decomposition, and habitat formation. Diverse bacteria and algae play roles in recycling essential elements like carbon and nitrogen, supporting plant growth and enhancing soil health. In aquatic systems, algae ensure oxygen supply and provide nourishment for marine life, critical for biodiversity. Diverse microbial communities also enhance the ecosystem's resilience against external disruptions, such as pollutants, by metabolizing harmful substances, reducing environmental stressors, and promoting recovery. Understanding this microbial diversity aids in effective environmental management, allowing for targeted eco-solutions like bioremediation to manage pollutants and conserve natural resources.
59. Studying the structural differences between plant and animal cells is vital for understanding how organisms function in unique ways. Plant cells possess rigid cell walls, large vacuoles, and chloroplasts that enable photosynthesis, a process absent in animal cells. Animal cells, on the other hand, are more flexible and specialized for diverse functions such as movement, signaling, and energy use. Recognizing these distinctions allows scientists and students to explore metabolic pathways, energy conversions, and overall biological processes. This knowledge not only enhances our understanding of life but also contributes to practical fields like agriculture, medicine, genetics, and biotechnology.
60. Microorganisms, particularly microalgae, play a crucial role in maintaining oxygen balance within aquatic ecosystems. These microscopic plant-like organisms engage in photosynthesis, utilizing sunlight to convert carbon dioxide and water into glucose and oxygen. By releasing oxygen as a byproduct, microalgae significantly contribute to the atmospheric oxygen supply. In aquatic environments, they serve as primary producers, forming the foundation of the food web, supporting life across trophic levels. As microalgae flourish in suitable conditions, they help maintain adequate dissolved oxygen levels necessary for the survival of fish and other marine species. Their oxygen production mitigates oxygen depletion, preventing conditions like hypoxia, reinforcing the delicate ecological balance.
61. Microorganisms are essential for maintaining soil fertility through nutrient cycling. They decompose organic matter such as fruits, vegetable peels, leaves, and other plant waste. Fungi and bacteria break these materials down into simpler substances, converting them into nutrient-rich manure. When this

manure is returned to the soil, it replenishes essential elements like nitrogen, phosphorus, and potassium that plants need for growth. This process not only prevents waste accumulation but also improves soil health naturally. By recycling nutrients, microorganisms act as nature's cleaners and farmers, supporting sustainable agriculture and ensuring a continuous supply of resources for healthy plant development.

62. Fill in the blanks:

- (a) Fermentation
- (b) Nucleus
- (c) organ
- (d) cytoplasm
- (e) Carbon
- (f) tissue
- (g) Humidity
- (h) Carbon Dioxide
- (i) fungi
- (j) Nitrogen

USP