CELL BIOLOGY & BIOTECHNOLOGY

1. What is a cell? Who discovered it?

Answer:
A **cell is the structural and functional unit of life**.
Cells were discovered by **Robert Hooke in 1665** while observing cork cells under a microscope.

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2. Differentiate between plant cells and animal cells.

Feature	Plant Cell	Animal Cell
Cell wall	Present	Absent
Shape	Usually rectangular	Usually round/irregular
Vacuole	Large central vacuole	Small or absent
Chloroplast	Present	Absent
Mode of nutrition	Mostly autotrophic	Heterotrophic

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3. What are cell organelles? Name any four.

Answer:
Cell organelles are **specialized structures inside a cell that perform specific functions**.

Examples:

- Nucleus
- Mitochondria
- Ribosomes
- Golgi apparatus
- Vacuole

(Any four)

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4. State the function of nucleus.

Answer:

- Controls all activities of the cell
- Stores genetic material (DNA)
- Called the “control centre” of the cell

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5. What is mitochondria? Why is it called the powerhouse of the cell?

Answer:
Mitochondria are **energy-producing organelles**.
They are called **powerhouse of the cell** because they produce energy in the form of **ATP**.

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6. What is a chromosome?

Answer:
Chromosomes are **thread-like structures in the nucleus** made of DNA that **carry hereditary information**.

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7. Define diffusion and osmosis.

Answer:
Diffusion – Movement of particles from higher to lower concentration.
Osmosis – Movement of water through a semipermeable membrane from higher to lower concentration.

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8. What is tissue culture?

Answer:
Tissue culture is a **biotechnology technique** in which **new plants are grown from small tissues or cells under sterile laboratory conditions**.

□ BIOTECHNOLOGY

9. What is biotechnology?

Answer:
Biotechnology is the **use of living organisms or their products for human benefit**, such as improving crops, producing medicines, etc.

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10. What is genetic engineering?

Answer:
Genetic engineering is a method of **changing or modifying genes** of an organism using biotechnology.

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11. What are transgenic organisms?

Answer:
Organisms whose **genes are artificially modified or foreign genes are inserted into them** are called **transgenic organisms**.

Example: Bt cotton

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12. State two applications of biotechnology in agriculture.

Answer:

- Production of **disease-resistant crops**
- Increase in **crop yield**

- Development of stress-tolerant plants (heat, drought)
  (Any two)

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13. What is cloning? Give an example.

Answer:
Cloning is the process of **producing genetically identical copies of an organism**.

Example – **Dolly the sheep**

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14. What is DNA fingerprinting?

Answer:
DNA fingerprinting is a technique used to **identify individuals based on their unique DNA pattern**.

It is used in:

- Crime detection
- Paternity testing

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15. State advantages of biotechnology in medicine.

Answer:

- Production of **insulin, vaccines, antibiotics**
- Gene therapy
- Early disease diagnosis

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16. What are stem cells?

Answer:
Stem cells are **undifferentiated cells** that can develop into different types of body cells and help in **tissue repair**.

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17. What are biofertilizers? Give examples.

Answer:
Biofertilizers are **micro-organisms that increase soil fertility**.

Examples:

- Rhizobium
- Azotobacter

✍▩ VERY SHORT QUESTIONS (1-2 marks)

1 Name the green pigment in plants.
✓ Chlorophyll

2️⃣ **Where does photosynthesis occur?**
✓ Chloroplast

3️⃣ **What is cytoplasm?**
✓ Jelly-like substance inside the cell where organelles are present

4️⃣ **What is the basic unit of heredity?**
✓ Gene

5️⃣ **Who is the father of genetics?**
✓ Gregor Mendel

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18. Explain the structure and function of the cell membrane.

Answer:

- Cell membrane is a **thin, flexible outer covering** of the cell.
- It is **semipermeable**, meaning it allows only selected substances to enter or exit.
- It protects the cell and maintains internal balance.
- It plays a key role in **diffusion and osmosis**.

📌 **LIKELY BOARD QUESTIONS**

✓ Define biotechnology
✓ Explain tissue culture
✓ Differentiate plant cell & animal cell
✓ Write functions of nucleus, mitochondria
✓ Applications of DNA fingerprinting
✓ Write short note on cloning
