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Subject : General Science and Ability.

⇒ Q. No. 1 (a):

Describe Cell structure.

Write down at least three differences between plant and animal cell.

⇒ (1) Cell :

The cell is the basic structural and functional unit of life. Millions of cells are present in human body. The size of cells is vary, thus, cannot be seen through naked eye. Instead microscopes are used to see them.

The cell was discovered by Robert Hooke in 1665.

⇒ (2) Cell Structure:-

- (i) Cell membrane
- (ii) Cytoplasm.
- (iii) Nucleus.

⇒ (i) Cell Membrane:-

The outermost layer of the animal cell and the second most ^{outer} layer

of the plant cell is called cell membrane. The major components of the cell membrane is carbohydrates, phospholipids, proteins, and other lipids such as cholesterol. Together these components make up the fluid mosaic model. In plant cell different cell wall is present outside the cell membrane.

⇒ iii Cytoplasm:-

Cells have cytoplasm. It has fluid like material that is present between the cell membrane and nucleus. All the cell organelles :

- | | |
|------|------------------------|
| i. | Endoplasmic Reticulum. |
| ii. | Ribosomes. |
| iii. | Golgi bodies. |
| iv. | Mitochondria. |
| v. | Plastids |
| iv. | Vacuoles |

⇒ i. Endoplasmic Reticulum:-

Endoplasmic reticulum detoxifying the harmful bacteria that

enter through food along with preparation of protein.

ii.

Ribosomes:- Ribosomes helping in the digestion of food.

iii.

Golgi bodies:- Golgi bodies preparing the protein into the final product and sending it to where it is needed.

iv.

Mitochondria:- mitochondria providing energy to the body.

v.

Plastids:- Plastids assisting in the photosynthesis process.

iv.

Vacuoles:- Vacuoles acting as storehouses of water and other metabolic ~~products~~ products, etc are located within the cytoplasm, each having its distinct composition for the particular function.

⇒ (3) **Nucleus:-**

The other major component of

The cell is called nucleus. Nucleus being in the centre of the animal cells and at the side of the plant cells. The nucleus of the cell consists of the nuclear membrane, nucleolus, nucleoplasm, and chromosome that carries ~~the~~ ~~the~~ the genetic information in DNA, a part of the nucleus.

Plant cells

⇒ 1.

Nucleus:- The nucleus is present near the cell membrane.

⇒ 2.

Vacuole:- They have a relatively large vacuole.

⇒ 3.

Cell wall:- They have a cell wall.

⇒ 4.

Centrioles:- They do not have centrioles.

Animal cells

⇒ 1.

Nucleus:- The nucleus is in the centre of the cell.

⇒ 2.

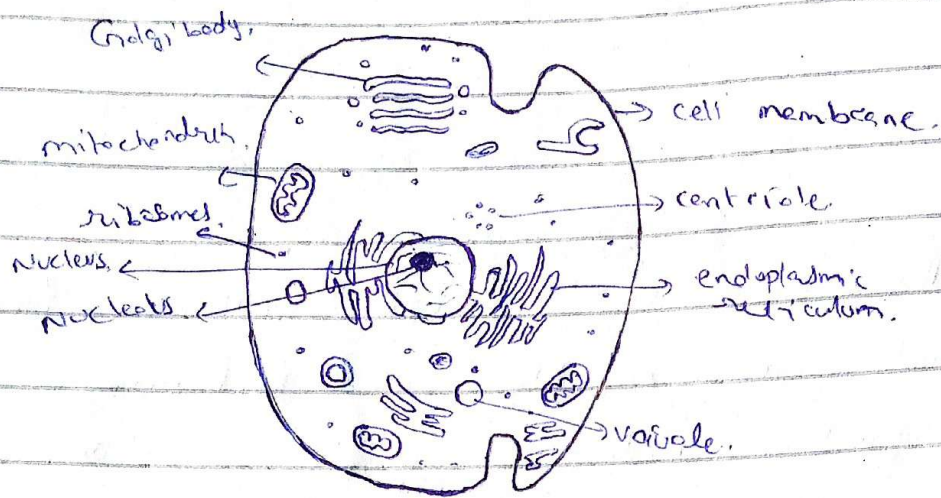
Vacuole:- They have a relatively small vacuole.

⇒ 3.

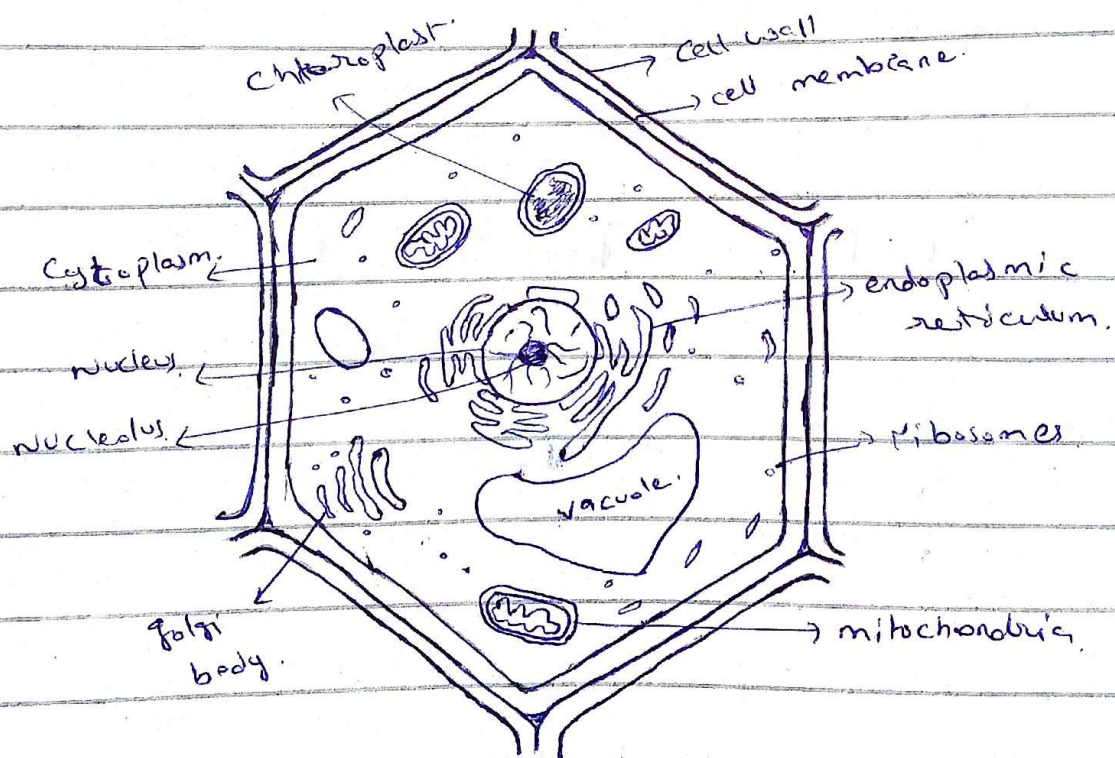
Cell wall:- They do not have cell walls.

⇒ 4.

Centrioles:- They have centrioles.



(Plant cell)



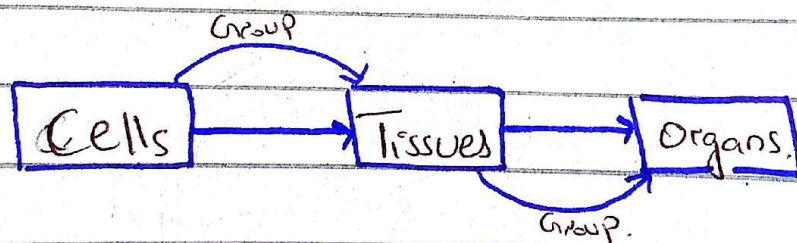
(Plant cell)

⇒ Q. No. 1 (b):

Explain with examples the relationship between cells, tissues, and organs.

⇒ (1) Cells, tissues and organs and their relationship:-

Cells are the simplest unit of life that are capable of performing biological functions, and similar types of cells performing a similar function combine to form a tissue. Eventually, the tissues performing similar actions make up an organ.



⇒ (2) Examples to illustrate the Relationship:-

(1) Muscles:-

- i. Muscle cells known as muscle fibers, are the basic building blocks of the muscles.
- ii. The ~~Three~~ types of muscle cells are skeletal, cardiac, and smooth.

iii. Different muscle cells combine to form muscle tissues that keep the body upright, move it, and pump the heart.

iv. Cardiac, skeletal, and smooth muscle tissues form cardiac, skeletal, and smooth muscles forming the muscular system.

2. Brain and the spinal cord:-

i. Neurons and glia are basic functional units of the nervous system.

ii. The neurons and glia combined to form nervous tissues.

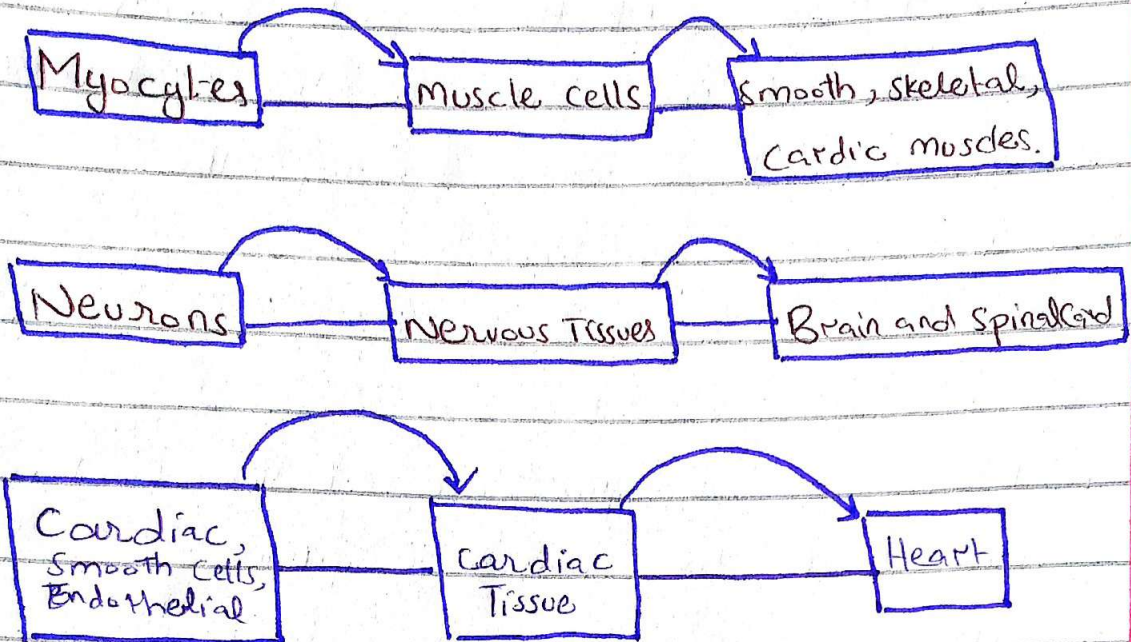
iii. Nervous tissues, muscle tissues, and other tissues to form the Brain and spinal cord, which together constitute the nervous system.

3. Heart:-

i. Cardiac, smooth, endothelial, and connective cells are the basic unit of cardiovascular organs.

ii. These cells combine to form cardiac tissues, smooth tissues, endothelial connective tissues.

iii. Different cardiac, smooth, endothelial, and connective tissues help to function properly.



⇒ Q.No 1 (c):-

Explain the differences in structure and function between a cell wall and a cell membrane.

<u>Cell wall</u>	<u>Cell membrane</u>
⇒ <u>Structure of cell wall:-</u> 1. The outermost layer of the plant cell is called cell wall.	⇒ <u>Structure of cell membrane:-</u> 1. The outermost layer of the animal cell is called cell membrane.

Structure of cell wall

2. It is present only in plant cells.

3.

The cell wall has a thick and rigid structure with a fixed shape.

4.

Pectin, cellulose and hemicellulose form the cell wall.

5.

It is made up of 35% pectin, 30% cellulose, 30% hemicellulose, 5% protein.

6.

The cell wall is 0.1 μm thick.

⇒ Functions of a cell wall:-

1.

It maintains the shape of the cell.

Structure of cell membrane.

2. It is present in all types of cells.

3.

The cell membrane has a thin and delicate structure with a fixed shape.

4.

It is made up of 4 types of molecules: Proteins, carbohydrates, cholesterol and phospholipids.

5.

It is made up of 60-80% protein and 20-40% fat.

6.

It is 7.5-10nm thick.

⇒ Functions of a cell membrane:-

1.

It maintains the shape of the cell.

Functions of a cell wall:- Functions of cell membrane:-

2.

The regulation of the transfer of material into and out of the body is controlled by a cell wall.

3.

It provides protection to the cell and separates it from its surrounding environment.

4.

It is fully permeable.

2.

It plays role in the transportation of things into and out of the cell.

3.

It provides internal protection to the cell from the external environment.

4.

It is the Porous membrane, however, it is selectively permeable allowing selective cells to pass into and pass out of the cell.

→ Q.No: 1(d). What do you understand by the DNA and RNA?

→ (1) Nucleic Acids:-

Nucleic acids are polymers of nucleotides. They were first isolated from nuclei of "pus" cells in 1869 by a German chemist, Friedrich Miescher. Nucleic acids were named due to their isolation from nuclei and their acidic nature.

Nucleic acids are complex substances and are the polymers of nucleotide units. There are three units in each nucleotide.

1. A pentose sugar.
2. A nitrogen-containing base.
3. A phosphoric acid.

⇒ (2) Types of Nucleic acids:-

- a) Deoxyribonucleic acid (DNA)
- b) Ribonucleic acid (RNA)

→ DNA

1. Occurrence:-

Chromosome nuclei of cells mitochondria.

→ RNA

1. Occurrence:-

Nucleolus Ribosomes
Cytosol Smaller

DNA

and chloroplast

2.

Composition:- Double
Stranded

3.

Units:- 5 carbons sugar
is deoxyribose.

4.

Nitrogenous bases:- Thymine,
Adenine, Guanine, cytosine

5.

Types of material:-

Hereditary material

6.

Synthesis Process.

Synthesis of DNA is
called replication.

7.

A-DNA:- right handed,
double helix and

similar to B-DNA:-

most common and right

handed also. Z-DNA

is left handed.

RNA

amount in other cells

2.

Composition:- Single
Stranded.

3.

Units:- 5 carbons sugar
is ribose.

4.

Nitrogenous bases:- Uracil,
Adenine, Guanine, cytosine

5.

Types of material:-

No hereditary material
but used in protein
synthesis.

6.

Synthesis Process:-

Synthesis of RNA is
called transcription.

7.

mRNA bring genetic
message from nucleus to

ribosome. tRNA:

read the code on

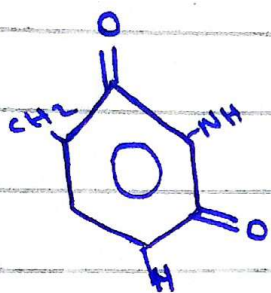
mRNA and transfer
amino acids

DNA

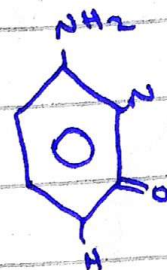
double helix and
wound in zig-zag
Pattern

RNA

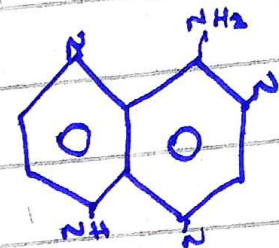
Go to the ribosome.
mRNA: Combine
with ribosomal protein
and form ribosomes



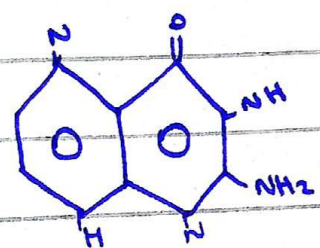
Thymine
DNA nucleobase



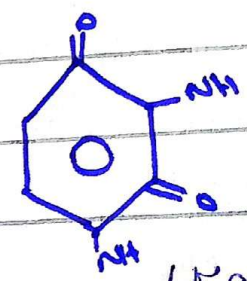
Cytosine



Adenine



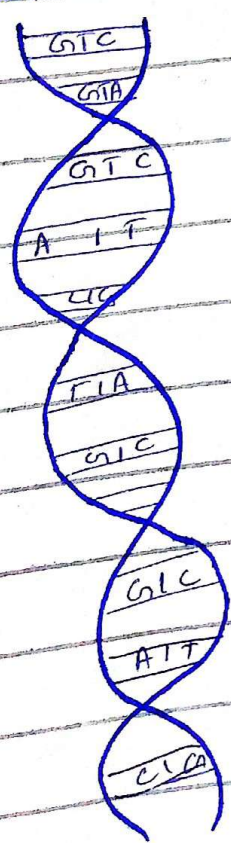
Guanine



Uracil
RNA nucleobase

(DNA nucleobases)

DNA



RNA

