1. Short answer questions:

i. What is the name of the thread like structures found in the nucleus of a cell?

Ans: The thread like structures found in the nucleus of a cell are called chromosomes.

ii. What are chromosomes and genes made of?

Ans: Genes and chromosomes are made up of deoxyribonucleic acid (DNA). DNA is the molecule that carries genetic information for the development and functioning of an organism.

iii. How many chromosomes do humans have in each body cell?

Ans: Humans have 46 (23 pairs) of chromosomes in each body cell.

iv. What is a specie?

Ans: A specie is a group of closely related organisms that are very similar to each other and are usually capable of interbreeding and producing fertile offspring.

v. What name is given to the differences in characteristics between organisms of the same species?

Ans: The differences in the characters or traits among the individuals of a species is called variation. Variation arises due to crossing over, recombination, mutation & environmental effects on the expression of genes present on chromosomes.

vi. What does the word inherited mean?

Ans: The word inherited means the transmission of characters from parents to their offspring's.

vii. What is difference between parent and daughter cell?

Parent cell	Daughter cell
The cell which divides is called parent cell.	The cells which are produced as a result of cell division are called daughter cells.

viii. What is the role of chromosomes in cell division?

Chromosomes allow DNA to be accurately copied during cell divisions. During cell division, chromosomes are duplicated so that each new cell will have the same genetic information as the original cell.

2. Long answer questions:

i. What is the importance of meiosis?

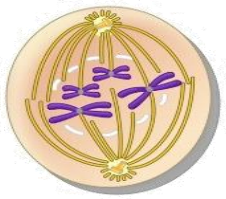
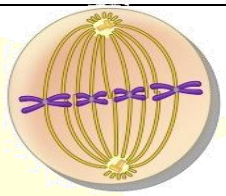
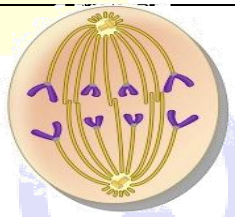
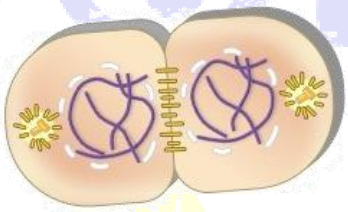
- Meiosis is responsible for the sexual reproduction and formation of the gametes.
- It activates the genetic information for the development of gametes.
- It reduces the number of chromosomes to half in gametes cells and helps in maintaining the constant number of chromosomes. This is important because the chromosome number doubles after fertilization.
- Meiosis gives rise to variations and causes genetic mutation.

ii. What are the similarities and differences between mitosis and meiosis?

Mitosis	Similarities	Meiosis
Occurs in somatic cells.	Occur in eukaryotes.	Occurs in germ line cells.
Number of chromosomes in daughter cells remain the same.	Produce new cells.	Number of chromosomes in the daughter cells are reduced to half.
Two daughter cells are formed.	Start with a single parent cell.	Four daughter cells are formed.
Nucleus divides once.	Begin with one parent cell.	Nucleus divides twice.

iii. Explain the process of mitosis.

Mitosis is a type of cell division that produces two identical daughter cells, with the same number of chromosomes as that in the parent cell. The process of mitosis consists of four stages.

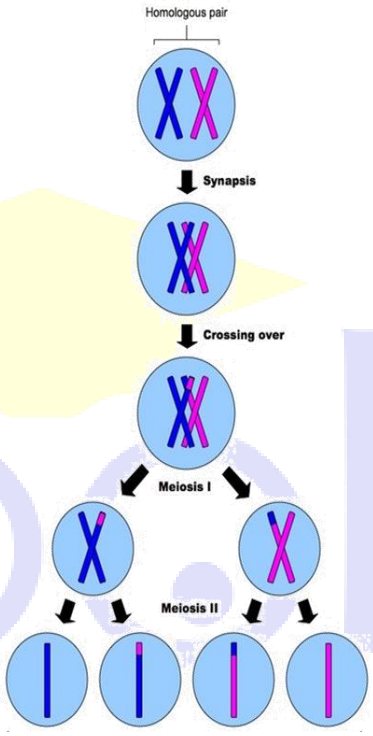
Prophase	The chromosomes condense and the nuclear envelope breaks down. Formation of spindle fibers takes place.	
Metaphase	The chromosomes line up in the middle of the cell, forming a metaphase plate.	
Anaphase	The chromosomes separate and move to opposite ends of the cell.	
Telophase	The chromosomes decondense, the nuclear envelope reforms, and the cytoplasm divides.	

iv. Explain the process of meiosis.

Ans: Meiosis a type of cell division that results in four daughter cells each with half the number of chromosomes of the parent cell.

Meiosis is a two-step process:

Meiosis I

Prophase I	The chromosomes condense and become visible. Homologous chromosomes pair up and form tetrads. Crossing over can occur.	
Metaphase I	The tetrads line up along the equator of the cell.	
Anaphase I	The homologous chromosomes separate and are pulled to opposite poles of the cell.	
Telophase I	The chromosomes decondense and the nuclear envelopes reform. The cell divides into two daughter cells, each of which has half the number of chromosomes.	

Meiosis II

Meiosis two is similar to mitosis because the half number of chromosomes is retained in four daughter cells.

3. Tick the right option.

1. Which of the following is the control center of cell?			
I. Cell membrane	**II. Nucleus**	III. Vacuole	IV. Cytoplasm
2. In this phase chromosomes condense and the nuclear envelope breaks down;			
I. Metaphase	II. Anaphase	**III. Prophase**	IV. Telophase
3. Before cell division chromosomes are in the form of threads called:			
I. Chromatin	II. Tetrad	III. Bivalent	IV. Chiasmata
4. In this phase the cell neither divides nor prepares itself for the division.			
I. G1 phase	II. G2 phase	III. S phase	**IV. G0 Phase**
5. The cell which divides is called;			
I. Parent cell	II. Mother cell	III. Daughter cell	IV. Eukaryotic cell

4. Fill ups

i. A **cell** is the smallest unit of life.

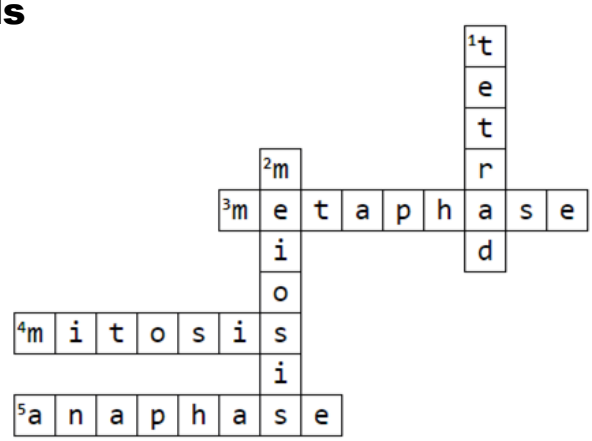
ii. **Interphase** is the longest phase of cell cycle.

iii. **Chromosomes** are structures in the nucleus of cells that contain DNA.

iv. Mitosis occurs in the **somatic** cells.

v. Meiosis occurs in the **germ** cells.

4. Crosswords



Across	Down
5. Chromosomes align in center	1. Pair of homologous chromosomes
6. Same number of chromosomes	2. Half number of chromosomes
7. Chromosome separate	

5. Words Search

Find the following word in the words search.

Cell	Variation	Spindle	Genes	Cytoplasm

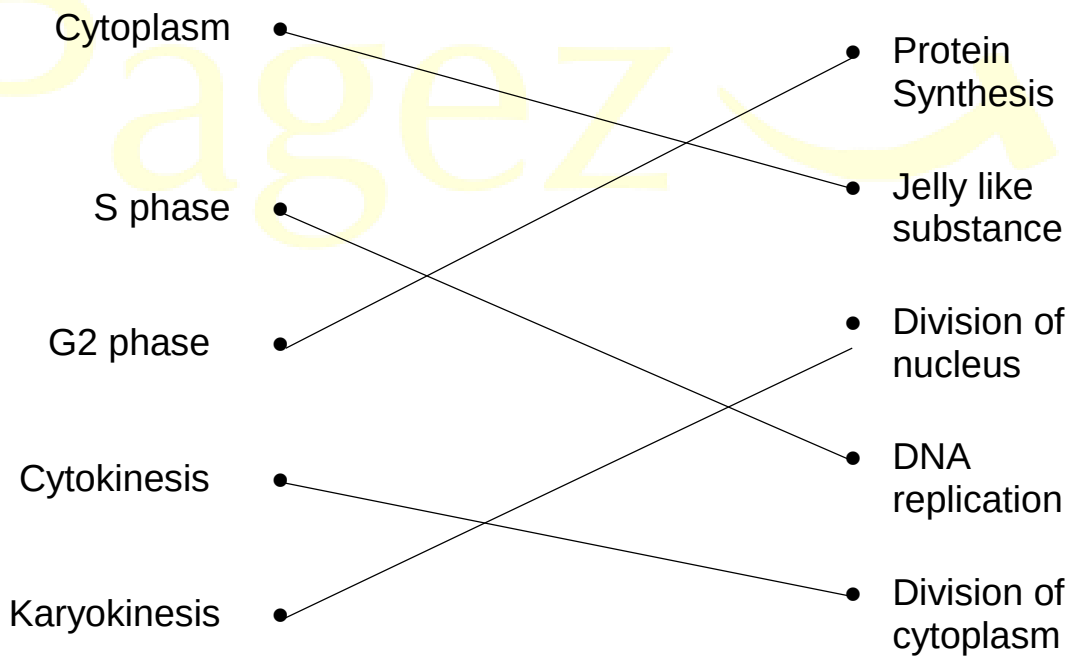
S	C	A	T	S	A	L	T	Y
K	Y	A	G	E	N	E	S	N
B	T	E	A	T	H	I	N	G
G	O	O	U	R	C	E	L	L
P	P	N	K	H	E	A	E	I
O	L	I	U	E	E	R	A	R
V	A	R	I	A	T	I	O	N
E	S	P	I	N	D	L	E	S
C	M	B	T	U	I	M	B	T

6. Jumbled Words

i.	CTIONDUPRORE	REPRODUCTION	ii.	SOMEMOCHRO	CHROMOSOME
iii.	GOTEZY	ZYGOTE	iv.	ETEGAM	GAMETE
v.	NESISKICYTO	CYTOKINESIS	vi.	TATIONADAP	ADAPTATION
vii.	NESISKIKARYO	KARYOKINESIS	viii.	TICALIDEN	IDENTICAL
ix.	GOUSLOHOMO	HOMOLOGOUS	x.	RENTPA	PARENT

7. Columns

Match the statements

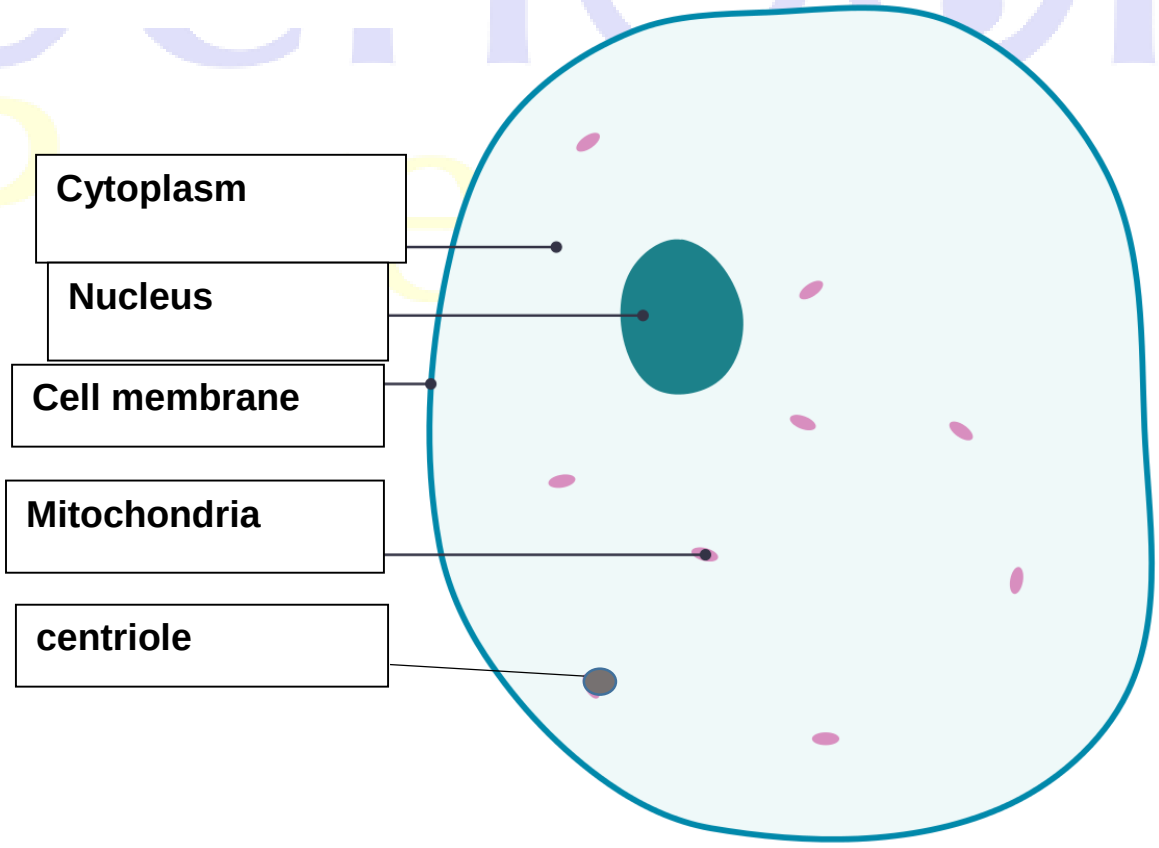


8. Write "T" for the true and "F" for the false statement.

i.	The cell membrane is a thin layer that surrounds an animal cell.	F
ii.	The nucleus is the control center of the cell.	T
iii.	The cells which are produced as a result of cell division are called daughter cells.	T
iv.	Humans have 23 pairs of chromosomes.	T
v.	Formation of spindle fibers take place during metaphase.	F

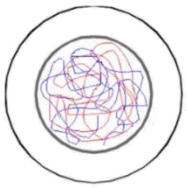
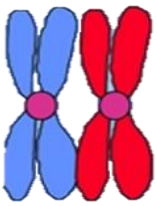
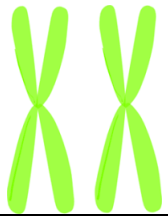
9. Label the diagram.

Structure of an animal cell



10. Drag and Drop

Look at the pictures and write their names in the relevant column.

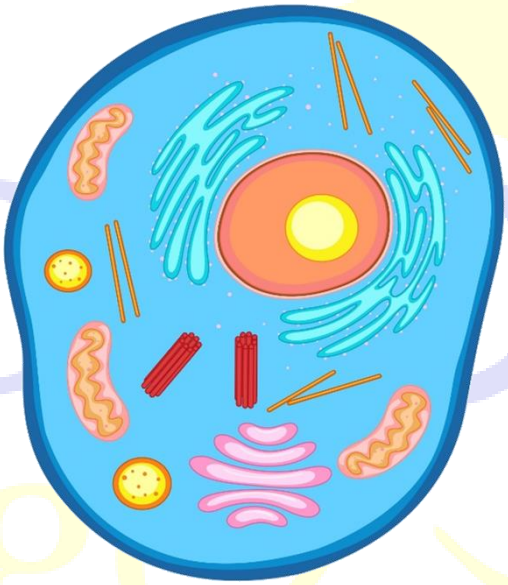
				
Chromatin	Chromosome	Tetrad	Homologous chromosomes	Crossing over

Structure/Stage	Appearance
Chromatin	Thread like structure
Chromosome	Condensed form of chromatin
Tetrad	A group of four chromatids
Homologous chromosomes	Similar but not identical
Crossing over	Exchange of segments

11. Comprehension

Answer the following questions after reading the paragraph and observe the picture carefully.

Cell division is a vital process in the life of a cell, ensuring growth and reproduction. There are two main types: mitosis and meiosis. Mitosis is like a cell's everyday job, creating two identical "worker" cells. It happens in our body cells, helping us grow and replace damaged tissues. On the other hand, meiosis is like a special task for making babies. It occurs in cells that become eggs or sperm, and the result is four unique cells with half the usual stuff. So, whether it's for everyday tasks or making new life, cell division plays a crucial role in keeping living things going.



I. What is the importance of cell division?

Ans: Cell division is a vital process in the life of a cell, ensuring growth and reproduction.

II. How many types of cell division are?

Ans: There are two main types: mitosis and meiosis.