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BIO-DIVERSITY

1. Explain term biodivessity and its importance.

→ The term biodivessity refess to the vasiety of living organisms. Biodivessity brings togethes the diffesent species and forms of life (animal, plant, and othes) and their variability that is to say their dynamics of evolution in their ecosystems. Biodivessity is a part of ous daily livelihood and includes resources upon which families, communities, nations and future generations depends. Having a diffesent array of living organisms allaw othes organisms to take advantage oves the resources provided. Biological resources that provide goods for human use include:

i. Food - species that are hunted, fished and gathesed as well as those cultivated for agricultuse, forestry and aquaculture.

ii. Shelter and warmth :- timbes and othes forest products and fibess such as wool & cotton.

iii. Medicines - both traditional medicine and those synthe sized from biological resources and processes.

2. What are the 3 levels of divesity?

→ The 3 levels of divessity are discussed as - genetic, species and ecosystem divessity.

i. Genetic divessity is all the different genes contained in all individual plants, animals, fungi and microorganisms. It occurs within a species as well as between species.

ii. Species divessity is the difference within and between the population of a species and between different species.

iii. Ecosystem divessity is all the different varieties of habitats, biological communities, ecological processes as well as variations within individual ecosystems.

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3. What are the threats to divessity?

→ The threats to biodivessity are as follows:

i. Habitat loss and destruction is usually as a ~~diffe~~ direct result of human activity and population growth is a major force in the loss of species, population and ecosystems.

ii. Alteration in ecosystem composition such as the loss or decline of a species can lead to the loss of a biodivessity.

iii. The introduction of exotic (non-native) species can disrupt entire ecosystems and impact populations of native plants or animals. These invaders can adversely affect native species by eating them, infecting them, competing with them or mating with them.

iv. The over-exploitation of a species or population can lead to its downfall.
v. Human generated pollution and contamination can affect all levels of biodiversity.
vi. Global climate change can alter environmental conditions. Species and population may be lost if they are unable to adapt to new conditions or relocate.

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MICRO-ORGANISM

1. Define microorganisms. What are the different groups of microorganisms giving examples in each group?

→ Microorganisms are the unicellular organisms which are not visible through human naked eyes.

→ The different groups of microorganism with examples in each are as follows:

i. Bacteria:

Bacteria are unicellular organisms and are prokaryotic as they lack a nucleus. There are good and bad bacterias and are killed by antibiotics. for eg. Cocci, bacillus, etc.

ii. Virus:

Viruses are noncellular entities that consist of a nuclei acid core (DNA or RNA) surrounded by a protein coat. Although viruses are classified as microorganisms, the are not considered as living organisms. Viruses cannot reproduce outside a host cell and cannot metabolize on their own. Viruses often infect prokaryotic and eukaryotic cells causing diseases. for eg: ebola virus, rhino virus, corona virus, etc.

iii. Fungi:

Fungi are eukaryotic cells and are multi-cellular and their cell wall is composed of chitin. They obtain nutrients by absorbing organic material

from their environment through symbiotic relationships with plants or harmful relationships with a host. fungi reproduce by relasing spores. for eg: mushroom, molds, yeasts, etc.

iv. Algae:

Algae, also called cyanobacteria or blue green algae are unicellular or multi-cellular eukaryotes that obtain nourishment by photosynthesis. They live in wates, damp soil and rocks and produce oxygen and carbohydrates used by other organisms. For eg: ulothrix, fucus, spirogyra, etc.

v. Protozoa:

Protozoa are unicellular aerobic eukaryotes. They have a nucleus, complex organelles and obtain nourishment by absorption or ingestion through specialized structures. For eg: malasia, red tide, etc.

---

2. Explain 5 kingdom classification? Where are the microorganisms placed in this system?

→ The 5 king classification is explained below:

i. Monera:

Bacteria are categorized underneath the kingdom monera. They occur everywhere. They posses a cell wall and are prokaryotic. The cell wall is formed of amino acids and polysaccharides. Bacteria can be heterotropic and autotropic.

ii. Protista:

They are unicellular and eukaryotic organism. Some of them have cilia or flagella for mobility. Sexual reproduction is by a process of cell fusion and zygote formation. They are sub categorized in chrysophytes, Dinoflagellates, Euglenoides, Slime molds and protozoans.

iii. Fungi:

They are filamentous excluding yeast. Their figure comprises slender, long thread like construction called hypae. The cell wall of fungi is composed of polysaccharides and chitin. Some of fungi are symbionts. Some are parasites.

iv. Plantae:

The kingdom plantae is filled with all eukaryotes which have chloroplast. Most of them are autotrophic in nature but some are heterotrophic. The cell wall mainly comprises cellulose.

v. Animalia:

All multicellular eukaryotes which are heterotrophs and lacks cell wall are set aside under this kingdom. Many of the animals adapt for locomotion. They reproduce by sexual mode of reproduction.

→ Microorganisms are placed under Monera, protista and fungi kingdom.

3. Explain the significance of microorganism.

→ The significance of microorganism are explained below:

i. Bacteria:

Bacteria produce antibiotics, insulin, food supplements as well as used in producing cheese and yoghurt. They are also used for cleaning of oil spills.

ii. Viruses:

Viruses cause diseases in humans and plants. Virus is termed as a good field for genetic engineering.

iii. Fungi:

Fungi ~~make~~ helps in making cheese, bread and alcoholic beverage. They are also used in producing antibiotics like penicillin.

iv. Protozoa:

They are food for aquatic animals.

v. Algae:

They are used as food supplement, for production of food in aquatic environments as well as cleaning of aquatic environments.

CELL

1. Define cell. Explain the postulates of cell theory.

→ Cell is the basic membrane bound unit that contains the fundamental molecules of life and of which all living things are composed.

→ The postulates of cell theory are explained as:

i. All living organisms are composed of one or more cells.

ii. The cell is the basic unit of structure and organization in organisms.

iii. Cells arise from pre-existing cells.

2. What are prokaryotes? Draw the structure of a prokaryotic cell?

→ A microscopic single-celled organism which has neither a distinct nucleus with a membrane nor other specialized organelles are called prokaryotes.

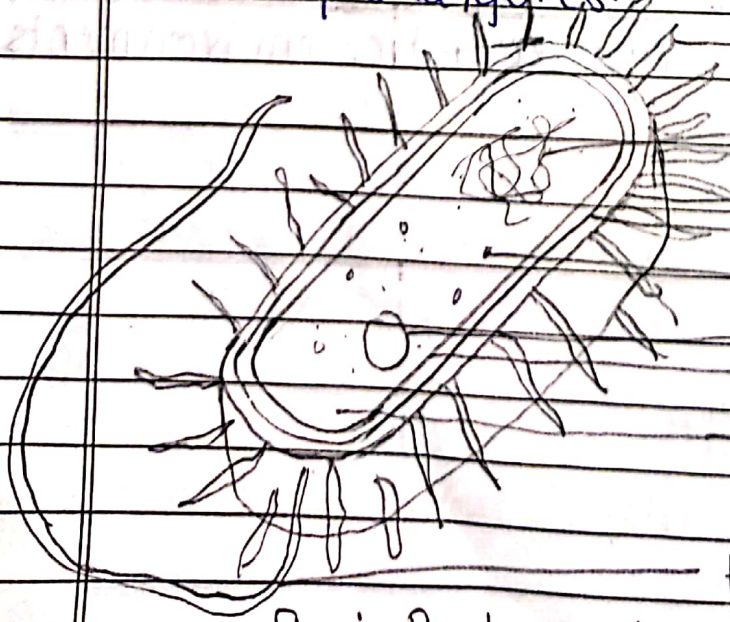

Fig: Prokaryotic cell.

i. Cell Wall - Gives shape and structural support. Protects cells from external.
ii. Cell Membrane - Gives protection and helps in movement of substances from in and out of cells.
iii. Flagella - A slender whip like structure used for locomotion.
iv. Pili and Fimbrae - Attachment to substrate
v. Ribosome - Protein synthesis.
vi. Naked DNA (Nucleoid): Store genetic information and passed to daughter cell.
vii. Plasmid: Extra chromosomal DNA. Contain antibiotic resistance gene. Used as vector for genetic engineering.
viii. Capsule: Protect cell from chemical and dry environment.

2. What are differences between prokaryotic and eukaryotic cell?

→

SN	Characteristics	Prokaryotic cell	Eukaryotic cell
1	Meaning of name	Pro: Primitive Karyon: Nucleus	Eu - True Karyon - Nucleus
2.	Size	Generally small	Generally large
3.	Nucleus	Absent	Present.
4.	Chromosome	Single circular. Plasmid present	Many linear No plasmid.
5.	Nucleolus	Absent	Present.
6.	Membrane bound cell organelles	Absent	Present like mitochondria, plasmid, ER.
7.	Motility	Pili, fimbriae, flagella	cilia, flagella.

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4. Draw a well labelled diagram of an animal cell?

→

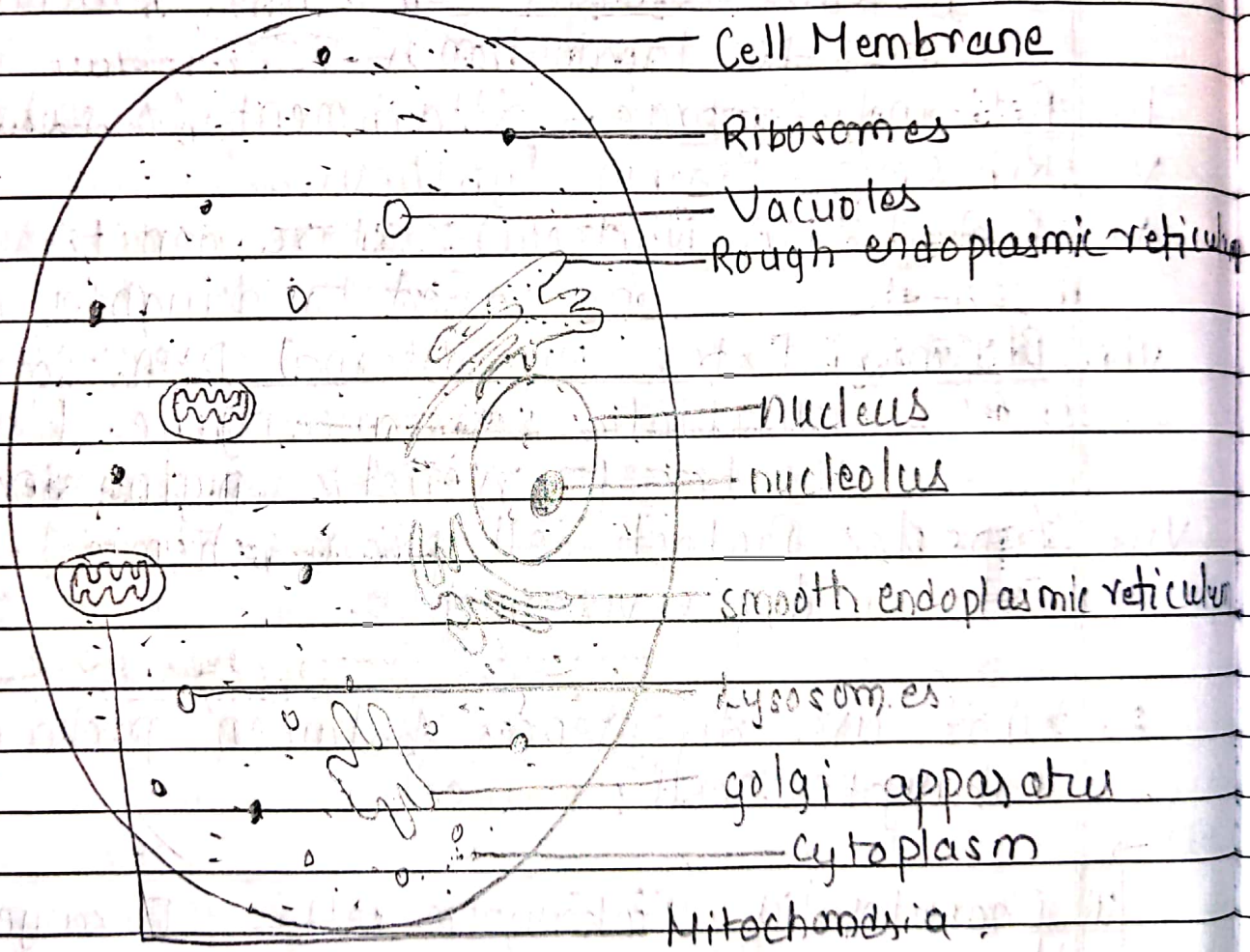

Fig: Animal Cell.

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Draw a well labelled diagram of a plant cell.

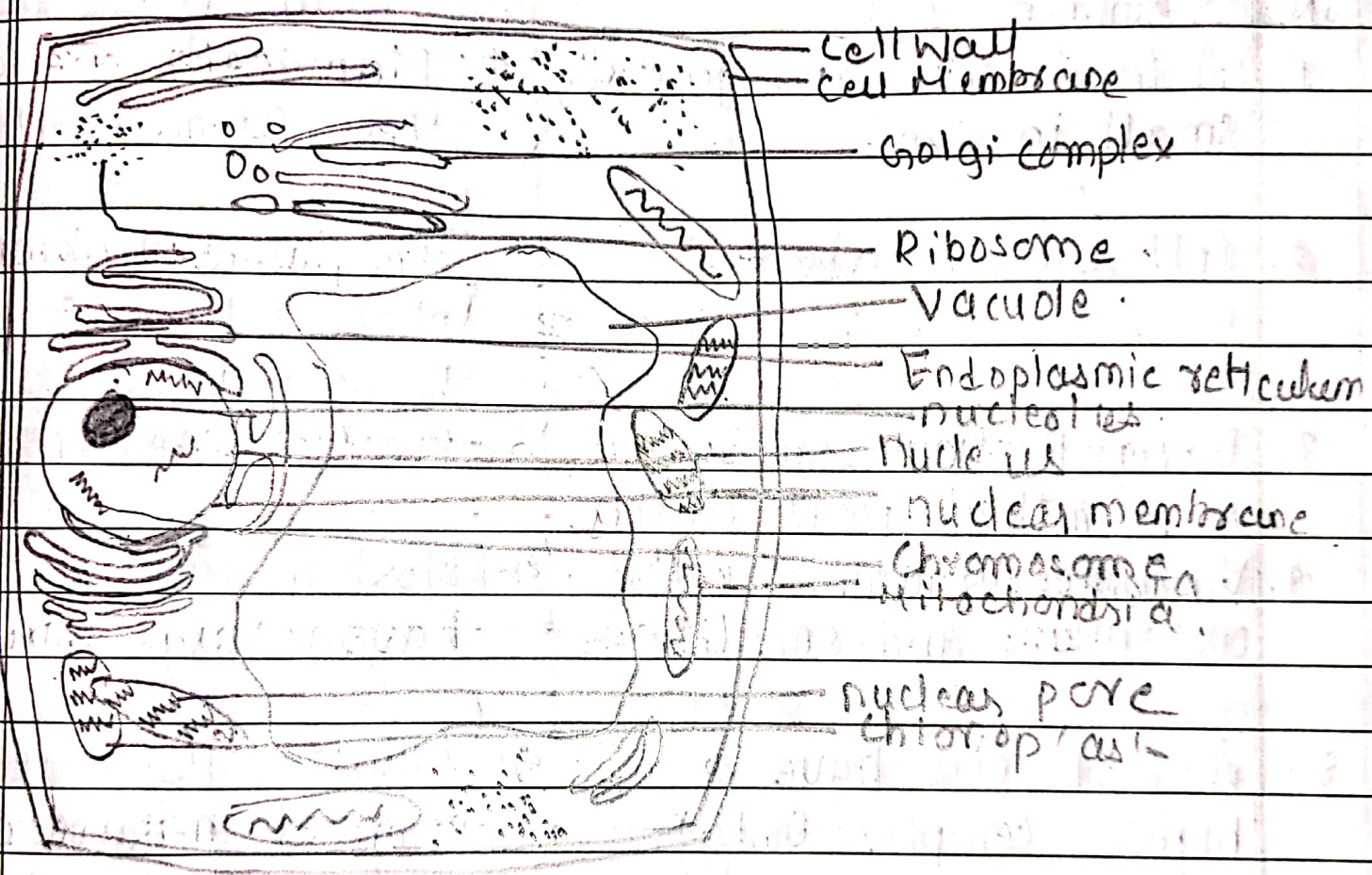

Fig: Plant Cell

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6. What are the differences between plant and animal cell?

→ The differences between plant and animal cell are:

S.N.	Animal Cell	S.N.	Plant Cell
1.	Animal cells are generally small in size.	1.	Plant cells are larger than animal cells.
2.	Cell wall is absent.	2.	The plasma membrane of plant cells is surrounded by a rigid cell of cellulose.
3.	Except the protozoan Euglena, no animal cell possess plastids.	3.	Plastids are present.
4.	Vacuoles in animal cells are many and small.	4.	Most mature plant cells have a large central sap vacuole.
5.	Animal cells have a single highly complex Golgi.	5.	Plant cells have many simpler units of and prominent Golgi apparatus called dictyosome.
6.	Animal cells have centrosome and centrioles.	6.	Plant cells lack centrosome and centrioles.

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7. What are the different organelles performing specific functions in a cell? Explain.

→ The functions of different organelles in a cell are:

i. Cell Membrane:

It is also called plasma membrane or cell membrane. It is selectively permeable i.e. it allows only selected substances to pass through.

ii. Nucleus:

It directs cell activity. It is bounded by a double membrane with pores. It contains a liquid or nucleoplasm where the nucleolus and chromosome present.

iii. Cytoplasm:

It is the content of cell located between the cell membrane and the nucleas membrane. It comprises a liquid medium or cytosol, comprising wates and soluble substances where the sparse organelles.

iv. Mitochondria:

It is called as power house of cells. It is responsible for breakdown of sugar molecules per releasing ATP (the energy currency of cells).

v. Endoplasmic reticulum:

It is responsible for structural frame work, production and processing of protein (RER), synthesis of carbohydrates & lipid (SER).

vi. Ribosome:

It is the site of protein synthesis.

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vii. Golgi apparatus:

A number of proteins synthesized by ribosomes on the endoplasmic reticulum are modified in the cisternae of the golgi apparatus before they are released from its trans face. Golgi apparatus is the important site of formation of glycoproteins and glycolipids.

viii. Lysosomes:

It contains lytic enzyme. It is the site for intracellular digestion and destruction of certain organelles at the time of development. It is also called suicidal sac.

ix. Cytoskeleton:

It provides mechanical support, motility and maintenance of the shape of the cell.

x. Centrosome and Centrioles:

The centrioles form the basal body of cilia or flagella and spindle fibres that give rise to spindle apparatus during cell division in animal cells.

xi. Cell wall:

It main cell shape and avoid cell bursting (only plant cell).

xii. Chloroplast:

It is a site of photosynthesis.

xiii. Vacuoles:

It contain water and salt. It maintain pressure against cell wall.

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CELL DIVISION

1. What is cell division and what are its uses? What is the necessity of a cell to divide?

→ The biological process in which a diploid parent cell divides into two or four daughter cells is called cell division.

→ Its uses are!

i. It serves as a means of reproduction in unicellular organisms through binary fission.
ii. It aids in the formation of gametes.
iii. It helps in growth in living organisms.
iv. The human body repairs injuries by means of cell division.

→ The major necessity of a cell to divide is for genetic diversity. In case of multi-cellular organism, cell division helps maintain chromosome number in germ cells. In unicellular organism, cell division is necessary for reproduction.

2. Explain the process of binary fission in prokaryotes.

→ In the process of binary fission in prokaryotes, the single, circular bacterial chromosome is replicated. The replication begins at the origin of replication and proceeds bidirectionally. New chromosomes are partitioned to opposite ends of the cell and septum is formed to divide the cell into 2 cells.

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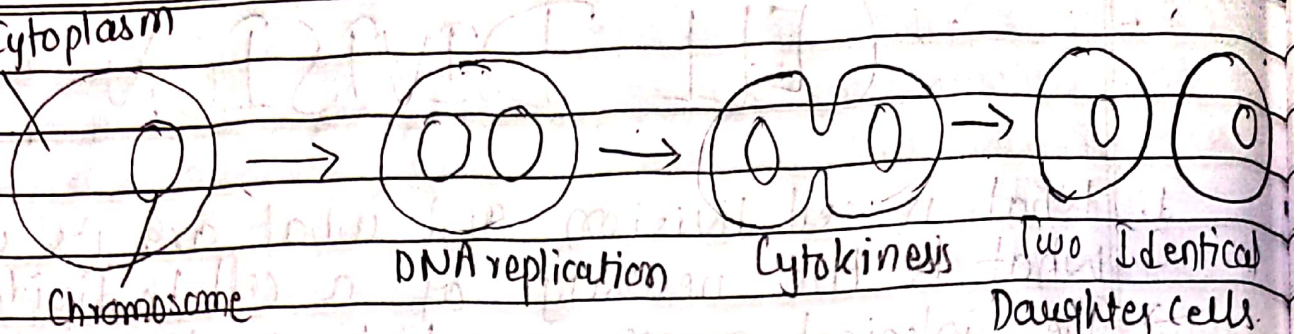

fig: Binary fission.

3. Explain the process of cell cycle in living organism.

→ A cell cycle is the process or series of events that takes place in a cell as it grows and divides. Cell cycle is divided into interphase and ~~mitosis~~ mitosis. A cell spends most of its time in interphase and during this time it grows, replicates its chromosomes and prepares for cell division. The cell then leaves interphase undergoes mitosis and complete its division. The resulting cells known as daughter cells, each enter their own interphase and begin a new round of the cell cycle.

4. Elaborate the interphase stage of cell cycle?

→ The interphase stage of the cell cycle includes three distinctive parts:

i. G1 phase:

The G1 phase follows mitosis and is the period in which the cell grows, synthesizes its structural proteins and enzymes to perform its functions.

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ii. S-phase:

During S phase of the interphase, the DNA within the nucleus replicates. During this process, each chromosome is faithfully copied so by the end of the S phase, two DNA molecules exist per each one formerly present in the G_1 phase. Each chromosome now consists of two sister chromatids.

iii. G_2 phase:

In this phase, the cell checks the duplicated chromosomes and gets ready to divide i.e. mitosis. Proteins organize themselves to form a series of fibers called the spindle which is involved in chromosome movement during mitosis.

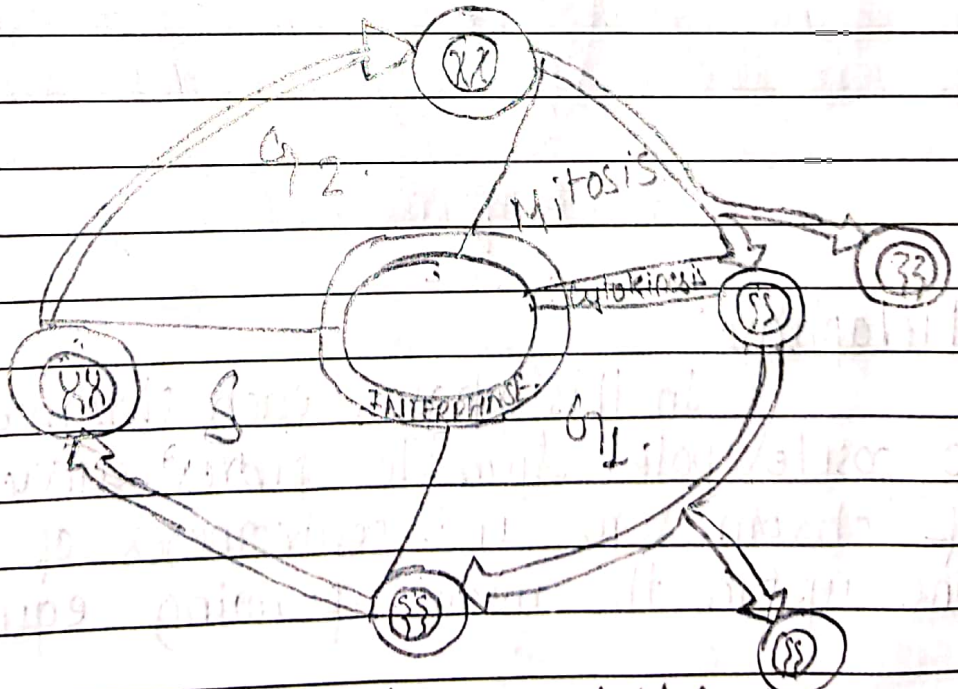

Fig: Interphase of cell cycle.

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5. Explain mitosis? What are the different stages of mitosis and explain their characteristic features.

→ Mitosis is a process of cell division during which one cell give rise to two genetically identical daughter cells. It consists of four stages. They are:

i. **Prophase:**

In this phase, nucleus membrane breaks down, nucleolus disappears, chromosomes become visible, spindle fibers form and centrioles move towards opposite side of the cell. This occurs only in animal cells.

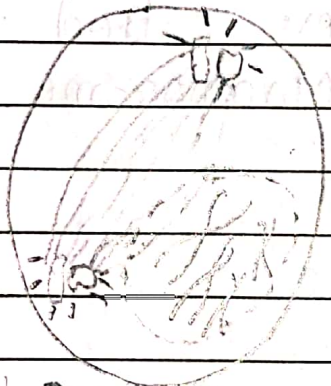

Fig: Prophase

ii. **Metaphase:**

In this phase, each chromatid faces opposite pole. Spindle fibres attach to centromere of chromosome and centromeres of chromosomes line up in the midde forming equatorial plate.

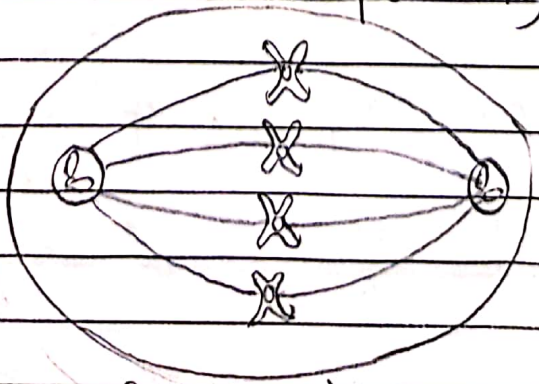

Fig: Metaphase

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iii. **Anaphase :**

Chromosomes break at centromeres and sister chromatids move to opposite ends of the cell in anaphase.

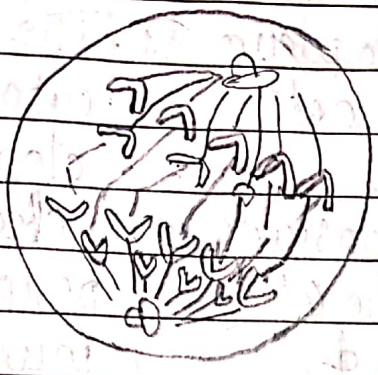

Fig: Anaphase

iv. **Telophase :**

In telophase, the cell is nearly done dividing and it starts to re-establish its normal structures as cytokinesis takes place. The mitotic spindle is broken into its building blocks. Two new nuclei form, one for each set of chromosesand nucleus membranes and nucleoli reappears.

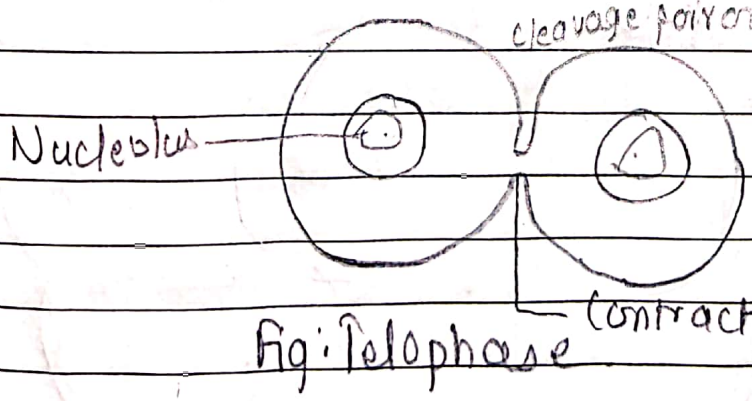

Fig: Telophase

MyosinII and actin filament ring contract to cleave cell in two.

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6. How is the process of cytokinesis different in plants and animals?

→

	Cytokinesis in plant cells		Cytokinesis in animal cells
i.	The division of cytoplasm takes place by cell plate formation.	1.	The division of the cytoplasm takes place by cleavage.
ii.	Cell plate formation starts at the centre of the cell and grows outward toward lateral walls.	2.	Cleavage starts at the periphery and then moves inward, dividing the cell into two parts.

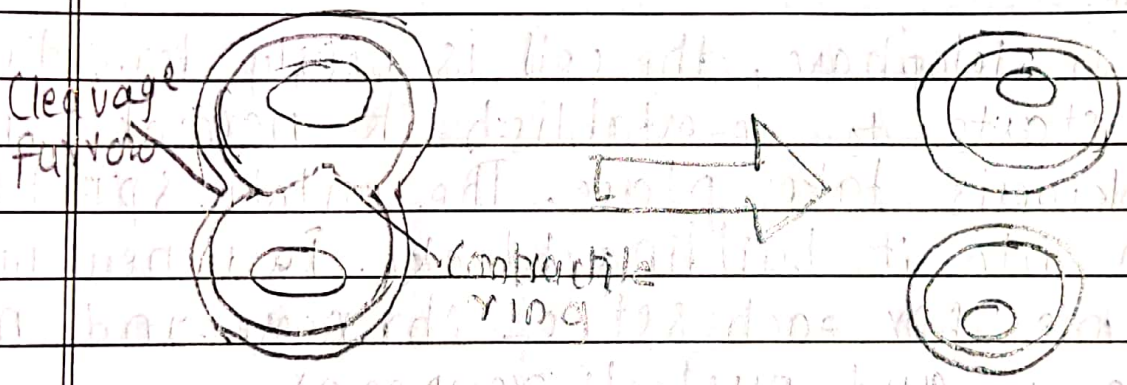

Fig: Cytokinesis in Animal Cell

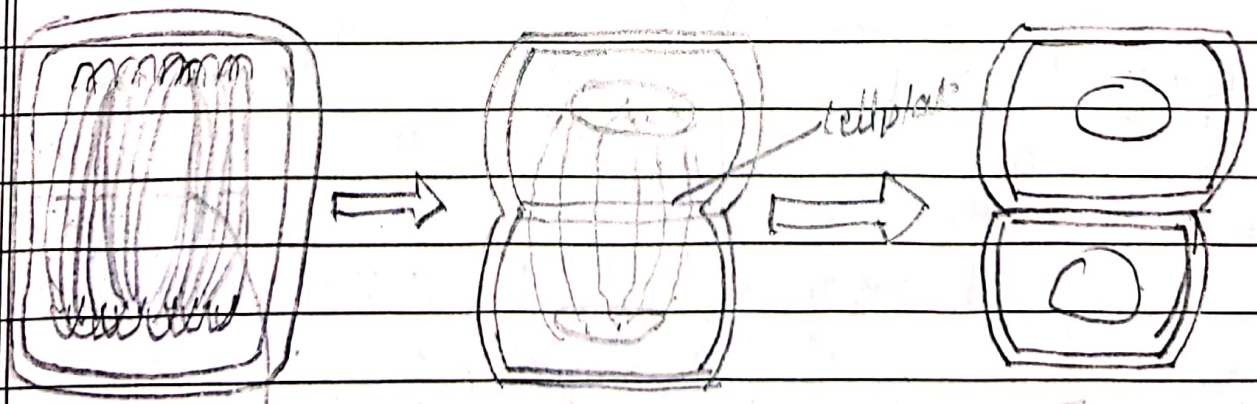

fig: Cytokinesis in Plant Cell.

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7. Explain meiosis. What are the different stages of meiosis?

→ Meiosis is a form of cell division by which gametes with half the number of chromosomes are produced. It is divided into two stages Meiosis I and Meiosis II. The different stages of Meiosis I are explained as;

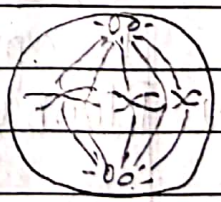
i. Interphase:

Cells in interphase carry out various process such as replicating DNA, chromosomes and synthesizing proteins.

ii. Prophase-I:

Replicated chromosomes of two sister chromatids become visible during this stage as they begin to condense and form pairs. Synapsis or the exchange of chromosome segments then takes place between the paired chromosomes and genetic information is exchanged. During this process, the nuclear envelope has broken down and centrioles with spindle fibers have moved the opposite ends of the cell.

iii. Metaphase-I:



The homologous chromosomes line up as pairs at the equator of the cell. Spindle fibers then attach to the centromere of each homologous chromosome.

iv. Anaphase-I:

The homologous chromosomes separate as each pair is then guided by spindle fibers and moved to opposite ends of the cell. The chromosome number is reduced from 2n to n chromosomes separate. Each chromosomes still consists of two sister chromatids.

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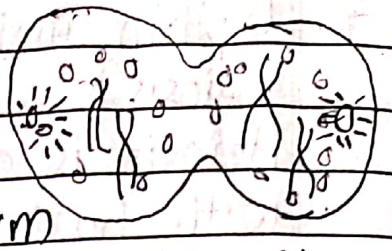
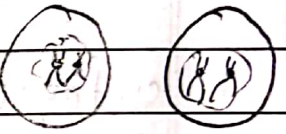
v. Telophase-I:



The homologous chromosomes consisting of two sister chromatids reach opposite ends of the cell to form to nuclei. The sister chromatids might not be identical due to crossing overs during synapsis in prophase-I. Each pole contains only one member of the original pair of homologous chromosomes.

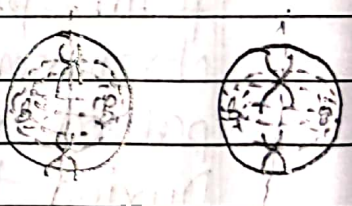
-> The different stages of meiosis-II are explained as:

i. Prophase-II:



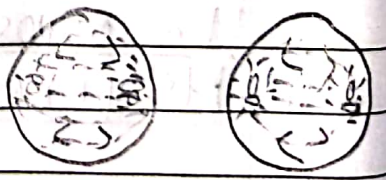
Chromosomes condense, spindle fibers form in each new cell and spindle fibers attach to chromosomes.

ii. Metaphase-II:



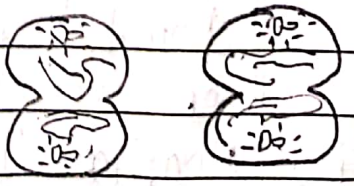
Centromeres of chromosomes line up randomly at the equator of each cell.

iii. Anaphase II:



The centromeres split and the sister chromatids separate and move to opposite poles.

iv. Telophase II:



Four nuclei form around the chromosomes, the spindle fibers to break down and the cells divide.

v. Cytokinesis:

four cells have formed and each nucleus contains a haploid number of chromosomes.

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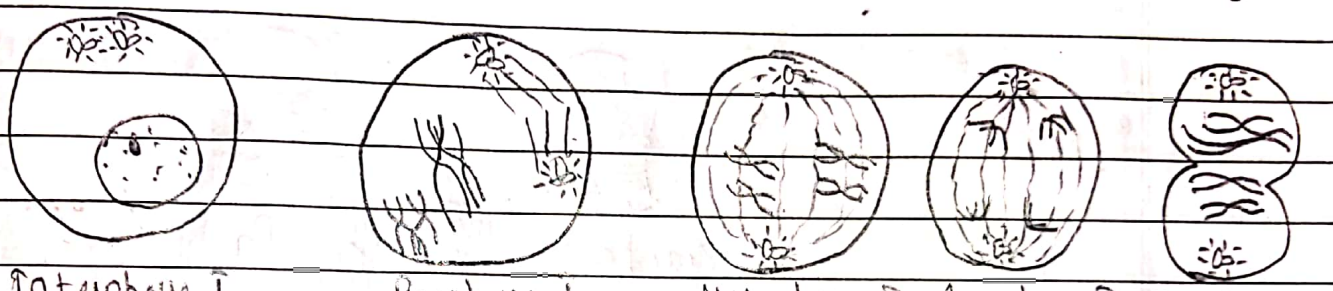
8. Explain the reduction division in meiosis with help of diagram.

→ The cell division in meiosis I is called the reduction division as it results in the reduction of the chromosome number from diploid (cell has two copies of each chromosome, one maternal and one paternal chromosome) to haploid (cell has only one copy of each chromosome either maternally derived or paternally).



9. Explain the most important stage of meiosis with diagram.

→ The most important stage of meiosis is prophase-I. The prophase I of meiosis occurs in the following stages:

i. Leptotene:

This phase is marked by the condensation of chromosomes and start of prophase-I.

ii. Zygotene:

In this phase, the homologous chromosomes start pairing up called synapsis. The synaptonemal complex starts building up. Bivalent chromosomes are visible at this stage.

iii. Pachytene:

In this stage, this non-sisters chromatids of homologous chromosomes exchange their parts called crossing overs.

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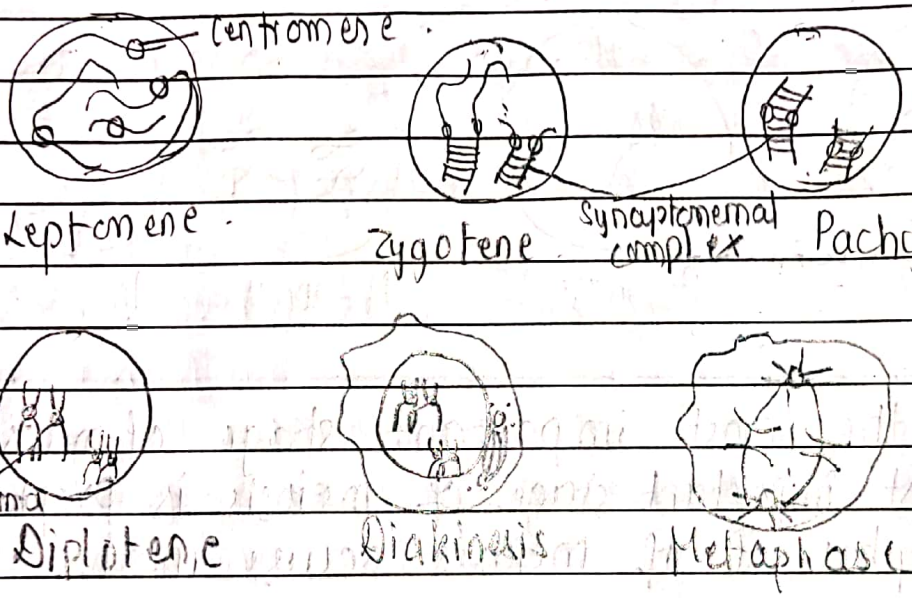
iv. Diplotene:

The crossing over process is completed by this stage. The homologous chromosomes remain attached at the point of chiasma.

v. Diakinesis:

The homologous chromosomes start to separate and synaptonemal complex disappears. The nucleus membrane also disappears.



10. What are the major difference between the process of mitosis and meiosis?

SN	Mitosis	SN	Meiosis
1.	One cell division occurs.	1.	Two cell division occurs.
2.	Synapsis of homologous chromosomes doesn't occurs.	2.	Synapsis of homologous chromosome occurs along with crossing over bet^n non-sister chromatids.
3.	Two diploid (2n) daughter cells that are genetically identical to the parent cell are formed.	3.	Four haploid (n) daughter cells that are genetically different to the parent cell are formed.
4.	In animal body, produces cells for growth and repair.	4.	In animal body, produces gametes and assures genetic diversity

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11. Explain the terms:

i. **Diploid:**

Having two sets of each chromosome in a cell or cell nucleus, one set from the female parent and one set from the male parent is called diploid.

ii. **Haploid:**

The cell that contains half of the set of homologous chromosomes present in the somatic cell is called haploid cell.

iii. **Chromatids:**

A chromatid is one of two strands of a copied chromosome.

iv. **Sister chromatids:**

Chromatids that are joined together at their centromeres are called sister chromatids.

v. **Centromere:**

The centromere is the specialized DNA sequence of a chromosome that links a pair of sister chromatids

vi. **Kinetochore:**

A complex of proteins attached with the centromere of a chromosome during cell division, to which the microtubules of the spindle attach is called kinetochore.

vii. **Homologous Chromosome:**

They are chromosome pairs that are similar in length, gene position and centromere location.

viii. **Synapsis:**

The pairing of two homologus chromosomes that occurs during meiosis is called synapsis.

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CELL DIFFERENTIATION

1. Explain the term differentiation? What is the status of the genome during differentiation?

→ Differentiation is a biological process whereby unspecialised cells develops into a specialized cell.

→ Genome is the haploid set of chromosomes in a gamete or microorganism or in each cell of a multicellular organism. There are two status of genome during differentiation.

i. Changes in genome during differentiation:

The overall trend in RBC maturation is large, pale nucleus to darker smaller nucleus to loss of nucleus, increase in cytoplasm, gradual decrease in size, cytoplasm from intensely blue (full of RNA) to grayish (mixture of RNA and haemoglobin) to reddish (full of haemoglobin, no RNA) identify the following cells.

ii. Genomic equivalence during cell differentiation:

No information is lost from the nucleus of cells as they pass through the early stage of embryonic development. Eg: the eight cell stage embryo regarded as totipotent has the capacity of each cell to give whole organism.

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2. Define:

i. Totipotency:

Totipotency is the ability of a single cell to divide and produce all the differentiated cells in an organism.

ii. Pluripotency:

Pluripotency refers to the stem cell that has the potential to differentiate into any of the three germ layers: endoderm (interior stomach lining, gastrointestinal tract, the lungs), mesoderm (muscle, bone, blood, urogenital) or ectoderm (epidermal tissues and nervous system).

iii. Multipotency:

Multipotency refers to progenitor cells which have the gene activation potential to differentiate into discrete cell types.

---

3. Elaborate the term homeostasis with an example? What are the consequences of an imbalanced homeostatic state in the body?

→ Homeostasis is the tendency of an organisms to auto-regulate and maintain their internal environment in a stable state. for eg: during blood clotting, a cascade of homeostasis events occurs leading to prevents blood loss.

→ The consequences of an imbalanced homeostatic state in the body are diseases due to deficiency toxicity, confusion, irritability, aggression, anxiety, delirium, etc.

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9. What are the different ways in which homeostasis is regulated in the body? Give example.

→ The different ways in which homeostasis is regulated in the body are as follows:

i. Intrinsic homeostatic system:

An intrinsic controlled system is inherent in an organ, i.e. the organ itself is capable of maintaining homeostasis within itself. For eg: the heart can control its own heart rate.

ii. Extrinsic homeostatic system:

An extrinsic control system exist outside of the organs they control i.e. these systems can override intrinsic systems. For eg: although the heart controls its own rate, a slamming door will prompt the nervous system to increase the heart rate externally.

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CHROMOSOMES & GENES

1. Define chromosomes and genes? What is the structure of chromosome?

→ Chromosomes are the genetic substances that help in the inheritance of characters from parents to offspring.

→ Genes are the smallest units of DNA that control the biological characteristics of organisms.

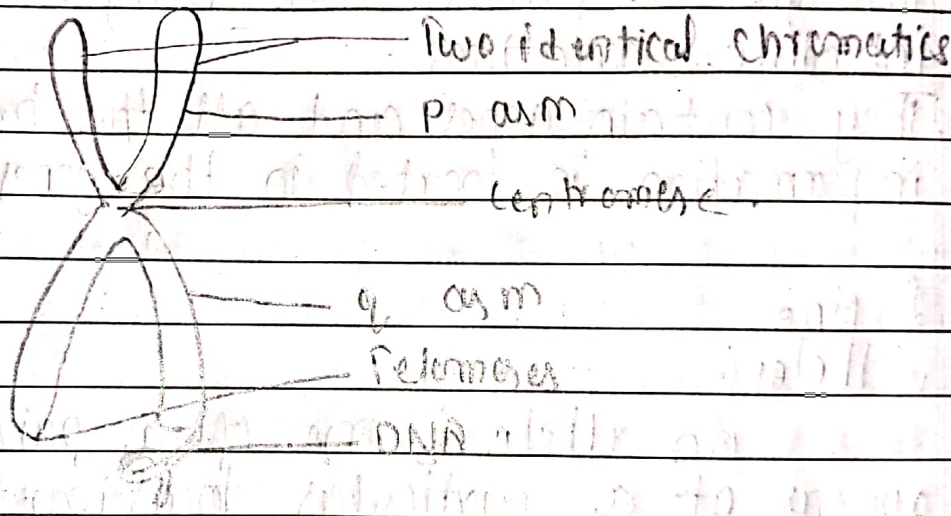
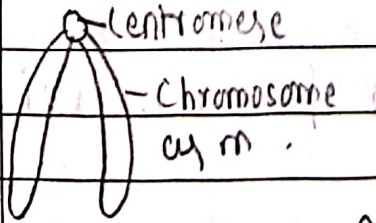
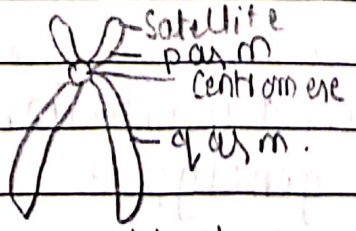


Fig: Structure of chromosome.

2. What are the different types of chromosomes based on the position of centromere?

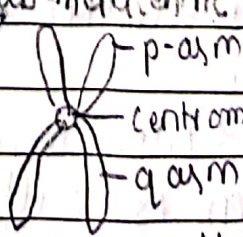
→ Telocentric chromosome

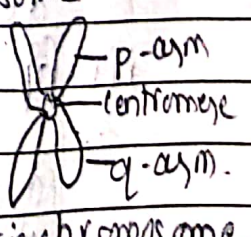




Acrocentric chromosome

Sub-metacentric chromosome





Metacentric chromosome.

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3. Explain sex chromosomes (allosomes) and autosomes?
→ A sex chromosome is a type of chromosome that participates in sex determination.
→ Autosomes are those chromosomes which control the growth and development of organisms.

4. What are the functions of chromosomes?
→ The functions of chromosomes are:
i. They control cellular differentiation.
ii. Through the process of crossing overs, chromosomes introduce variations.
iii. They contain genes and all the hereditary information is located in the genes.

5. Define
i. Alleles:
An allele is one of a pair of genes that appears at a particular location on a particular chromosome and control the same characteristics.
ii. Phenotype:
The set of observable characteristics of an individual resulting from the interaction of its genotype with the environment is called phenotype.
iii. Genotype:
The genetic constitution of an individual organism is called genotype.
iv. Dominant Genes:
Dominant gene is a gene that produces the same phenotype is the organism whether or not its allele identical.

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v. Recessive Genes:

A recessive gene is a gene whose effects are masked in the presence of a dominant gene.

DNA & RNA.

1. Define nucleotides and nucleosides? What are the composition of different nucleic acids?

→ Nucleotides are building blocks of nucleic acids DNA and RNA and are composed of a nitrogeneous base, a five-carbon sugar and at least one phosphate group.

→ Nucleosides are the structural subunit of nucleic acids such as DNA or RNA which is composed of a nucleobase i.e. pyrimidine or a purine.

→ Each nucleic acids contains four of five nitrogen containing bases: adenine (A), guanine (G), cytosine (C), thymine (T) and uracil (U).

2. What are the different bonds present in DNA and how are they formed?

→ There are two types of bonds present in DNA. They are:

i. Hydrogen bond:

Hydrogen bonds occur between the two strands and involve a base from one strand with a base from the second in complementary pairing. These hydrogen bonds are individually weak by collectively quite strong.

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ii. Covalent bonds:

Covalent bonds occur within each linear strand component and ~~between~~ strongly bond the bases, sugars and phosphate groups (both within each component and between components.

3. What are the differences between DNA and RNA?

→

	DNA		RNA
1.	It is double stranded nucleic acid.	1.	It is single stranded nucleic acid.
2.	It contains deoxyribose sugar.	2.	It contains ribose sugar.
3.	It contains Thymine (T) as a nitrogenous base.	3.	It contains Uracil (U) instead of Thymine.
4.	It is genetic and hereditary material of the cells.	4.	It is involved in synthesis of proteins.
5.	It is present in the nucleus of the cells.	5.	It is present in both nucleus and cytoplasm.

4. What are the salient features of the double helical structure proposed by Watson and Crick?

→ The salient features of the double helical structure proposed by Watson and Crick are:

i. The two strands are antiparallel i.e. one strand runs in the 5' to 3' direction while the other in 3' to 5' direction.

ii. The two polynucleotide chains are not identical but complementary to each other due to base pairing.

iii. Each strand of DNA has a hydrophillic deoxyribose phosphate backbone on the outside (periphery). The two strands are held together by hydrogen

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bonds formed by complementary base pairs. The A-T pair has 2 hydrogen bonds while the C-G pair has 3 hydrogen bonds. The G-C is stronger by about 50% than A-T.

iv. The hydrogen bonds are formed between a purine and pyrimidine only. The only base arrangement possible in DNA structure is A-T, T-A, G-C, C-G.

v. The genetic information resides on one of the two strands known as template strand or sense strand. The opposite strand is antisense strand.

5. Explain Chargaff's rule with example.

→ Chargaff's rule state that DNA from any species of any organism should have a 1:1 stoichiometric ratio of pyrimidine and purine bases and more specifically that the amount of guanine should be equal to cytosine and the amount of adenine should be equal to thymine. This pattern is found in both strands of the DNA.

for eg:

i) A — T
G — C
T — A
C — G
C — G
T — A
A — T
G — C

ii) (%A + %T) + (%G + %C) = 100%

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6. What are the functions of different types of RNA?

⇒ The functions of different types of RNA are:

i. mRNA:

↳ It is known as messenger and made using DNA.
↳ It carries genetic info from the nucleus to ribosome.

ii. tRNA:

↳ It transfers an amino acid to the growing protein.

iii. rRNA:

↳ It makes up the bulk of ribosomes