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🡪**QUESTION:NO:01:-**

**🡪 ANSWER:NO:01:-**

🡪**Fill in the Blanks.**

1. One PCR cycle comprises of 3 steps (a) Denaturing  (b) Annealing (c) **Extending**
2. Interphase is often called the “resting” phase but cell is not at rest.
3. The unwound form of the chromosome is called , linear pieces.
4. According to segregation law of Medal, during the formation of gametes, the paired alleles separate randomly so that each gamete receives one allele or the other.
5. Natural slection is the differential survival and reproduction of individuals due to differences in phenotype.

**QUESTION:NO:02:-**

**ANSWER:NO:02:-**

🡺(1):-

🡪 Interphase:-

🡪 Interphase is the portion of the cell cycle that is not accompanied by observable changes under the microscope, and includes the G1, S and G2 phases.

🡪During interphase,

🡪The cell grows,

🡪 Replicates its DNA and prepares for mitosis.

🡺(2):-

🡪Check Points in Cell Division:-

🡪 The cell cycle is controlled at three checkpoints.

🡪The integrity of the DNA is assessed at the G1 checkpoint.

🡪Proper chromosome duplication is assessed at the G2 checkpoint.

🡪Attachment of each kinetochore to a spindle fiber is assessed at the M checkpoint.

🡺(3):-

🡪DNA Synthesis Phase:-

🡪**DNA synthesis** is the biological process by which a deoxyribonucleic acid (**DNA**) molecule is created.

🡪 In the cell, each of the two strands of the **DNA** molecule acts as a template for the **synthesis** of a complementary strand.

🡺(4):-

🡪G1 G2 and G0 phase:-

🡪The studying of molecular events in cells, scientists have

determined that interphase can be divided into **4 steps**:-

🡪Gap 0 (**G0**), Gap 1 (**G1**), S (synthesis) **phase**, Gap 2 (**G2**).

🡪An important cell cycle control mechanism activated during

-this period (**G1** Checkpoint) ensures that everything is ready **for** DNA

-synthesis.

QUESTION:NO:03:-

ANSWER:NO:03:-

🡺MUTATION:-

🡪In genetics, a mutation is a permanent change of the nucleotide sequence of the genome of an oraganism, virus, or extra-chromosomoal genetic element.

🡪Mutations can result from DNA copying mistakes made during cell division, exposure to ionizing radiation, exposure to chemicals called mutagens, or infection by viruses.

TYPES OF MUTATIONS

🡪The DNA sequence of a gene can be altered in a number of ways, The types of mutations include:-

🡪**Missense mutation:**

**🡪** This type of mutation is a change in one DNA base pair that results in the substitution of one amino acid for another in the protein made by a gene.

🡪Nonsense mutation:

🡪A nonsense mutation is also a change in one DNA base pair.

🡪Instead of substituting one amino acid for another, however, the altered DNA sequence prematurely signals the cell to stop building a protein.

🡪 This type of mutation results in a shortened protein that may function improperly or not at all.

**🡪Silent mutation:**

🡪Some mutations that change DNA bases do not have any effect on the sequence of amino acids in the protein.

🡪 These mutations are called silent mutations and they do not affect the structure or function of the protein because there is no effect on the amino acid sequence.

**🡪Insertion or Deletion:**

🡪An insertion changes the number of DNA bases in a gene by adding a piece of DNA. A deletion removes a piece of DNA.

🡪Insertions or deletions may be small (one or a few base pairs within a gene) or large (an entire gene, several genes, or a large section of a chromosome). In any of these cases, the protein made by the gene may not function properly.

**🡪Frameshift mutation:**

🡪This type of mutation occurs when the addition or loss of DNA bases changes a gene’s reading frame. A reading frame consists of groups of 3 bases that each code for one amino acid.

**QUESTION:NO:04:-**

**ANSWER:NO:04:-**

**🡺medal genetics: 🡪** The **Genetics** Society **Medal** is an award that recognizes outstanding research contributions to **genetics**.

Those making nominations must be members of the **Genetics** Society, but there is no requirement for the nominee to be a member, nor any restriction on nationality or residence.

🡺MENDAL LAW OF SEGREGSTION:-

🡪The principles that govern heredity were discovered by a monk named Gregor-Mendel in the 1860s.

🡪 One of these principles, now called Mendel's **Law of Segregation**, states that allele pairs separate or **segregate** during gamete formation and randomly unite at fertilization.

🡺 **MENDAL LAW OF INDEPENDENT ASSORNMENT:-**

**🡪** Mendel's **law of independent assortment** states that the alleles of two (or more) different genes get sorted into gametes **independently** of one another. In other words, the allele a gamete receives for one gene does not influence the allele received for another gene.

**QUESTION:NO:05:-**

**ANSWER:NO:05:-**

**🡪MITOSIS:-**

**🡪** A type of cell division that results in two daughter cells each having the

same number and kind of chromosomes as the parent nucleus, typical of ordinary tissue growth.

🡺 **DETAIL OF MITOSIS:**

**🡪** Mitosis is a process of asexual reproduction observed in unicellular organisms. Read on to explore what is mitosis, and the different stages of mitosis.

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## 🡺Stages of Mitosis:-

🡪The different stages of mitosis occurring during [cell division](https://byjus.com/biology/cell-division/) are given as follows-

### 🡺Interphase:-

🡪Before entering mitosis, a cell spends a period of its growth under interphase. It undergoes the following phases when in interphase:

* **G1 Phase:**This is the period before the synthesis of DNA.
* **S Phase:**This is the phase during which DNA synthesis takes place.
* **G2 Phase:**This is the phase between the end of DNA synthesis and the beginning of prophase.

### 🡺Prophase:-

🡪Prophase immediately follows S and G2 phase of the cycle and is marked by condensation of the genetic material to form compact mitotic chromosomes composed of two chromatids attached at the centromere.

### 🡺Prometaphase:-

🡪In the prometaphase, the nuclear envelop disintegrates. Now the microtubules are allowed to extend from the [centromere](https://byjus.com/biology/centromere/) to the chromosome.

🡪The microtubules attach to the kinetochores which allow the cell to move the chromosome around.

### 🡺Metaphase:-

🡪At this stage, the microtubules start pulling the chromosomes with equal force, and the chromosome ends up in the middle of the cell.

🡪This region is known as the metaphase plate.

🡪Thus, each cell gets an entire functioning genome.

### 🡺Anaphase:-

🡪The splitting of the sister chromatids marks the onset of anaphase.

🡪 These sister chromatids become the chromosome of the daughter nuclei.

🡪The chromosomes are then pulled towards the pole by the fibres attached to the kinetochores of each chromosome.

🡪The centromere of each chromosome leads at the edge while the arms trail behind it.

### 🡺Telophase:-

🡪The [chromosomes](https://byjus.com/biology/chromosomes/) that cluster at the two poles start coalescing into an undifferentiated mass, as the nuclear envelope starts forming around it. The nucleolus, Golgi bodies and ER complex, which had disappeared after prophase start to reappear

🡪Telophase is followed by cytokinesis, which denotes the division of the cytoplasm to form two daughter cells. Thus, it marks the completion of cell division.

## 

## 🡪Functions of Mitosis…

Following are the two important functions of mitosis:

1. Mitosis helps in the development of an organism. In single-celled organisms, mitosis is the process of asexual reproduction.
2. Mitosis helps in the replacement of damaged tissues.
3. The cells near the damaged cells begin mitosis when they do not sense the neighbouring cells.
4. The dividing cells reach each other and cover the damaged cells.

## 🡺Significance of Mitosis:-

1. Mitosis is responsible for the development of the zygote into an adult.
2. Equal distribution of chromosomes to each daughter cell.
3. It is responsible for the growth and development of an individual.
4. It maintains the constant number of chromosomes in all body cells of an organism.
5. Mitosis is required for asexual reproduction, vegetative propagation in plants and also responsible for repair and regeneration of damaged tissues.
6. Mitosis helps in maintaining purity of genome as there is no recombination or crossing over takes place.
7. It is responsible for repair and regeneration of old and damaged cells in animals e.g. gut epithelium, blood cells, etc.