**Final-Term Assignment (Summer-2020) (BS-MLT)**

**Course Title: Human Genetics Instructor: Mr. Fazli Zahir Mian**

**Time: 4 Hours**

**I.D 14547**

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**Q1: Fill in the Blanks.**

1. One PCR cycle comprises of 3 steps (a)Denaturation (b)Annealing (c)Extension
2. Metabolic phaseis often called the “resting” phase but cell is not at rest.
3. The unwound form of chromosome is origin.
4. According to the 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 selection is the differential survival and reproduction of individuals due to differences in phenotype.

**Q2: Briefly explain the following**

1. Interphase
2. Check Points in Cell Division
3. DNA Synthesis Phase
4. G1, G2 and G0 Phases

**Q3: Write a detail note on mutation and types of mutation.**

**Q4: What is Medal Genetic? Discus Medal law of segregation and medal law of independent assortment.**

**Q5: Discus in derail the process of mitosis with diagrams.**

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**Q2: Briefly explain the following**

**1)Interphase**

Ans. **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 (G1), replicates its DNA (S) and prepares for mitosis (G2).

**2)Check Points in Cell Division**

Ans. Each step of the cell cycle is monitored by internal controls called **checkpoints**. There are three major **checkpoints** in the cell cycle: one near the end of G1, a second at the G2/M transition, and the third during metaphase. Positive regulator molecules allow the cell cycle to advance to the next stage.

**3)DNA Synthesis Phase**

Ans. deoxyribonucleic acid

**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 Phases**

Ans.Interphase is divided into the first growth (**G1**), Synthesis (S), and the second growth (**G2**) **phases** (figure 1). The growth **phases** are, as you may have suspected, for the growth of the cell, during the synthesis **phase** the DNA replication occurs in preparation for the second growth **phase**.

**Q3: Write a detail note on mutation and types of mutation.**

Ans. Four classes of **mutations** are (1) spontaneous **mutations** (molecular decay), (2) **mutations** due to error-prone replication bypass of naturally occurring DNA damage (also called error-prone translesion synthesis), (3) errors introduced during DNA repair, and (4) induced **mutations** caused by mutagens. 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.

**Q4: What is Medal Genetic? Discus Medal law of segregation and medal law of independent assortment.**

Ans. Here's an **example** of the **law of segregation** in action: In this imaginary lumpy species, the gene for L (more lumpy) is dominant to the gene l (less lumpy). Two heterozygous lumpies with genotype Ll (meaning they have one dominant allele and one recessive allele) mate and have children. The **Mendel Medal** is awarded to outstanding scientists who have done much by their painstaking work to advance the cause of science. Demonstrating that between true science and true religion there is no intrinsic conflict.

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.

**Q5: Discus in derail the process of mitosis with diagrams.**

Ans. The **four stages** of **mitosis** are known as prophase, metaphase, anaphase, telophase. Additionally, we'll mention three other intermediary **stages** (interphase, prometaphase, and cytokinesis) that play a role in **mitosis**. During the **four phases** of **mitosis**, nuclear division occurs in order for one cell to split into two.

**Mitosis** is a **process** of nuclear division in eukaryotic cells that occurs when a parent cell divides to produce two identical daughter cells. During cell division, **mitosis** refers specifically to the separation of the duplicated genetic material carried in the nucleus.