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**Q1: Fill in the Blanks.**

1) __**James watson**_____and __**Francis _crick**_____ discovered the double helical structure of the DNA molecule.
2) Watson and Crick were awarded Nobel Prize in ___**1962**_____.
3) ____**nucleic**_____**acid**_____store, transmit, and help express hereditary information.
4) The amino acid sequence of a polypeptide is programmed by a unit of inheritance called a_____**Gene**_____.
5) Hundreds of Y-shaped regions of replicating DNA molecules where new strands are growing called_____**reflection** _____**fork**_____.
6) **Topoisomerase**_____are enzyme which relieves stress on the DNA molecule by allowing free rotation around a single strand.
7) __**Genetic code**_____ is a dictionary that corresponds with sequence of nucleotides and sequence of amino acids.
8) **Amino acylation or charging** the process of covalently attaching an amino acid to the tRNAs.
9) **Single strand __binding__protein**___ are proteins which attach and help keep the separated strands apart.

**Q2: Write short notes on the following**

**(Q1 ) Common tools of molecular biology:**

**Answer:** nucleic acid fractionation .

- Polymer chain reaction
- Probes , hybridization
- Vector molecular cloning
- Nucleic acid enzyme
- Microarray
- DNA sequences
- Electrophoretic separation of nucleic acid
- **Detection of genes:**
- **DNA :** southern blotting, Insitu hybridization : Fish techniques
- **RNA :** Northern blotting
- **Protein :** western blotting , immuno histochemistry..

**(2) what is nucleic acid :**

**Answer 2: nucleic acid :**

Nucleic acid was first isolated by **Friedrich miescher (1868)** from pus cell

- They were name nuclein
- **Hertwig (1884)** proposed nuclein to be the carrier of hereditary traits.
- Nucleic acid store transmit. And help express hereditary information
- The amino acid sequence of a polypeptide is programmed by a unit of inheritance called a **gene**
- **Genes** are made of DNA ,a nucleic acid made of monomers called nucleotide.
- Because of their acidic nature they were named nucleonics acid and then nucleic acids ( **Altmann ,1899)**

**(3)Chargaff's rules :**

**Answer: Chargaff's rules**

- The amount of Adenine = the amount of thymine
- The amount of Guanine = the amount of cytosine
- He failed to make a connection to the structure of DNA .
- Indicates that DNA is symmetrical .

- **(A). =. (T)**

**a. (G) =. (C)**

Purines =. Pyrimidine.

**(4) what is wobble hypothesis:**

**Answer :**

- Crick(1996) proposed the ' wobble hypothesis to explain the degeneracy to the genetic code .
- Expect the for tryptophan and methionine, more then one codons direct the synthesis of one amino acid .
- There are 61codobs that synthesis Amin Acids therefore there must be 61 tRNAs each having different anticodons . But the total number of tRNAs is less than 61.

**(5) Names of main steps in Translation and Transcription:**

**Answer (5): Answer : Transcription : Transcription occurs in the three steps.**

**Steps** 1 initiation: It is the beginning step of transcription.

**Steps** 2 Elongation: it is the second step of transcription in which the addition of nucleotides to the mRNA strands.

**Steps** 3 Termination: it is the last steps of transcription.

**Translation** : Translation proceed in three steps.

**Initiation phase** : The ribosome assembles around the target mRNA .

**Elongation phase** : The tRNA transfer an amino acid to the tRNA corresponding to the next codon.

**Termination phase**: When a peltidyl tRNA encounters a stop codon, then the ribosome folds the polypeptide the structure .

## (Q3) Explain the process of DNA replication ?

**DNA : DNA is the essential molecule for life .it acts like a recipe holding the instructions telling** our bodies how to develop and function.

DNA Replication :DNA replication is the process by which DNA makes a copy of itself during the cell division.

The DNA molecule separates into two strands, and then produces two new complementary strands

following rules of base pairing. Each strands of the double helix of DNA serves as template or

models, for the new strands

**DNA replication key players :**

**Helicase**

**DNA polymerase**

**Primes**

**Ligase .**

**DNA polymerase** : are the family of enzyme that carry out all forms of DNA replication.

**Steps of DNA replication** :

➢ The first step in DNA replication is to unzip the double helix structure of the DNA molecule.

➢ This is carried out by an enzyme called helicase. Which breaks the hydrogen bonds holding the complementary bases of DNA together.

➢ The separation of the two single strands of DNA creates a (Y) shaped called a replication form.

➢ The two separate strands will acts as templates for making the new strands of DNA.

➢ One of the strands is oriented in the 3,to 5,direction, this is the leading strands.

➢ Other strands is oriented in the 5, to 3 direction .this is logging /lagging strands .

➢ As a results of their different orientation, the two strands are replicated differently.

➢ Once all of the bases are matched up enzyme call exonuclease strips away the primer (s).

➢ The gaps where the primer were are then filled by yet more complementary nucleotide.

➢ The now strands is proofread to make sure there are no mistakes in the new DNA sequences.

➢ Finally, an enzyme called ligase seals up the sequence of DNA into two continues double strands.

➢ The results of DNA replication is two molecule consisting of one new and one old chain Of nucleotide .

****** ***End*** ****